TOWARDS A POLITICAL ECONOMY OF URBAN

COMMUNICATION TECHNOLOGIES

by

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DISSERTATION ABSTRACT

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By the year 2050, about three quarters of the world's population will live in cities. Most cities are developed by state or federal governments; however, some cities are developed for the purpose of private interests that plan the city. While the concept of private companies planning and sometimes even owning cities is not a new development, there seems to currently be a rise in this trend, with communication corporations such as IBM, Google, Intel, and Cisco now taking advantage of this growing market.

Known as "smart" or "wired" cities, this new privatized way of planning communities allows major communication corporations to play an important role in shaping the future of our communities. Google, IBM, and Intel are all playing a role in planning the future of Portland, Oregon. By analyzing documents such as planning ordinances, financial reports, and government transcripts, as well as conducting interviews with city planners and corporate employees, this study found that many of the "smart" city efforts being undertaken by these communication corporations are intimately tied to their efforts to bring the Internet of Things (IoT) to fruition. Ultimately, the main goal of these efforts is to utilize urban communication technologies (UCTs) to gather data about community members by tracking their activities. In this emerging personal data economy, identities are the main commodity being fetishized.

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Ostrove, G. (2014). The political economy of financially successful independent hip hop artists. *Class, Race, and Corporate Power,* 2, Article 3.

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Ostrove, G. (2013). Adorno, Auschwitz, and the new categorical imperative. *Perspectives on Global Development & Technology,* 12, 298-309.

Ostrove, G. (2012). Hip hop's holy GURU: Evidence of Spirituality in Keith Elam's Rhetoric. *Spirituality: Theory, Praxis and Pedagogy*, 293-303.

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CHAPTER I

INTRODUCTION

<u>Towards a Political Economy of Urban Communication Technologies (UCTs)</u>

On March 30, 2011, Kansas City, Kansas was selected from over 1,100 applicants to be the first Google Fiber community (Medin, 2011). This new Internet service provides residents with three options. There's a free broadband Internet option (which only includes a construction fee), an Internet only option, and an option including both Internet and television services (Google Support, 2015). However, the Internet services that Google is attempting to provide to communities do not begin to tell the important story of why this phenomenon is crucial for us to understand.

What is of major significance here is that Google is attempting to build the actual infrastructure that their Internet services would utilize in order to operate. In order for Google's fiber Internet services to run properly, the company needs to install utility cabinets in the public right of way along city streets. These cabinets, which are 2x2x4-feet each, are placed around the city in order to create an ultra-high-speed, fiber-optic network that brings faster Internet connections to local homes. Google says the cabinets divide its fiber into small bundles that run to the individual homes they serve (Rogoway, 2014).

While Google has already successfully installed their fiber Internet infrastructure in Kansas City (both in Kansas and Missouri now), Austin, and Provo, the company recently announced that it plans to extend their services to 34 more urban centers (Medin, 2014). One of those locations that have been identified by Google is Portland, Oregon. In

fact, the Portland City Council is currently working on an ordinance that would allow Google to construct 200 utility cabinets along city streets (Rogoway, 2014).

The fact that the City of Portland would be willing to change the language in their city planning ordinances to allow Google better access to consumers is of major significance. It shows a concerted effort by the City of Portland to work with Google to help with community planning efforts. According to Google, these efforts have paid off significantly for the communities who have installed and embraced this new infrastructure.

According to Google, they have made a significant impact on the lives of community members who have been given the opportunity to utilize their Internet infrastructure. Google even promotes a number of philanthropic associated with their particular fiber product. For example, Google has been working with local partners across Fiber cities to get more families in public housing online with Gigabit Internet for $0/month. Residents at Kansas City's West Bluff public housing community recently became the first in the country to activate this service.

The Housing Authority of the City of Austin (HACA) serves 4,300 Austin residents through public housing. In partnership with their initiative, Unlocking the Connection, each HACA resident will be able to connect to the internet at home for free via Google Fiber. Also, the ConnectHome program, a partnership between the U.S. Department of Housing and Urban Development (HUD) and Google Fiber, is working to bring $0/month Gigabit Internet connectivity to more children and families living in HUD-assisted housing.

The City of Portland has already developed a reputation for being a city that is looking to collaborate with major communication corporations in order to promote efficient use of the city's space and resources. In fact, Josh Alpert, the Mayor of Portland's Director of Strategic Initiatives, led a team of Portland city staff in an effort to apply to be the first ever Google Fiber community. According to Josh, he was stunned to hear that Kansas City was selected instead of Portland (Interview, 2015). However, as is discussed in great detail throughout this dissertation, there were some very specific reasons why Google chose Kansas City instead of Portland and how Google selects each new Google Fiber community.

Portland, a city known for "keeping it weird" is now grappling with the question of figuring out to what extent it wants to be "smart." A city once known for its food carts, coffee, and breweries, Portland is now becoming a hot bed for the tech industry. Therefore, Portland has already participated in a number of efforts to connect with communication corporations.

In late 2009, before Google introduced their first fiber internet infrastructure to Kansas City, the City of Portland was approached by IBM to see if the community was interested in testing IBM's new System Dynamics for Smarter Cities model, which was designed to help mayors and other municipal officials reduce the unintended negative consequences of municipal actions on citizens, as well as uncover hidden beneficial relationships between municipal policies (Hannon, 2011).

IBM was attracted to Portland's reputation for pioneering efforts in long-range urban planning. Therefore, IBM's model would be used to support the development of metrics for the Portland Plan, the city's roadmap for the next 25 years. To kick off the

project, in April of 2010 IBM facilitated sessions with over 75 Portland-area subject matter experts in a wide variety of fields to learn about ways that Portland's planning processes could be more efficient. Later, with help from researchers at Portland State University and systems software company Forio Business Simulations, the city and IBM collected approximately 10 years of historical data from across the city to support the model. The year-long project resulted in a computer model of Portland as an interconnected system that provides planners at the Portland Bureau of Planning and Sustainability with an interactive visual model that allows them to navigate and test changes in the city's systems (Hannon, 2011).

"By overcoming silos in the way we think, we are able to better visualize how our city systems work together and develop policies that achieve multiple objectives to help realize the full potential of our city," said Sam Adams, former Mayor of Portland. "By collaborating with IBM and applying the power of innovation, we have created an exploratory model that arms our city leaders with ways to explore decisions. In turn, that can help us become a Smarter City" (quoted in Hannon, 2011).

According to Michael Littlejohn, Vice President of Strategy for Smarter Cities at IBM, "The City of Portland serves as a living laboratory to explore how complex city systems behave over time. While other analytical approaches rely on breaking a problem down into smaller and smaller pieces, the model we've created recognizes that the behavior of a system as a whole can be different from what might be anticipated by looking at its parts. Using this model, the City of Portland can experiment with different scenarios to see how their decisions might affect various parts of the city over the next 25 years" (quoted in Hannon, 2011).

As an example of how the model could be used in practice, recently the City of Portland laid out plans to achieve a 40 percent reduction in carbon emissions by 2030, and an 80 percent reduction by 2050. The City already knew that shifting some trips away from driving to active forms of transportation, such as walking and biking, would be a part of how Portland meets its goals. However, when the IBM model was used to explore other relationships to active transportation, it revealed an interesting connection. "The model reflects that, on average, obesity levels decline as more people walk and bike. Similarly, if obesity levels go down, active transportation becomes a more attractive option to more people. Essentially the tool highlighted a reinforcing feedback loop that could be used to jump start a continued cycle of improvement. Since shifting to walking and biking reduces driving trips, the obesity/active transport loop could be a self-reinforcing policy lever to address carbon goals" (Hannon, 2011).

Portland's vision for the year 2050 is important because by that time it's estimated that about three quarters of the world's population will live in cities. Therefore, it is vital that we understand who controls the resources that our communities rely on to operate and how those processes are being planned and managed. What impact does IBM's influence over the Portland Plan have on the community's residents? How does it impact their ability to play a role in the city's planning processes?

Michael Armstrong, the Senior Sustainability Manager for the Portland Bureau Planning & Sustainability, played a major part in the effort to engage with IBM. In his view, though, IBM's promises never really panned out. Instead, the effort simply cost the City of Portland time and resources as a result of needing to use City staff and elected officials.

According to Michael, the main conflicts between IBM and the City of Portland arose because of inconsistencies in how each side viewed the other. For example, when IBM contacted Michael via email in late 2009 about being a part of this effort, he was already initially hesitant to participate. He was worried about whether the costs of using the City of Portland's staff and resources would really pay off if they participated in this program.

IBM reached out to Michael because they identified Portland as a community that could really work well with the IBM Smart City Challenge. According to Michael, this had a lot to with the structure of Portland's government. The City of Portland is made up of 27 bureaus, ranging from things like police and fire departments to community planning and environmental service agencies. The City Council consists of four elected City Commissioners, who are all elected at-large. This means that the City Commissioners do not represent a specific region or district of the city; they are voted into office by the entire city. The Mayor of Portland is also elected at-large by the entire city.

When the City Council makes decisions, all five members' (four Commissioners + one Mayor) votes are of equal value. The Mayor's vote is of no more importance than any of the Commissioners. The most important power that the Mayor does have is to decide who will run each of Portland's Bureaus. You see, all of Portland's 27 Bureaus are headed by either the Mayor or a City Commissioner. This government structure produces some interesting results.

For example, City Commissioners do not run for office based on the idea that they will focus on one specific aspect of city government. Instead, Commissioners run a

generic election campaign and don't receive their actual assignment until voted into office. Many times, the Mayor chooses Bureau leaders based on personal strengths, but this isn't always the case. Political relationships play a major role in deciding who runs each Bureau.

Currently, Portland's leadership structure looks like this: Commissioner Nick Fish serves as Commissioner-in-Charge of the Portland Water Bureau and the Bureau of Environmental Services, and as Council liaison to Elders in Action, Age-Friendly Cities, the Regional Arts and Culture Council (RACC), Venture Portland, and the Governor's Regional Solutions Advisory Committee. Commissioner Amanda Fritz is assigned to Portland Parks & Recreation and the Bureau of Development Services (BDS). Commissioner Dan Saltzman currently manages the Portland Housing Bureau, Portland Fire & Rescue, the Gateway Center for Domestic Violence Services, and the Portland Children's Levy. Commissioner Steve Novick was given responsibility for the Portland Transportation Bureau and the bureaus of Emergency Management and Emergency Communications. Finally, the Mayor currently runs the rest of the bureaus.

The structure of Portland's government makes it increasingly attractive to companies that want to be involved in the community's planning processes. Because Portland's unique government structure has just one Commissioner running each of the city's bureaus, companies such as Google realize that they only need to build a relationship with one government representative in order to possibly impact an entire bureau. For example, if IBM wants to collaborate on a project with Portland's Bureau of Planning & Sustainability, they only need to build a relationship with one Commissioner, as opposed to having to deal with an entire City Council.

IBM, however, is not the only major communication company to play a major role in shaping the Portland Plan. In the fall of 2012, Herman D'Hooge, Senior Principal Engineer and Innovation Strategist at Intel, taught a course in the University of Oregon's School of Architecture that he described as a "Smart Cities Workshop." As D'Hooge explains, the focus of the course "was to explore the space of possibility created by the adoption of information and communications technology (ICT) in the urban environment" (quoted in Poole, 2013).

D'Hooge grew up in the small village of Lennik, Belgium, a place, he notes is known for a charmingly non-technological connection to draft horses. The landscape of Lennik might have launched an early appreciation for the nature of a village or the possibility of a city within the peacefulness of an environment; whatever the impetus was, Herman D'Hooge's path led him to an academic background steeped in technology innovation, the accelerated world of information systems, and the concept of "smart" cities (Poole, 2013).

With graduate degrees in electrical engineering and computer science, D'Hooge arrived at Intel in 1979 as part of an exchange program between Intel and ITT Bell Telephone from Antwerp. For his exchange assignment, he worked on the development of the operating system of Intel's newest microprocessor. The knowledge gained from this project would be invaluable in designing ITT's first generation of computer-controlled telephone switching systems after his return. As D'Hooge became increasingly immersed in the Intel project, he also became increasingly fascinated with leading-edge microcomputer development. In fact, he never returned to his job at ITT

Bell Telephone. Instead, in 1981 he joined Intel as a full-time employee and worked his

up the corporate ladder (Poole, 2013).

In the mid-1990s, D'Hooge's interests shifted from technology invention and

development to thinking more about what it is that people want from an experience with

their computers. It was during this period when Intel started experimenting with

ethnographic methods to gain insights into consumers' habits. It became clear that

computing would also provide value to people when delivered in forms other than

computers.

According to Poole (2013), one such opportunity occurred in 1998 when

D'Hooge co-founded a joint project with toy giant Mattel:

> Mattel was perhaps best known for Barbies and Hot Wheels. The venture opened
> in Portland's Pearl district and set out to develop a line of PC-connected toys that
> enabled ways of playing enabling kids to discover, explore and create in ways
> connecting them to technology. The venture ran for about three years and created
> and marketed toys such as Intel Play QX3 computer microscope among several
> others. When the internet bubble was about to burst in 2001, the toy venture was
> closed and the business assets sold to a small toy company in Atlanta (which to
> this date still sells computer microscopes). D'Hooge and most of his teammates
> flowed back into mainstream Intel (p.1).

In 2010, D'Hooge joined Intel's Eco-Technology Program Office, where he and

the team explored the use of Information and Communication Technologies (ICTs) for

improving environmental sustainability. The approach was based on the simple idea that

the adoption and use of ICTs in industries such as buildings, construction, transportation,

agriculture, energy, and water would enable those industries to gain better insights into

what goes in their systems which would, in turn, lead to better decisions and ultimately a

smarter use of resources such as energy and materials, a reduction in cost, and a smaller

environmental footprint. One environment where many of these systems all come

together and interact which each other creating additional opportunities for innovation is within a city. This initially sparked D'Hooge's interest in looking at the city as the unit of analysis (Poole, 2013).

Getting ready to start a sabbatical in 2012, D'Hooge asked to spend his sabbatical teaching at the University of Oregon exploring his interest in integrating technologies, sustainability, and product design. He hoped to also delve deeper into the "smart" cities concept. D'Hooge, a self-proclaimed open-source diplomat, realized the possibility of teaming up with University of Oregon students could bring fresh pairs of eyes to these concepts with particular insights and connectivity to a city they lived in and cared about (Poole, 2013).

The final deliverable from the course was a document that D'Hooge called the "Smarter" Portland Plan. In essence, this planning document examined the goals laid out in the city's original plan and highlighted areas where Intel products could be utilized to help satisfy that goal. Therefore, it's beneficial for both the company and the city to share this relationship because, while the city gets the perspective of topnotch innovators, the company gets to advertise its products.

Some have argued that allowing these companies to invest in the building and operating of our communities is a good thing that could potentially lead to more efficient use of our space and resources; however, others wonder whether this sort of relationship results in residents being viewed more as commodities than as citizens. They warn us to watch out for the negative impacts of what they call the "urban growth machine" (Rodgers, 2009). In short, they are critical of the privatization of city planning processes.

Studying the Privatization of Portland's Planning Processes

Using Portland as a case study, the purpose of this project is to explore what it means to allow private interests to play a major role in a community's planning process. Specifically, this study analyzes the growing trend of communication corporations, such as Google, IBM, and Intel, playing an increasing role in these processes. By understanding the historical development of other forms of communication technologies, such as the telegraph, telephone, radio, and television, and how they impacted the design of urban environments, this project looks at how these new forms of urban communication technologies (UCTs) introduced by Google, IBM, and Intel affect the everyday lived experience of Portland residents.

The notion of Information and Communication Technologies (ICTs) has been studied extensively; however, there has not been much of a particular focus on the subset of ICTs that are meant specifically for urban infrastructure. Therefore, a main goal of this project is to introduce the UCT concept in order to establish a base for a critical discussion amongst scholars, community members, politicians, and policymakers about the political economic system that produces UCTs and the forces that gain power from their implementation.

This project included an extensive examination of Portland's planning documents in order to understand the processes that these private interests are influencing. This included examining the City of Portland's Master Plan, Transportation Plan, Utility Protection Plan, and many others. The purpose of this activity was to understand Portland's vision for how the community was expected to grow in the coming years and to analyze to what degree the City was reaching their development goals.

It also included many interviews with people from both the private and public sectors in an attempt to highlight the ways in which the rise of "smart" cities impacts the jobs of city planners and policymakers. This included interviews with City of Portland Bureau staff, State of Oregon employees, elected officials, and employees from Google, IBM, Intel, Cisco, and other communication corporations. The goal of these interviews was to gain a better sense of how people working on "smart" city projects viewed these efforts.

The researcher also visited a number of communities in order to observe and understand how they functioned. Some of these cities were part of the IBM Smarter Cities Challenge (Atlanta, Los Angeles, San Francisco), some were part of the Google Fiber program (Austin, TX), some were unique master-planned communities (Celebration, FL), and others were simply interesting communities that helped with comparison and analysis in order to understand the similarities and differences between these "smart" city efforts.

Finally, this study also utilized surveys in order to analyze how Portland residents are reacting to the privatization of their city's planning processes. Two surveys were available: one for Portland residents and one for everyone else. The goal of these surveys was to inform community members of these "smart" city efforts and gage their awareness of this trend.

This study is especially important because of its focus on how communication corporations are influencing the planning and design of cities. Other studies have looked at how private interests play a role in creating public space and planning urban environments; however, there has not been enough attention specifically on UCTs. The

increasing role of UCTs in the city planning process is an important topic for both communication and planning scholars, and this issue has not been studied extensively by either discipline.

This study shows the importance of combining the disciplines of communication theory and community planning. The dominant political economic system plays a major role in engaging with both of these areas of study, and both approaches put a special emphasis on the notion of praxis- combining theory and action to bring about revolutionary change. This study shows how praxis can be enacted in an increasingly digital world.

As more and more of our actions are tracked and gathered by communication corporations who want to sell data about our everyday habits to advertisers and security companies, our physical environment will be developed in a way that eliminates perceived inefficiencies. This standardization of experience will impact our personal identities.

The purpose of introducing the UCT concept is to help highlight the similarities and differences between products currently being introduced with the motivation of impacting city planning processes. Google, IBM, Cisco, and Intel all create many products; however, most are not meant to directly influence the planning and design of urban communities. UCTs are the products that these companies create in their attempt to profit from the city planning process. The goal of this project was to understand to what extend these UCTs influence the ability of community residents to democratically engage with local planning and policy processes.

The twenty-first century has been called the "urban century" (UN-Habitat, 2008). After two centuries of urbanization spreading around the world, the majority of the global population currently lives in urban areas, and urban centers will continue to grow. In fact, three-quarters of the world will live in urban centers by 2050. Therefore, cities will continue to play a dominant role in global consumption, production, and pollution (Sukhdev, 2009).

Cities are often associated with social and economic problems such as poverty and segregation, tensions between different groups, and economic vulnerability, as well as ecological problems related to pollution, resource use, congestion and spatial competition (Legner and Lilja, 2010). They are also associated with economic and cultural wealth, and dynamic developments within cities can provide opportunities for technological and social innovation (Sukhdev, 2009).

According to Boulos & Alshorbaji (2014), "With the emergence of the 'information society', the smart cities concept started to become a reality, as more cities of the world in general and in Europe in particular realized that to become healthier they have to go digital. 'Digital economy', 'information economy' and 'knowledge society' all began to be recognized as integral concepts and components of city planning and sustainable development. Smart cities share common characteristics as they move from focusing their investment on traditional, physical infrastructure to more emphasis on digital infrastructure, including information and communications technology (ICT) to support the knowledge economy."

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What Boulos & Alshorbaji (2014) call the knowledge economy refers to the reality that exists when data about individuals' habits and rituals become a fetishized base of exchange. As more municipalities are convinced by powerful communication corporations to engage with this "smart" city trend, technological implementation becomes a major factor in how communities make decisions about how they will be planned and designed.

Community members and policymakers need to think about the impacts this trend has to our lived experience of reality. While increased efficiency is certainly a positive thing in certain aspects of our lives, do we want every decision about who we are and what we do to be based on data gathered about our previous actions? More importantly, do we want that data gathered in the first place and who do we want to possess our personal data?

Therefore, studying "smart" cities is vital for critical communication scholars who study issues concerning power and control. Similar to how powerful communication corporations have come to dominate the digital commons, these same companies are currently making a push to dominate the processes for designing the physical infrastructure of our communities. It is the responsibility of critical researchers to analyze this trend and its social and cultural impacts on society.

The next section of this paper presents the research questions that helped to guide this study. It will also give details about the importance of each question and the contributions it could make to our understanding of how UCTs impact local planning processes.

1. How are major communication corporations influencing Portland's planning processes?
2. What are the major communication companies that are involved in Portland's planning processes?
3. What are the implications of major communication corporations becoming an integral part of Portland's planning processes?

These questions are all vitally important in order to understand what happens when we allow major communication corporations to play an increasing role in the planning and design of our communities. To begin with, we need to understand what UCTs are and how they differ from other products introduced by major communication corporations. It is also important to analyze other communities where UCTs have already impacted local planning processes. This study looks at how these urban planning processes have traditionally been managed and whether UCTs impact specific planning processes (such as water quality efforts, public transportation implementation, air quality control, public utility services, infrastructure development, etc.) more than others.

Next, it is important to know which specific communication corporations are involved in Portland's planning processes. It is important to understand their motivation for entering this new market and understand these efforts heading into the future. It's also crucial to understand the specific UCTs that these companies are introducing and how they are different from one another.

Google has started to supply cities with their own fiber Internet infrastructure; they have already started development in three metro areas and have plans for nine more very soon (including Portland). IBM's Smarter Cities Challenge asks cities to apply to IBM with community planning projects that tackle a diverse array of issues, including protecting drinking water supplies, tackling food deserts, and reducing traffic congestion.

To date, they have served over 100 cities with this program. On top of that, companies such as Cisco and Disney have helped to design and build cities from the ground up. Cisco designed South Korea's Songdo International Business District, while Disney designed, built, and owned Celebration, Florida.

This study looked at how UCTs impact both the lives of local residents and the jobs of local planners and policymakers. It looked at whether UCTs allow planners and policymakers to utilize their time more efficiently and whether UCTs impact the ability of residents to democratically engage with local planning processes. This project also examined whether a city is perceived to be branded as a result of having a close relationship with private interests.

This dissertation starts with an overview of the historical context of this issue, followed by a review of the pertinent theories and pieces of literature that will inform this project. Then, there is a description of the methods used to conduct this study. Finally, the findings and conclusions developed from the research are revealed, as well as the significance and limitations of this project.

CHAPTER II

FROM COMPANY TOWNS TO "SMART" CITIES:
THE PRIVATIZATION OF THE COMMUNITY PLANNING PROCESS

In order to begin to answer these three research questions, we must first explore the history of how new forms of communication technology have impacted the planning and design of communities. This section presents an outline of how private interests have historically impacted urban planning processes. By starting with an examination of company towns, we can begin to think about the ways in which private interests have historically shaped our experience of reality by shaping the physical environment we live in.

Then, we look at how company towns eventually evolved into communities controlled by private interests that weren't necessarily interested in housing employees close to work; instead, private interests began to see community planning as a profitable market in itself. Thus, we end up with the rise of "smart" or "wired" cities – communities touted as being livable, sustainable, and efficient because of the introduction of new forms of technology.

When we look at the introduction of UCTs relative to the introduction of other communication technologies, a lot of similarities begin to surface. Analyzing this trend historically and comparing it to similar eras of history helps to contextualize this study and provides more depth to the data by providing a greater understanding of how society reacts to technological innovations.

The next section highlights the origin and evolution of company towns-communities built for the purpose of a private financial interest.

<u>The History and Evolution of Company Towns</u>

This section outlines why company towns emerged and how they evolved over time. At the core of this conversation is the question of what makes up a healthy community. As the quote below reveals, the communities we build can be seen as physical manifestations of our society's moral and values:

> The city has emerged in recent years as an indispensable concept for many of the struggles for social justice we are all engaged in—it's a place where theory meets practice, where the neighborhood organizes against global capitalism, where unequal divisions based on race and class can be mapped out block by block and contested, where the micropolitics of gender and sexual orientation are subject to metropolitan rearticulation, where every corner is a potential site of resistance and every vacant lot a commons to be reclaimed, and, most importantly, a place where all our diverse struggles and strategies have a chance of coming together into something greater.
>
> (Call for Participation, Civic Committee of the Commercial Club of Chicago, 2009, p.1)

Traditionally, the company town, a settlement completely owned, built, and operated by a single business interest, has been used as a temporary pioneering device, especially suited to the conditions of nations undergoing rapid economic development. As Porteous (1970) explains, "Coming into existence by default, the company town throve after the late eighteenth century in western Europe and areas of white colonial settlement, and, to a lesser extent, in their political and economic colonies. In general, extractive company towns have been the product of economic pioneering" (p. 127).

The Europeans who colonized North America were from the beginning urban-minded people, "linked to commercial markets. Even the earliest explorers in New England had viewed the 'new' land in terms of the commodities it yielded or promised to yield" (Chudacoff, 1988, p.1). Thus, they created cities, places where they could

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accumulate and disseminate goods and information. Many times, companies subsidized the development of these communities.

Company towns continued to flourish throughout the 19th century as American colonists moved west across the continent. In the 20th century, company towns became an important element of inter-American relations and reinforced their neocolonial character. The United States and Latin America shared a history of colonial rule and of struggles for independence from European powers in the 18th century. Their historical trajectories diverged, however, in the 19th century, with the United States becoming an industrial power while Latin American industry fell behind (Dinius & Vergara, 2011, p. 5).

According to Dinius and Vergara (2011):

By the 1920s, most of Latin America (with Argentina as a notable exception) saw more foreign investment in manufacturing, mining, and export agriculture from the United States than from any other country. U.S. capital financed company towns in Latin America that became places of cultural encounter as managers transferred their urban visions and social ideologies from the North to the South. In Venezuela in the 1920s, oil companies built camps for their employees to remove them from the gambling and prostitution that characterized life in existing towns and to foster a stable community (p.5).

Even earlier in the 19th century, The Panama Canal Company provided its workers with housing and basic urban services, and it explicitly conceived that its company town in the Canal Zone would serve as a mechanism to "civilize" the land and the local population. Company towns continued to be an integral part of the advance of industrial capitalism throughout the 20th century. The transformation experienced by the United States during and after the New Deal and World War II created the conditions for the creation of federally owned company towns such as Sunflower Village in Kansas,

Norris in Tennessee, and Boulder City in Nevada. In 1953, the Magma Copper Company

built San Manuel in Arizona, and Anaconda opened a new mine and town in Yerington,

Nevada. Even in Canada, company towns were beginning to become popular, with The

Iron Ore Company of Canada building Schefferville in northern Quebec (Dinius &

Vergara, 2011, p. 4).

Beginning in the mid-20th century, under a policy known as "import substituting

industrialization," Latin American states promoted and often subsidized the establishment

of heavy industrial complexes, and company towns became an integral part of this new

industrialization effort. They also began to invest in larger cities that already existed.

Some companies built worker housing, and even entire neighborhoods, in cities such as

Sao Paulo (Brazil), Medellin (Colombia), and Santiago (Chile). In Berisso, Argentina,

meatpacking companies dominated the economic life of the city, so they provided urban

services for its residents and employees (Dinius & Veraga, 2001, p. 4).

However, these company towns were not usually great places to live because the

residents were viewed more as commodities than citizens. In Santa Paula, California, the

Limoneira Company designed the town so that their citrus pickers would be racially

segregated (McBane, 2011). The town of Fayette, Michigan, constructed and owned by

Jackson Iron Company, had an outbreak of parasitic infections because of health issues

(Faulker, 2000). The lack of livability within these communities has always been a strong

argument for not allowing major corporations to be involved in the planning of our

communities.

However, Scotia, California, a small town in Humboldt County serves as one of

the last examples of a well-functioning company town. Developed in the 1880s by the

Pacific Lumber Co., which needed housing for its loggers and mill workers, this Northern California town was named for the Nova Scotian lumberjacks who were among its early residents. From the 1890s to the 1980s, Pacific Lumber Co. was owned by a family with a paternalistic view toward its employees and Scotia earned a reputation as a desirable place to live. Pacific Lumber maintained all of the town's housing, which was rented to company employees at affordable rates, and even gave residents presents at Christmas. Generations of workers raised their families in Scotia; however, in the mid-1980s, Pacific Lumber's longtime owners sold the business, and in 2007 the new owners filed for bankruptcy (Nix, 2014).

Scotia, then comprised of some 270 homes, several churches, a hotel and a handful of other commercial buildings, became the property of a New York hedge fund, Marathon Asset Management. In 2011, the 800 residents were asked whether Scotia should be put up for sale or become a self-governing town, and the community voted for independence. Tenants received the opportunity to buy their homes, and in 2014, Scotia's first elected officials were sworn in.

For this study, the focus is on moving beyond the company town framework to uncover contemporary trends regarding the privatization of city planning processes. While the company town framework is appropriate for beginning a conversation about the privatization of community planning processes because of the subtle similarities, it isn't necessarily appropriate for discussing how private interests impact cities today. Specifically, the focus of this study is on new ways that private interests are playing a role in planning and designing communities. The next section discusses some of those strategies (Nix, 2014).

<u>Moving Beyond the Company Town</u>

The mid-20th century marks a big change in the way in which company towns were utilized and designed. Until this time, most American company towns were industrial landscapes that were built based on expediency and pragmatism for the owners and "their patterns mirrored the demands of industrial processes" (Crawford, 1988, p. 49). In the mid-20th century, however, professional designers, such as architects, planners, and landscape architects, took over the task of designing company towns. Now, carefully constructed landscapes could act as a form of social engineering:

> …synthesizing architecture, landscape, and planning into coherent images that embodied illusions of social unity and coherence during periods of dramatic social and economic change… These new company towns constitute an important chapter in a continuing American design tradition of fantasy environments" (Crawford, 1988, p. 49).

In the late 20th century, we begin to see a whole new sort of company town develop. Realizing that the mass majority of the world will be living in cities in the very near future, urban development is now seen by major corporations as a growing market that has the potential to yield high profits. In response, communication corporations such as Disney, IBM, Philips, Siemens, and Cisco are now taking advantage of this growing market.

Lipman (2011) attributes this trend to a perpetuation of neoliberal policies and ideals. She says, "Neoliberal policies that facilitated perhaps the greatest concentration of wealth in the fewest hands in history have reshaped urban areas" (p. 22). This contention is supported by other planning scholars, such as Peck, Brenner, and Theodore (2008), who say:

[C]ities (including their suburban peripheries) have become increasingly important geographical targets and institutional laboratories for a variety of neoliberal policy experiments, from place-marketing and local boosterism, enterprise zones, tax abatements, urban development corporations, and public–private partnerships to workfare policies, property redevelopment schemes, new strategies of social control, policing and surveillance and a host of other institutional modifications within the local state apparatus. The overarching goal of such experiments is to mobilize city space as an arena both for market-oriented economic growth and for elite consumption practices (p.22).

One example is Celebration, Florida. Built by Disney in the mid-1990s, Celebration is an example of both New Urbanism as well as Disney's utilization of synergy to market its products across a variety of media markets. New Urbanism is a planning theory that advocates design based on small-town examples of yore. Yet, many of the movement's most prominent examples are in *suburban* settings. Therefore, many of the results of New Urbanism simply perpetuate the status quo. Celebration is not anomalous in this regard (Bartling, 2004). This is important since post- World War II suburbia has often been analyzed for its utopian characteristics (Ewen, 1988; Fishman, 1987).

Ross (1999) describes the history and development of Celebration, Florida. Celebration is a city completely designed, built, and operated by the Walt Disney Company. The book chronicles a year he spent living in the city from September 1997 to August 1998. It provides key insights regarding the lived experience of the residents, as well as an analysis of what this type of development means to our society in terms of urban development trends. A major component of Ross's analysis has to do with critiquing the concept of New Urbanism. To put it simply:

Zoning and the regulation of land use determine what level of citizenship homeowner will enjoy. In the geography of suburbia, the status of residents tends to increase with the distance between home and work, as well as the distance from lower priced homes. In New Urbanist geography, the reverse is true; your status

increases with proximity to work and to other homes corresponding to different income levels. But mixed-income and high-density housing in places like Celebration are still enormous risks to the ironclad patterns of predictability that command the housing industry and realty market. How easy it is to backslide. It took only a year or so in Celebration for the Phase Two lot plan for the North Village to revert to some elements of the conventional suburban pattern. Because New Urbanism marches to a different beat, the golden egg of resale value – predictability- is not guaranteed. Consequently, professional management must be as tight as a drum (Ross, p. 306).

Ross points out this type of strict, controlling professional management has dramatic impacts on the lived experience of the residents of Celebration. Instead of being treated like a resident or citizen, you get treated like a customer. This is the result of a community justifying its decisions based on the success of a private corporation and not the holistic success of a government or society.

One of the major negative repercussions of looking at residents as customers is that different types of customers have different levels of value from a company's perspective. For example, Celebration was definitely looking for a very specific type of resident or customer to live in Celebration. They wanted residents that would over-consume; therefore, upper class populations were targeted. Yet, that doesn't mean that Disney doesn't seen value in everyone.

The only problem is that one's value according to Disney might simply be as a worker. As Ross puts it:

> Farther along route 192, Disney was drawing a different kind of migrant to Osceola County. Workers from Central America and the Caribbean were arriving to fill minimum-wage jobs at theme parks. The same day that families from the suburbs of Detroit and Miami were banking on Disney's gilt-edged name in the Celebration drawing, families from San Juan and Guadalajara with the promise of a thin Disney pay slip in hand were combing the apartment complexes just off the Kissimmee strip for affordable shelter. The company had at least two hands at work on this land, ushering people hither and thither, and the left one did not always care to know what the right one was up to (Ross, p. 19).

While the most dominant example of Disney impacting a community is Celebration, Florida, the company has also greatly affected the development of Anaheim, California. In the mid-1990s, the Disney Corporation decided that it was time to redevelop Disneyland and make it feel more similar to a resort like Disney World, which is located in Orlando, Florida. In order to do this, however, the Disney Corporation felt that it was also vitally important to help redevelop the City of Anaheim's popularity. Disney's strategies for doing this involved investing in a number of ventures within the City of Anaheim.

In an effort to promote Disneyland, Disney invested in a number of ventures in the Anaheim area, including the ownership of two professional sports franchises – the Anaheim Angels (baseball) and the Mighty Ducks of Anaheim (hockey). In fact, in 2004, just as Disney was selling the Ducks and Angels, Walt Disney Resort employed 21,750 people, which represented 24 percent of total city employment. Apart from Walt Disney Resort as the number one employer, Angels Baseball LP was Anaheim's fourth largest principal employer in 2004. Currently, Walt Disney Resort employs 23,512 people, 14 percent of Anaheim's total employment (*2014 City of Anaheim Annual Report*, 2014: 135).

Therefore, on top of dominating the non-work time of residents and visitors of Anaheim, Disney actually dominates residents' work time also. In that sense, Anaheim is the ultimate physical manifestation of the audience commodity. In 2004, almost a quarter of Anaheim's residents worked for a company that was investing in other city ventures that were meant to ultimately generate more profits for the place they worked - Disneyland.

Disney's attempt to redevelop Disneyland's identity depended upon the extent to which consumers fetishized Anaheim, California. That is why Eisner said that having "a professional hockey team and programs related to it was good for Anaheim, and therefore also good for Disneyland" (cited in Gentile, 2002: 1). City of Anaheim's entire identity is built on the idea of leisure. Disney realized that Disneyland would profit tremendously if Anaheim was fetishized as a vacation destination. Therefore, they invested in other leisure time activities throughout the region in order to promote corporate identity and Anaheim's reputation, simultaneously.

The late 20th century also represented the era of gated and master-planned communities. As urban centers continued to sprawl, private interests began to view the suburbs as a potentially lucrative housing market. This led to the rise of communities completely owned, built, and operated by private interests who had no connection to the residents who lived in the homes they developed and controlled.

While these communities were touted as being "livable' and "convenient," the efficiency these communities offer were often over-shadowed by the noticeable lack of choice and agency to move freely within these communities. In these communities, economic efficiency is valued above all else, including environmental and social implications of certain decisions.

In the early 21st century, we are now beginning to see a whole new urban planning market emerge. Known as "smart" or "wired" cities, these cities promote utilizing new forms of technology in order to create cities that are more efficient than cities of the past. In the next section, we explore the origin and evolution of these wired cities and the companies involved in this new trend.

The History and Evolution of "Smart" Cities

In 2011, the consulting firm ABI Research published a report on the fast expanding market of smart city projects. By 2016, ABI predicts that 116 billion dollars will be invested in wireless networks, digital governing, intelligent public transport systems and waste recycling devices (*Paris Tech,* 2012). As they put it, "Many municipalities around the world are exploring the Smart City concept as a way to make themselves better places to live, work, and grow. The market for technologies that feed into and support Smart City programs and projects will grow on a global basis from $8 billion in 2010 to exceed $39 billion in 2016, accounting for $116 billion in cumulative spending during that period. How will all that money be spent? These cities may be installing municipal wireless networks, implementing e-government initiatives by providing access to city departments and initiatives through websites, integrating public transportation with intelligent transportation systems, or developing ways to cut their carbon footprints and reduce the amount of recyclables consigned to the trash heap" (ABI Research, 2011).

While ABI seems to focus on the positive impacts of smart cities, Adam Greenfield sees many negative potential impacts of this trend. In *Against the Smart City*, Greenfield argues that the marketing materials and promises of their sponsors provide a valuable insight into how large corporations with an investment in this kind of top-down, data-rich urban management system will position – and budget for – the ideal smart city (Griffiths, 2013). This section will explore where the smart city concept originated from and how it evolved to the point it is at today.

In order to understand the history of smart or wired cities, we must go all the way back to the 1850s when the transatlantic telegraph was introduced. The invention of the telegraph itself changed the way in which cities could be planned, but the transatlantic telegraph connecting America to Britain represents a major shift in how urban development was perceived. Certain geographical boundaries that used to be obstacles for city planners could now be overcome because of this new form of communication technology (Magnet Lab, 2014).

On March 10, 1876, Alexander Graham Bell spoke into his newly invented device and said to his assistant, "Mr. Watson, come here, I want to see you." In doing so, Bell launched the telephone era with the first bi-directional electronic transmission of the spoken word. This further changed the ways in which humans were able to plan and design their communities (Zigterman, 2013). By 1956, the first transatlantic telephone wires were laid.

In 1969, the US Department of Defense commissioned the Advanced Research Projects Agency Network (ARPANET) to conduct research on creating a digital network that could be used for human communication. In 1971, they achieved their goal when the first people were able to communicate via a digital network. By 1973, international digital communication was possible. By 1977, email was being used more commonly and the internet was a reality (Marshall, 2014).

All three of these inventions had drastic impacts on the way our communities functioned and were physically designed. Along with the invention of radio in 1901 and cable television in the 1940s, these forms of communication technology have served as the main media that society utilizes to share information with others. Organizations such

as Bell Telephone Company and AT&T (which evolved out of Bell) have worked to create policies that allow them to implement their products city-wide, state-wide, and world-wide in a way that directly impacts the ways in which cities are planned and designed.

At the turn of the 20th Century, AT&T was dominating the phone service industry. By 1907, AT&T president Theodore Vail had made it known that he was pursuing a goal of "One Policy, One System, Universal Service." They wanted to control all phone services across the country. AT&T began purchasing competitors at such an alarmingly high rate that it attracted the attention of antitrust regulators. To avoid antitrust action, Vail made a deal with the government and agreed to the Kingsbury Commitment of 1913. One of the three terms of this agreement forbade AT&T from acquiring any more independent phone companies without the approval of the Interstate Commerce Commission (Brooks, 1976).

Today, AT&T is focusing more on city development. For example, AT&T once used the Consumer Electronics Show in Las Vegas to show off its newest phones or tout its spiffed-up wireless network. This past year, however, it was all about discussing cars, glucose monitors, and "smart" cities. According to Chen (2016), "The change in tone speaks to how AT&T plans to be a part of your new, more connected life. It's no longer enough to power your mobile phone or home DSL connection. The carrier wants to be the link that connects your car, the health monitors and even your city's traffic lights."

"This is the new AT&T," says Ralph de la Vega, CEO of AT&T Mobile and Business Solutions (Chen 2015).

Therefore, there is a long history of powerful companies, such as AT&T, trying to play a major role in the way in which our communities are planned and designed. Today, the Internet of Things (IoT) is contributing to this trend. IoT represents the idea that almost every material object will be connected to a smart grid in the very near future. Not only will this impact the way in which we consume commodities, it will also change the way in which communities are planned and designed.

IoT will be discussed in much further detail later in this paper, but it's worthwhile to note that IoT efforts are intimately tied to "smart" city efforts. In order for IoT to be fully realized, "smart" cities must truly come to fruition. Therefore, you can't really talk about IoT without talking about "smart" cities.

Chapter V highlights a number of "smart" cities that exist around the world, as well as the companies involved in creating them. "Smart cities" has become such a popular concept that companies such as IBM have entire sectors of their corporation dedicated towards it. This is yet another example of how communication technologies, and the private interests that are driving them, impact the way our communities are planned and designed.

The next chapter explores the pertinent theories and literature that will inform this study, as well as highlights the work of researchers whose findings have inspired me to delve deeper into this topic.

CHAPTER III

THE DISAPPEARANCE OF LEISURE TIME AND PUBLIC SPACE

The purpose of this chapter is to explore the main theories and literature that are important to conduct this study. It will start off with a description of the Internet of Things (IoT), followed by a review of the main paradigms within planning theory, before outlining the political economic theories that help to frame this analysis. That will then be followed by a description of the literature that informs this study.

The Internet of Things (IoT): "We're in for a Wild Ride"

The Internet of Things (IoT), also known as the Internet of Objects or the Internet of Everything, is the notion that most, if not all, consumer products can be placed on a smart grid and monitored by corporations and governments in order to increase efficient use of that commodity. Major communication corporations such as Google, Intel, IBM, and Cisco are promoting the idea that IoT "will change everything—including ourselves. This may seem like a bold statement, but consider the impact the Internet already has had on education, communication, business, science, government, and humanity. Clearly, the Internet is one of the most important and powerful creations in all of human history. Now consider that IoT represents the next evolution of the Internet, taking a huge leap in its ability to gather, analyze, and distribute data that we can turn into information, knowledge, and, ultimately, wisdom. In this context, IoT becomes immensely important" (Evans 2011, p. 2).

The gathering of data is at the center of IoT. As Gubbi (2013) puts it, "One of the most important outcomes of this emerging field is the creation of an unprecedented

amount of data. Storage, ownership and expiry of the data become critical issues. The internet consumes up to 5% of the total energy generated today and with these types of demands, it is sure to go up even further. Hence, data centers that run on harvested energy and are centralized will ensure energy efficiency as well as reliability" (1649).

Gubbi (2013) goes on to propose that the "vision of IoT can be seen from two perspectives—'Internet' centric and 'Thing' centric. The Internet centric architecture will involve internet services being the main focus while data is contributed by the objects. In the object centric architecture, the smart objects take the center stage" (1651). As will be discussed in much more detail later in this paper, this subtle difference drastically changes the way in which IoT is introduced and, therefore, how we plan "smart" communities.

The architecture that makes up IoT possible can be split into three components: things, access points, and the Internet. According to Han (2013), things are "physical objects with very diverse hardware specifications in terms of communication, computation, memory and data storage capacity, or transmission power. Personal electronic devices, home appliances or all sorts of equipment, are examples of things" (624). Access points are more advanced devices that play the role of local network coordinator, as well as the interface and gateway for the communication over the Internet. In other words, access points allow people and objects to connect with each other using the final component of IoT- the Internet.

Another important component of IoT's architecture is radio frequency identification (RFID). RFID technology enables things like quick payment of tolls and quick identification of items. In addition, RFID provides benefits to large companies,

such as tracking assets, monitoring conditions for safety, and helping to prevent

counterfeiting.

Sun (2012) points out that all RFID systems contain three basic components: "The

first is the RFID tag that is attached to an asset or item. The tag contains information

about that asset or item and also may incorporate sensors. The second component is the

RFID interrogator, which communicates with (also called interrogating) the RFID tags.

The third component is the backend system, which links the RFID interrogators to a

centralized database. The centralized database contains additional information, such as

price, for each RFID tagged item" (p. 107). In a sense, RFID is the technology that

allows IoT architecture to function.

The fact that more and more people are moving into urban environments every

single day further helps these companies promote IoT as a solution to many of our

problems. IoT is advertised as a solution to unsustainable transportation routes, public

space, and utility use. As Evans (2011) puts it, "As the planet's population continues to

increase, it becomes even more important for people to become stewards of the earth and

its resources. In addition, people desire to live healthy, fulfilling, and comfortable lives

for themselves, their families, and those they care about. By combining the ability of the

next evolution of the Internet (IoT) to sense, collect, transmit, analyze, and distribute data

on a massive scale with the way people process information, humanity will have the

knowledge and wisdom it needs not only to survive, but to thrive in the coming months,

years, decades, and centuries " (p. 7). In other words, IoT is promoted as a solution to

important societal problems; it is not promoted as a strategy for increasing corporate

power and profits.

In fact, it's hard to argue with some of the examples provided by these companies. Cisco, for example, promotes IoT as a resource to solve the lifestyle problems associated with elderly populations: "The world's population is aging. In fact, approximately 1 billion people age 65 and older will be classified as having reached 'non-working age' by the middle of the century. IoT can significantly improve quality of life for the surging number of elderly people. For example, imagine a small, wearable device that can detect a person's vital signs and send an alert to a healthcare professional when a certain threshold has been reached, or sense when a person has fallen down and can't get up" (Evans 2011, p. 9).

IoT can also help communities prepare for natural disasters and other emergencies. According to Yand (2013), "The IoT technology has many positive impacts on every stage of emergency response (ER) operations from the mobilization rhythm, preliminary situation assessment rhythm, all the way to the intervention rhythm. It enhances cooperation between various participating organisations, improves situational awareness, and enables complete visibility of response force and their remaining resources, thus providing for faster and more efficient and effective ER operations" (1865).

Specifically, IoT can help communities be notified of when an important event occurs. Urban public safety emergency management early warning systems based on IoT can realize the functions of omnidirectional monitoring and controlling, accurate prediction, and disposing abrupt emergencies efficiently. In this complex environment, this system can strengthen the city's ability to withstand public emergencies and improve

the emergency management efficient to reduce personnel and property losses (Chunquan & Shunbing, 2012, p. 753).

These innovations are especially important in urban centers, where "the development of smart grids, data analytics and autonomous vehicles will provide an intelligent platform to deliver innovations in energy management, traffic management and security, sharing the benefits of this technology throughout society" and "the ability of IoT to combine innovations in data analytics, 3D printing, and sensors, will improve productivity by enabling a step change in the quality of decision making, efficiency of production, personalisation of retail, and productivity of food production" (GSMA 2014, p. 7).

A main challenge for the companies that are thinking about how to plan for IoT is to narrow down what type of data is the most valuable for them to collect. As Kalsi (2014) explains, "Big data alone means nothing. More important is relevant data. Early on, big data trends focused on accumulating as many data points as possible, without a specific purpose, and employing analytics tools to spot trends. There is a certain amount of value in this method, but the better approach – one that yields more useful results and new applications – is to begin the big data process with a goal in mind, focusing on accumulating the right type of data, and using it to find solutions to specific problems" (p. 7).

While most major communication corporations are interested in IoT, each sees it a little differently. Google has a number of products that would benefit from IoT coming to fruition. Their "Google Cloud hosting service is a logical partner to any innovation to come about from the Open Web of Things program. The company's Google Fiber

technology also makes Google an Internet service provider, which might be an avenue to explore for connecting products. And its Physical Web is its attempt to create a new type of application layer for the Internet, one that interacts with any smart device without having to go through a separate app that's dedicated to any specific device" (Amirtha 2015).

GE sees the development through an industrial lens, focused on the optimization of complex systems like railways and jet engines. GE believes that sensors "in next-generation jet engines will anticipate a maintenance problem during flight, send that information to the ground crew, and automatically order the parts, so that when the plane lands, the problem can be fixed immediately" (Maney 2013).

According to Maney (2013), Ford looks at the IoE in two ways: outside the car and inside the car. "Outside, the car becomes a node in a person's transportation network, which might include subways, trains, and planes... If the system knows where you are and where you want to be, it can suggest the best combination of ways to get there based on real-time information about all the different modes of transportation. Inside, a car becomes a smart, networked system that connects sound, visuals, and instruments to help the commuter be productive while driving."

In other words, IoT is a trend that will have an influence over almost every aspect of the way we plan and design communities, and the top communication corporations are starting to realize the enormous financial potential associated with IoT. As Bradshaw (2105) points out, "Alongside Intel, tech companies from Apple, Samsung and Google to IBM and Cisco are betting that the 'internet of things' or IoT will become a meaningful market in the coming years. The 'smart home' is expected to be a focus for Apple and

Google at their forthcoming developer conferences in May and June [of 2015], while

IBM has said it will invest $3bn over the next four years in cloud services and software

related to IoT."

Regalado (2014) adds, "The Internet of things is especially important for

companies that sell network equipment, like Cisco Systems. Cisco has been

enthusiastically predicting that 50 billion 'things' could be connected to communications

networks within six years, up from around 10 billion mobile phones and PCs today… No

wonder this year, in his annual letter to shareholders, Jeff Immelt, CEO of General

Electric, the world's largest manufacturer, told his investors that 'every industrial

company will be a software company.'" (p. 72).

One of the main issues associated with IoT has to do with balancing surveillance

and privacy. There is no doubt that IoT represents a risk to the security of our digital

information if there are not steps taken to provide protection. In fact, in "the context of an

integrated security policy, The 'Internet of Things' is the ultimate driver of converged

risk. Digital crime trumps physical crime, and the gap is widening exponentially

everyday" (Dunkel 2014).

According to Budd (2015), "We have to take the lessons we've learned from the

20+ years of connecting to the Internet and apply them when we talk about IoT. We've

learned the power and convenience the Internet brings benefits not just you, but those

who mean you harm. Not only do you have to play the 'have you ever.... you will' game

with the benefits that IoT brings, but with the risks, too."

Security issues associated with IoT could be even more harmful than those

associated with current Internet use. As Budd (2015) puts it, "In security, we raise alarms

not to cause panic but to prompt action. The bright future of technology is intriguing and exciting, but we must first take responsibility for our security and privacy as to avoid any downfalls… A security problem with your computer can cost time and money. A security problem with your smartphone can cost time, money and privacy. But with these new devices, a security problem can cost all three plus real risks to your or your family's personal safety."

Gershenfeld & Vasseur (2014) believe that there is hope for those who want to protect thee privacy of their digital identities: "The flip side of security is privacy; eavesdropping takes on an entirely new meaning when actual eaves can do it. But privacy can be protected on the Internet of Things. Today, privacy on the rest of the Internet is safeguarded through cryptography, and it works: recent mass thefts of personal information have happened because firms failed to encrypt their customers' data, not because the hackers broke through strong protections. By extending cryptography down to the level of individual devices, the owners of those devices would gain a new kind of control over their personal information."

However, they go on to point out that this will be a difficult goal to achieve, given the invisible nature of IoT: "The Internet's defining attribute is its interoperability; information can cross geographic and technological boundaries. With the Internet of Things, it can now leap out of the desktop and data center and merge with the rest of the world. As the technology becomes more finely integrated into daily life, it will become, paradoxically, less visible. The future of the Internet is to literally disappear into the woodwork" (Gershenfeld & Vasseur, 2014).

This opens the potential for governments and private interests to gather data in a way that benefits their power and control and not in a way that empowers community members. We've already seen this occur in other countries. As Hvistendahl (2012) explains, "China's growing influence on the Internet of Things worries some critics. The country's approach encourages data hoarding rather than data sharing." Therefore, attention must be spent understanding to what extent governments and companies will open source the data they gather.

There is also a social structure to IoT. In other words, "smart" devices will be able to communicate with each other in order to fix problems and increase efficiency. As Atzori (2011) points out, "PCs in the same local area network can establish social relationships that can be used to find solutions to common setting problems, such as those related to the configuration of a tricky network printer or an AP. Similarly, cars of the same brand, model and year can provide information about possible solutions to frequent and common mechanical/electrical concerns. In other scenarios, devices that visit the same geographical area can establish friendships to exchange useful information on the physical world" (p. 1195).

Another debate taking place pertaining to IoT has to do with the platforms that will be used to access it. There is a growing contingency that belives that standardization in necessary. On the other hand, getting all of these powerful communication corporatiosn to work together is extremely difficult. Nonetheless, they are trying. Amirtha (2015) notes, "With all of this tech floating around, industry leaders have already begun to realize that standardization is necessary. Samsung and Google got together last year with other hardware makers to create a low-power wireless network

called Thread… Then there's the Open Interconnect Consortium, an initiative led by Samsung, Dell, and Intel which aims to drive open standards in the industry and deliver open-source solutions to connect any device with one another, no matter what the operating system, connection provider, or form factor."

Evans (2011) adds, "As often happens, history is repeating itself. Just as in the early days when Cisco's tagline was 'The Science of Networking Networks,' IoT is at a stage where disparate networks and a multitude of sensors must come together and interoperate under a common set of standards. This effort will require businesses, governments, standards organizations, and academia to work together toward a common goal" (p. 9).

In other words, for the IoT vision to truly come to fruition, there must be a single platform that all sectors of our communities are connected to. This single platform is what would make a completely integrated community possible. If there are competing platforms, then all of our actions can't be gathered from one single monitoring site. Instead, there would be multiple companies that would own that data.

In short, the major debates surrounding IoT seem to be centered on issues focusing on surveillance, standardization of platforms, and data security. As more and more RFID chips are placed within a diverse array of objects, these debates will become increasingly important in the years to come. As Dave Evans, Cisco's chief technologist for their Internet Business Solutions Group (IBSG), said, "Imagine a low-cost sensor embedded in the lock on your home that can see your face and send it back through the cloud and decide to let you in based on face recognition. We're in for a wild ride."

<u>Planning Theory: Communicative Rationality vs. Advocacy Model</u>

Smart cities have become a landmark in urban planning. According to Kourtit and Nijkamp (2012) they are "the result of knowledge-intensive and creative strategies aiming at enhancing the socio-economic, ecological, logistic and competitive performance of cities. Such smart cities are based on a promising mix of human capital (e.g. skilled labor force), infrastructural capital (e.g. high-tech communication facilities), social capital (e.g. intense and open network linkages) and entrepreneurial capital (e.g. creative and risk-taking business activities)" (p. 93).

Modern cities are put in a tough position in terms of balancing private and public partnerships. Public funding can't provide all of the necessary resources for a community hoping to constantly keep up with technological advancements. Zimmerman and Simpson (2012) point out, however, that even though they can't provide all of the necessary funding, public institutions can still "provide framework conditions, incentivize, moderate, stimulate ideas, innovate and provide and set market incentives. Towards this cities need to be prepared: communal targets must be developed and new models built, governance styles improved, technical expertise acquired and new instruments tested for a multiplicity of different interests and actors. Local governments must continuously refine their roles and approaches" (p. 3).

Critical planning scholars acknowledge that "the environment and the economy necessarily interact i.e. environmental degradation is not an incidental consequence of economic activity, but a central consequence of the way consumption and production are organized" (Jacobs, 1991). Simpson (2012) credits this to the "tensions between economic forces, economic benefits and socially undesirable outcomes [that] are deeply

interwoven with the choices made on infrastructure investments, production, distribution and consumption cycles, and the inclusion of environmental and social considerations therein. Choices are being made in cities on what to invest where, what to produce and distribute how, and what to consume why, as well as what to throw away where" (p. 14).

Efforts to address these issues within cities are referred to as "greening." According to Ordero (2012), "'Green' in the context of cities has long been associated with open recreational spaces, urban forestry, ambient air quality, and similar attributes that portray a 'healthy' and arguably, sustainable urban environment;" however, with "the emergence of climate change as the defining issue at the turn of the twenty-first century, the notion of green cities has progressively taken on a new meaning underlined by an emphasis on 'green growth,' 'low carbon development,' 'climate compatible development.' etc. The new focus of the green cities concept – energy efficiency, reduction of greenhouse gas emissions, and green jobs – has transformed how we think about urbanization, especially how we (re)create and use urban spaces" (p. 17).

Many times, these greening efforts are framed in terms of their economic benefits. McKendry (2012) points out, "It is relatively easy to see the economic benefits of a greener city, particularly as environmental amenities such as parks, trees, and green space increase property values, generate tourist revenue, and benefit local businesses... It is therefore not surprising that city leaders have justified their sustainability efforts largely in terms of their economic benefits" (p. 29).

The twenty-first century has been called the "urban century" (UN-Habitat, 2008). After two centuries of urbanization spreading around the world, the majority of the global population currently lives in urban areas, and urban centers will continue to grow. Cities

play a dominant role in global consumption, production and pollution (Sukhdev, 2009). Cities are often associated with social and economic problems such as poverty and segregation, tensions between different groups, and economic vulnerability, as well as ecological problems related to pollution, resource use, congestion and spatial competition (Legner and Lilja, 2010). They are also associated with economic and cultural wealth, and dynamic developments within cities can provide opportunities for technological and social innovation (Sukhdev, 2009).

Urban sustainability problems are not necessary characteristics of urbanization but can rather be considered as results of poor governance and planning (Rode and Burdett, 2011). According to McCormick et al (2012), "Interpreting these different development processes, responding to related demands, and identifying and realizing opportunities are constant challenges for urban governance and planning. Cities around the world are also influenced in different ways by large scale transformation processes, such as global economic development and downturns, but the vulnerability of and opportunities for specific cities may also differ due to internal factors, such as the local economic structure as well as external relations and geographic location" (p. 35).

Camagni (1998) provides a constructive definition of sustainable urban development as "a process of synergistic integration and co-evolution among great subsystems making up a city (economic, social, physical and environmental), which guarantees the local population a non-decreasing level of well-being in the long-term, without compromising the possibilities of development of surrounding areas and contributing by this towards reducing the harmful effects of development on the biosphere."

Therefore, Simpson (2010) argues, "Sustainable urban economic development must encourage symbiotic relationships among industries, governments, universities and citizens to ensure sustainable management of human, ecological and economic capital, and turn density and urban systems into eco-efficiency." According to McCormick et al (2012), "This encompasses preserving existing 'green' spaces (such as parks and gardens) and 'blue' features (such as ponds and canals) and integrating new 'green' and 'blue' structures into cities in innovative ways that stimulate social interactions" (p. 40). In other words, competent city planning is essential to all efforts to achieve anything close to a sustainable, green community.

When it comes to the theoretical foundations that drive the work of planning scholars and practitioners, there are two main schools of thought. The advocacy model of planning promotes the notion that planners should be proponents of specific solutions. On the other hand, many planners adhere to the notion of communicative rationality, which relies on planners taking a more pluralist approach to understanding problems and choosing solutions. This section describes both models.

Healey (1992) promoted the notion of the "communicative turn in planning theory." Known as "planning through debate," Healey's theory aims to realize the democratic potential of planning practices within contemporary society. In Healey's view, "Any claim for the relevance of planning in such societies has to confront the challenges to the planning idea from both the resurgence of economic evaluation within public policy, and, more fundamentally, the philosophical post-modernist critique of scientific rationalism" (p. 1). The notion of how scientific rationalism and planning

theory are related is discussed in greater detail in the following chapter, which highlights

pertinent literature for this study.

Jurgen Habermas has been called "the last great rationalist," and in many ways he

is (McCarthy, vi). But his perception of rationalism is unique in its incorporation of

insightful critiques into his framework of the concept. It seems as though the "basic

question for Habermas is whether a critical theory of society in the contemporary age that

shares the practical intentions of Marx's theory is still at all possible" (Roderick, 22). In

Habermas's perspective, in order to achieve this goal there should be less of a

concentration on the mode of production and more of a focus on the process of

communication.

In *The Theory of Communicative Action*, Habermas outlines how the ideal speech

situation can be constructed. To begin with, the first step of his argument presupposes

that it is indeed possible for two or more subjects to reach an agreement or understanding.

The next step contends that it is possible to distinguish between genuine and deceptive

communication. However, the persuasive force of the better argument can prevail if and

only if communication is free of deceptive, hidden constraints. Habermas notes that

communication is only free of hidden constraints when there is a symmetrical distribution

of opportunity to communicate for all participants. In short, "the ideal speech situation

(as a communicative characterization of ideas of freedom, truth, and justice) contains a

practical hypothesis upon which the critique of ideology (as 'systematically distorted

communication') can be based" (Thompson, 128). Its main hypothesis is that rationality

is created and reified by communicatively achieved agreement.

This notion of communicative rationality is an important concept for community planners to understand. Many of the problems that planners face involve understanding and acknowledging a number of different rationalities. Communicative rationality is the most affective model for community planners to adhere to when attempting to solve a "wicked problem."

Hartmann (2012) defines a wicked problem "by the following properties: it cannot be definitively formulated, it has no 'stopping rule' and it is always unique (and so is its solution). A solution to a wicked problem is not 'true-or-false,' but 'good-or-bad'; such a solution cannot be tested, and there are no enumerable options of solutions. In addition, a wicked problem can be considered as a symptom of another problem, and the choice of explaining a wicked problem determines the problem's resolution" (2). In other words, a wicked problem is an issue that has no definitive answer. It involves a number of different stakeholders who have a hard time even defining the problem. Wicked problems require "clumsy solutions" because a clumsy solution is polyrational by design (Hartmann, 9).

However, many planners choose to utilize the advocacy model instead. Some planners believe that we should "reject the notion of a rationality-based democracy as a major vehicle for solving our problems, and join with like-minded allies to work toward what is right" (Flyvbjerg 1998: 234). Davidoff (1965) believes, "Where plural planning is practiced, advocacy becomes the means of professional support for competing claims about how the community should develop. Pluralism in support of political contention describes the process; advocacy describes the role performed by the professional in the process... The advocate planner would be more than a provider of information, an analyst

of current trends, a simulator of future conditions, and a detailer of means. In addition to carrying out these necessary parts of planning, he would be a *proponent* of specific substantive solutions" (425).

Rittel and Webber (1973) noted that wicked problems are never solved; "at best they are only re-solved – over and over again" (160). In their view, "In a pluralistic society there is nothing like the undisputable public good; there is no objective definition of equity; policies that respond to social problems cannot be meaningfully correct or false; and it makes no sense to talk about 'optimal solutions' to social problems unless severe qualifications are imposed first. Even worse, there is no 'solution' in the sense of definitive and objective answers" (155). In other words, they are coming from a postmodern perspective where the planner is not someone who is simply "hired to eliminate those conditions that predominant opinion judged undesirable" (156). Instead, planners have to deal with problems that are inherently wicked. The problems they face are difficult to define and require a solution that is a "one-shot operation" because there is no opportunity to learn by trial and error (163).

Therefore, the advocacy model of urban planning is completely inconsistent with Rittel and Webber's interpretation of wicked problems. As previously noted, Rittel and Webber (1973) believed that pluralism produced a reality absent of undisputable truths. That means that taking a stance that one position is highly superior to the other is contradictory to what makes wicked problems wicked.

Instead of adhering to this model, Martin Buber believes that urban planners should be "participants in a genuine dialogue (as opposed to merely a conversation) [and] have a real openness to one another. Rather than tuning out each others' views and

marshaling arguments to counteract what each other says, participants [should] internalize the views of others to enhance their mutual understanding" (Innes, p. 119).

Communicative rationality is an excellent model for tackling wicked problems because collaborative dialogue can generate network power. This occurs when participants get to know and understand other stakeholders and become more powerful themselves. "As they develop common heuristics and shared purposes, each is empowered by the others" (Innes, 109).

The purpose of this project is to demonstrate how media scholars and planning practitioners may actively and strategically engage with the public to have their research impact public deliberation, policy, and practice. Flyvbjerg (2002, 2004) presents the theory and method of phronetic planning research, which is an approach to the study of values and power in planning based on a contemporary interpretation of Aristotelian phronesis, variously translated as practical wisdom or judgment. The aim of phronetic research is to inform public deliberation and practice though effective communication strategies.

Such research is focused on the following four value rational questions, asked for specific instances of planning practice in a particular context: (1) Where are we going with planning? (2) Who gains and who loses, by which mechanisms of power? (3) Is this development desirable? (4) What should be done, if anything? Even in Aristotle's original definition of phronesis, laid down more than two millennia ago, the knowledge–action relationship is clear. Phronetic research results ("reason") are therefore results only to the extent they have an impact on practice ("action"). Similar to the concept of praxis, phronetic planning research is concerned with using theory to inspire action. Phronetic

planning is a helpful resource for planners and policymakers who are confronted with wicked problems.

Recognizing the polyrational nature of policymaking, Schwarz and Thompson (1990) promoted a new framework for policy analysis. One of the main components of the political culture that Schwarz and Thompson desired was recognition of the four rationalities laid out in Cultural Theory: individualist, egalitarian, hierarchist, and fatalist.

In fact, they utilized these four rationalities to analyze a number of planning and public policy issues. In their view, "Each of the rationalities, when acted upon, both sustains and justifies the particular organizational form that goes along with it. The high-rise, system-built tower block, for instance, is the hierarchist's solution to the housing problem; gentrification, the individualist's; cooperative self-build, the egalitarian's; homelessness, the fatalist's" (p. 8).

Therefore, different people will have different reactions to the implementation of "smart" cities and IoT. While some might see it as an invasion of their privacy, others might see it as a tool for the public good. While some might it as detrimental to the environment, others might focus more on short-term impacts.

According to Hartmann (2010):

Individualists believe that problems should be solved by the market and interventions should be rare in order not to create market failures. Egalitarians emphasize morality and community; the world is a dangerous place to live, and society has to care for the protection of nature. Command and control through rules and nested bound networks is the approach of hierarchists; for them nature can tolerate human intervention as long as society does not exceed certain boundaries (p. 17).

Thompson (1990) notes that fatalists do not believe in the controllability of the market; for them fate is a rational response to the world. Fatalists believe in a fate that

will occur regardless of any sort of human intervention. From the perspective of one rationality, the responses of the others are obviously irrational (Davy, 1997).

In other words, perceptions about the nature of reality legitimatize and reproduce certain kinds of institutional relationships. One's perception of how humans are supposed to interact with their communities drastically impacts perception of plans and policies. Schwarz and Thompson (1990) note, "Hierarchists trim and prune social transactions until they fit neatly into their orderly ambit, individualists pull them into the marketplace, egalitarians strive to capture them into a kind of voluntary minimalism (which, to those on the outside, often looks more like 'coercive utopianism'), and fatalists endure with more or less dignity whatever comes their way" (p. 8).

The diagram below represents the focus of each rationality. It also describes how each rationality perceives the notion of policymaking by utilizing pictographs. This diagram makes it easy to see why it is so difficult to implement policies that are consistent with every community member's perception of reality. How do you plan a community for people who are critical of IoT, as well as those who are not?

Four Rationalities

Prescribed
(externally imposed restrictions on choice)

Grid
+

Nature capricious

THE FATALIST

It doesn't matter who you vote for.

Nature perverse/tolerant

THE HIERARCHIST

A place for everything.

Individualized   **Collectivized**
                                                                                                    Group
−   +

Nature benign

THE INDIVIDUALIST

The bottom line.

Nature ephemeral

THE EGALITARIAN

Tread lightly on the earth.

Prescribing
(no externally imposed restrictions on choice)

Source: Schwarz, M. and M. Thompson, 1990, Divided We Stand:
Redefining Politics, Technology and Social Choice, p. 7.

Figure 1. Four Rationalities

In short, advocacy planning is about making your own personal argument prevail. "Dialogue on the other hand is not about winning or making your own view prevail. When someone's mistake is uncovered in dialogue, everyone gains..." (Innes, 121). Planners should be less interested in acting as advocates and engaging in persuasive arguments, and they should be more interested in adhering to Habermas's notion of the ideal speech situation and engaging in mutual dialogue.

In addition to understanding important planning theories, it is important to understand the political economic context in which this phenomenon takes place. Therefore, the next section will highlight the important political economic theories that will inform this study.

Political Economic Theory

Economics are central to the "green" city movement. Ahmed (2012) believes, "A Green Economy is one in which growth in income and employment is driven by public and private investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services. This will require a substantial increase of investments in economic sectors that build on and enhance the Earth's natural capital or reduce ecological scarcities and environmental risks" (p. 46).

At the national level, the impact of environmental policies within the broader context of innovation and economic performance is an important phenomenon to understand (Porter & van der Linde, 1995). From this perspective, government policy plays a critical role within economies to encourage innovation and growth (Stoneman, 1995) and is important as a means for choosing the direction of change (Foray, 2009).

Werna (2012) points out that "urban environmental problems have a negative impact on the lives and productivity of workers, and hence limitations for social and economic development. Improving the urban environment will not only counteract this impact, but also create businesses and employment. Initiatives to improve the urban environment require the active involvement of workers and enterprises" (p. 58). In other words, planning policies hold a tremendous amount of power and control within our communities.

Power and control is central to any understanding of modern society and "any adequate analysis of the distribution of power and of the process of legitimation must

necessarily include an analysis of the mass media" (Murdock and Golding, 1973, p. 224).

Political economists understand that power is located at different levels. It can be held within specific ownership structures, hierarchies and political alliances within media corporations, and, also, in access and reception. This section highlights the main political economic theories that will be used to frame this study.

According to McChesney (2004):

The problem of the media exists in all societies, regardless of their structure, but the range of available solutions for each society is influenced by its political and economic structures, cultural traditions, and communication technologies, among other things. In dictatorships and authoritarian regimes, those in power generate a media system that supports their domination and minimizes the possibility of effective opposition. The direct link between control over the media and control over the society is self-evident. But in democratic societies, the same tension exists between those who hold power and those who do not, only the battle assumes different forms. Media are at the center of struggles for power and control in any society, and they are arguably even more vital players in democratic nations.

Marx's *Capital: A Critique of Political Economy* begins with an analysis of the basic component of the capitalist economy: the commodity. From this he explains how many of the contradictions within a capitalist society arise. In the case of commodity-form capitalism, the intrinsic quality of something no longer determines its value, only its base of exchange. The commodity, then, becomes "crucial for the subjugation of men's consciousness to the forms in which this society finds expression and for their attempts to comprehend the process or to rebel against its disastrous effects and liberate them from servitude" (Lukacs, p. 85). This means that even the way in which one thinks about solving the problems caused by the commodity structure is influenced by the commodity structure.

Lukacs (1964) would call this phenomenon "reification." This concept refers to an abstract idea becoming material, and forming the basis for society's perception of reality. For instance, in contemporary capitalist society, exchange value has become the dominant way of knowing, organizing, and expressing the world. This means that the "problem of commodities must not be considered in isolation or even regarded as the central problem in economics, but as the central, structural problem of capitalist society in all aspects" (Lukacs, p. 83).

In order to achieve this domination, it would be necessary for the commodity structure to penetrate society in all aspects and to remold it in its own image (Lukacs, p. 84). This means that society's way of understanding and interacting with the world, in general, is influenced by commodity-form capitalism. This is even true when one is analyzing the commodity structure. Society's collective perception of reality is influenced by dominant hegemonic ideals; and "this development of the commodity to the point where it becomes the dominant form in society did not take place until the advent of modern capitalism" (Lukacs, p. 85).

The nature of commodities, though, does not arise from the fact that people produce them. People in all societies produce useful goods, but not all these goods are commodities. A good becomes a commodity when the good becomes fetishized. Traditionally, the term "fetish" refers to the religious practice of attributing human characteristics to material objects. In the general sense, though, the concept of "fetishism" refers to people finding more value in a good other than just simply its physical production value.

Marx begins *Capital* by explaining the contradictions between use-value and exchange-value. The idea of "fetishism" is key in this discussion, in that modern capitalist societies don't really operate based on use-value. The intrinsic value of an object doesn't mirror its market value. Instead, in today's economy, value is based on the commodities ability to be fetishized. The dialectical nature of the commodity expresses the central contradiction of capitalist society: the conflict between labor and capital. The worker thinks he sells his labor to the employer, but in fact what he sells is his labor power, which the employer then uses to generate value. In other words, human labor has become commoditized and fetishized. Therefore, the goal of political economists should be to dialectically critique the dominant means of production within a commodity-form capitalist society.

Marx and Engels were the first to give dialectics a truly materialist basis. Marx's *Capital* explains how the dialectical method can be used to analyze the most fundamental processes in society. In that sense, Marx's work represents a breakthrough, not only in the field of economics, but for social science in general.

Negative dialectics is a "sense of nonidentity through identity" (Gibson and Rubin, 2002, p. 264). In other words, to critique dialectically is to think in contradictions; and negative dialectics refers to forming an identity based around the tension between those contradictions. This means taking the dominant perspective and synthesizing it with other perspectives in order to reach truth.

Marx's dialectical criticism of capitalist society is centered on the idea that not only have goods and other material objects been commoditized, but human labor itself has also been commoditized.   According to Lukacs, "what is of central importance here

is that because of this situation a man's own activity becomes something objective and independent of him, something that controls him by virtue of an autonomy alien to man" (p. 86). This means that an individual becomes alienated from one's labor because even the labor itself has become a commodity. Labor power, therefore, is a commodity that can be bought, sold, and exchanged.

Marx noted that the value of a commodity reflects the value of the labor that has gone into producing it; but Smythe (1977) felt that when it came to communications, Marxist theory had a blind spot. His question to Marx was: What is the commodity form of mass-produced, advertiser supported communications under monopoly capitalism? And his answer: audiences. In other words, Smythe realized that the mass media had turned the audience into a commodity. In fact, what many people would consider "leisure time" is really just the time when the audience is being sold to advertisers.

This means the audience is really doing unpaid work. Therefore, the selling of audiences to advertisers not only serves as an essential marketing function, it also helps to reproduce labor power within society. It is not just "a question of the increasing control of the large media companies over a particular media sector or even several sectors, but also their increasing influence over the whole field of non-work time" (Murdock and Golding, p. 225). As will discussed in much more detail later in this paper, this concept is increasingly important to understand as we enter the IoT era.

McGuigan and Manzerolle (2014) looked at how the audience commodity can be applied in a digital age. Compiling chapters from some of the discipline's most renowned critical political economists, this work asks the question: Is the audience commodity concept still important today?

Graham Murdock, an active participant in early debates about this topic, contributes a highly personalized assessment of how critical media theory has come to achieve its present level of development. Because Murdock's 1978 article was focused more specifically on critiquing Smythe's treatment of North American media systems as the only forms worthy of critical engagement, he is also able to call attention to both the economic and ideological role of the governments in Europe that managed the public broadcasting networks of that time. In this chapter, he emphasizes the role of the cultural environment in shaping our behavior in the political realm as citizens as well as consumers (Gandy 2014).

Eileen Meehan's contribution to this continuing debate was what she termed a "third answer" to the questions being asked about the commodity audience (or the audience commodity). As she and later critics would suggest, the audience is actually a fiction, approximated at best by the "ratings" being produced by companies such as A.C. Nielsen. In her view, it was those ratings that were the commodities, rather than the imagined audiences that they represent (Gandy, 2014). This is certainly an important note for this project.

Three additional chapters by Micky Lee, Mark Andrejevic, and Vincent Manzerolle focus on new technologies and partnerships within the media environment; the first explores Google and the political economy of search; the second reopens the debate regarding the so-called "free lunch" used to attract and reward the laboring audience; and, the third introduces the challenge of characterizing the role of mobile media in the production of "audience attention"—a currently constrained, but vitally important economic resource (Gandy 2014).

The last three chapters return us to some of the issues around which Smythe

developed his initial critique:

> After Murdock's chapter on efforts to reclaim the commons in the face of
> widespread commercialization of the information environment, "Edward Comer
> and Christian Fuchs devote themselves more directly to the challenge of
> evaluating how well Smythe's contribution meshes with Marx's own insights with
> regard to labor and its exploitation. Fuchs, well known for his celebrations of the
> return of Marxist theory to the academic stage, lays out a fairly comprehensive
> assessment of the advances, and the remaining challenges that will have to be
> faced by those interested in firmly establishing a central space within which
> Marxist and critical social theory can enrich the study of communications and
> media (Gandy 2014, p. 884).

In an interview with Svec (2015), McGuigan and Manzerolle reiterate why they

think the audience commodity debate is as important today as ever:

> Theories of the audience commodity have also inspired critical research on data
> mining and online surveillance. It is argued that media users "work" at producing
> information about themselves and their behaviors, which are sold to various
> marketing interests. Companies of various stripes do a brisk trade in information
> harvested from digital media users, and media systems are organized in important
> ways around the production and interpretation of data-based consumer profiles.
> Again, a form of "work" that seemed more abstract in the context of broadcasting
> is increasingly concrete and observable. Regardless of disputes about whether this
> constitutes "labour"—and surely this work is less perilous than many other
> occupations—it is a matter of fact that when people use digital media (including
> web browsers, cable television, mobile phones, and Netflix) they produce data
> that are processed by additional labour into saleable commodities (p.2).

Fuchs (2012) reveals why a critical political economic approach is critical for

understanding how society works in this age of data and information: "Theodor W.

Adorno asked in 1968: What is the fundamental question of the present structure of

society? Do we live in late capitalism or an industrial society? In today's society, we can

reformulate this question: What is the fundamental question of the present structure of

society? Do we live in capitalism or an information society?" (p.1).

Frank Webster (1995, 2002) has identified five ways of defining an information society: (1) technological innovation; (2) occupational change; (3) economic value; (4) information flows; and (5) the expansion of symbols and signs. Touraine (1974) believes that the post-industrial or programmed society is "a new type of society" (p. 4). For Bell (1974), the "post-industrial society" has brought about "a vast historical change in which old social relations (which were property-bound), existing power structures (centered on narrow elites), and bourgeois culture (based on notions of restraint and delayed gratification) are being rapidly eroded" (p. 37) and "the emergence of a new kind of society [that] brings into question the distributions of wealth, power, and status that are central to any society" (p. 43).

Toffler (1980) argues that a third-wave society, which he also terms the "knowledge age," means a "giant wave of change battering our lives today" (p. 5), a "massive historical shift" (p. 243), "dramatic changes" (p. 243), and a '"evolutionary advance" (p. 168) resulting in a 'wholly new society' (1980: 261). Drucker (1992) argues that the "knowledge society" means "an Age of Discontinuity in world economy and technology" and that "work and workforce, society and polity, are all, in the last decade of this century, qualitatively and quantitatively different both from those of the first years of this century and from anything ever experienced before in human history: different in their configuration, in their processes, in their problems, and in their structures" (p. 10).

For Stehr (1994), the emergence of what he terms the knowledge society means that "the age of labor and property is at an end," that the "emergence of knowledge societies signals first and foremost a radical transformation in the structure of the economy" (p. 10) and the "emergence of a new structure and organization of economic

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activity" (p. 122). For Castells (2000), the rise of the "network society" means that a "new world is taking shape at this turn of the millennium" and that the "information technology revolution induced the emergence of informationalism, as the material foundation of a new society" (p. 367).

In terms of urban planning, we can certainly see how exchange-value has become the dominant way in which we organize reality. As we'll discuss in the next section, urban planning decisions are too often motivated by economic gain, instead of focusing on benefits to the community's residents. If we think of the base-superstructure model, we can visualize buildings (superstructures) being developed from a capitalist, exchange-value dominated base. Thus, powerful capitalist interests are able to impact planning processes.

There have been plenty of political economic analyses that focus on the rise of "smart" cities. Shapiro (2005) looked at how the rise of "smart" cities impacts employee's wages and labor. Also, a wide range of literature has highlighted the technical and financial knowledge, skills and expertise required of the public sector in enabling urban infrastructural and technological transitions (Monstadt, 2007). Buck and While (2015) examined initiatives by the UK national government to facilitate urban technological innovation through a range of strategies, particularly the TSB Future Cities Demonstrator Competition.

As highlighted by Hodson and Marvin (2010), it is to be expected that the most innovative private sector firms will gravitate towards wealthier places with the public or private resources to pay for enhanced urban services. This is precisely what is occurring today in Portland, Oregon. This is also currently demonstrated in the UK by the repeated

focus on London as the innovation hub, with many other cities left behind (Aziz et al., 2011; HM Treasury, 2006).

Nam and Pardo (2011) stress the importance of cross-organizational and cross-system interoperability, as well as strong leadership with a commitment to change. However, as Google, IBM, Intel, and a few other dominant companies continue to commit time, energy, and finances towards these "smart" city efforts, the issues involving monopoly power come into play.

In the media industry, we can certainly see the impacts of monopoly power. In terms of mass entertainment content production and distribution, five major corporations basically run the show: The Walt Disney Company, News Corporation, Time Warner, CBS Corporation and Viacom. The myth is that they compete against each other. The truth is that the intertwining of these big corporations through joint ventures gives each participant an interest in the success of the specific venture but also an active concern for the health of its partner. Therefore, while the rhetoric of the proponents of deregulation glorifies a free market, deregulation policies, in reality, create less competition and lead to the concentration of power and control.

This relates to what is occurring in Portland in a number of interesting ways. The relationship between Google, Intel, and IBM is very similar to the relationship that dominant companies have with each other in other markets. While they might be competing against each other on some level, they have an active concern for the health of their partners because of their similar interests. Therefore, planning policies and regulations must address this notion of monopoly power when considering how to

interact with private interests. If they don't, city planning could simply become another market dominated by just a handful of corporations.

When political economists use the term "monopoly," they do not use it in the very restrictive sense to refer to a market with a single seller. According to Bowles and Edwards (1985), "Monopoly in this sense is practically nonexistent. Instead, we employ it as it has often been used in economics to refer to firms with sufficient market power to influence the price, output, and investment of an industry - thus exercising 'monopoly power' - and to limit new competitors entering the industry, even if there are high profits" (141).

Political economists recognize that these firms generally operate in oligopolistic markets, where a handful of firms dominate production and can determine the price for the product. However, even that is insufficient to describe the power of the modern corporation. As Paul Sweezy (1972) put it, "The typical production unit in modern developed capitalism is a giant corporation," which, in addition to dominating particular industries, is "a conglomerate (operating in many industries) and multi-national (operating in many countries)" (8).

Google certainly fits this description by itself; however, if IBM and Intel are able to impact city planning processes also, we may begin to see an oligopoly form between the companies producing UCTs. Instead of trying to create Google cities, or IBM cities, or Intel cities, they may start to simply work together to create a market they can all profit from and control- a "smart" city market. As Foster and McChesney (2011) put it:

> Understanding monopoly power is not only indispensable to understanding how
> the capitalist system works and the problems of stagnation and financialization; it
> is also vital to understanding the real world of politics and governance, and to any
> meaningful analysis of imperialism. The struggle for democracy requires that we

face up to the reality of ever more concentrated political and economic power held by a plutocracy that owns and controls the giant monopolistic corporations.

Therefore, this political economic analysis utilizes the notions of monopoly power, reification, and base-superstructure in its attempt to highlight the ways in which private interests play a role in the community planning process. Classic works by Weber (1958) and Adorno (1976) suggest the ways in which capitalist institutions rationalized and standardized media practices. Weber (1958) highlighted how seemingly "irrational" cultural production could become rationalized. Adorno (1976) especially condemned popular music for being a product characterized by standardization; thus, it receives very standard reactions.

In his famed essay, "On Popular Music" (1941/1990), Adorno looked at how "mechanical schemata" is ideologically applied to musical production as a way to maximize profits by making consumers malleable, which turns music into a reified and fetishized commodity. He believed that records are "an artistic product of decline, the first mode of representation that can be possessed as a thing" (1984, 531). He also condemned popular and improvised music, such as jazz, for being "as standardized as the standards" (1967, 122).

Adorno (1975) was one of the first people to identify the entertainment industry as a major site for elite domination within contemporary capitalist societies. He recognized that this domination had connections with broader structures of political-economic power and control. He called this enveloping process "the culture industry". According to Biltereyst and Meers (2011), "if there is one truism in media and communication research then it is the one about how people rely on the culture industry

for the images, words, and voices with which they interpret and interact with their social environment" (2011: 415).

Adorno railed against the standardization of mass culture. According to Morgan (2013), "The [culture] industry claims the audience's approval of the standardised cultural form, and undermines any preference for the potentially radical cultural forms as a pretence" (10). According to Adorno, industrialization and standardization of culture removes choice or only provides choice according to accepted formats. For him, industrialization of culture and the "homogenization of culture into familiar entertainment products sever any link with a progressive societal project. In this respect, his cultural theory is deeply political" (Morgan 2013, p. 10).

Mass consumerism fortifies this process, in that "the sacrifice of individuality, which accommodates itself to the regularity of the successful, the doing of what everybody does, follows from the basic fact that in broad areas the same thing is offered to everybody by the standardized production of consumption goods" (Adorno, 1991: 40). Therefore, in a society dominated by commodification, "the individual both measures him or herself through their relative success, and when, through their consumption they can appreciate the exchange value of standardised goods, they feel a further proof of their success. Yet, in this process, individuality is quashed or 'liquidated' in the face of a system where identity is measured only by the capacity to perform through exchange values" (Morgan 2013, p. 11)

Therefore, contemporary consumers never get the opportunity to develop because the cultural goods are standardized, fetishized, and reified. That is why the culture industry can "crank out more standardised products with minimal innovation, safe in the

knowledge that there will also exist minimal opposition. Once more, this process is not just an individual 'sickness', but a societal one where potentially, civic society becomes pacified by commodification and like the regressed listener, mounts minimal opposition to the political and economic status quo" (Morgan 2013, p. 13).

Adorno proposes that the consumer of such cultural goods does have a sense of a vague discontent with industrialized products. He suggests that the consumer experiences a "betrayal" (Adorno, 1991: 50) when offered the same, standardized cultural artifacts. Thus, when the novelty or charm of a cultural product wears off, another substitute is offered in return for the cycle to begin again (Morgan 2013).

This is an interesting point for this study to consider. As "smart" cities develop and urban infrastructure becomes standardized. companies have to consider to what degree this standardization helps or hurts the popularity of their products. Will community members appreciate the efficient, standard way "smart" cities will be developed within IoT, or will the novelty wear off?

For example, urban infrastructure decisions within "smart" cities will be made in regards to data gathered about community members. These infrastructure decisions will be based on the idea that community members will want to repeat consumption choices they've already made. However, just because I usually take a certain route to work doesn't mean I never want to take another route. Just because I usually buy a certain product doesn't mean I don't want to be exposed to others. Therefore, the implementation of IoT "smart" cities represents a limiting of choices that community members can make.

When you consider the lack of choices that will occur within a "smart" city, it becomes clearer as to why Adorno railed against the standardization of mass culture. For

Adorno, such cultural products precluded the possibility of transcendental experience, and of contemplating "other" formulations of society. It is this key aspect of his critical theory that is of the most significance when discussing the political economy of communication.

A main focus of this project is re-imaging the audience commodity in the era of IoT. However, the notion of standardization plays a major role in this analysis, as well. The next section describes other literature that has utilized a political economic framework to critique urban planning processes.

Global Cities, the Technocracy, and the Commons

In her famous novel *The Death and Life of Great American Cities*, Jane Jacobs (1992) points out, "There are only two ultimate public powers in shaping and running American cities: votes and control of money. To sound nicer, we may call these 'public opinion' and 'disbursement of funds,' but they are still votes and money" (p. 131). In other words, Jane Jacobs would suggest we be careful when allowing powerful corporations with lots of money to have a major role in the development of our communities. It negatively influences the democratic process.

Therefore, the notion of allowing Google, Intel, and IBM to play a major role in planning and designing a community is completely counter to what Jane Jacobs believes constitutes a healthy community. While there has been a good deal of literature written about the ways private interests influence community planning processes, there has not been a focus specifically on UCTs. Hence, one of the goals of this study is to fill that gap.

According to Molotch and Logan (1987), "Environmental movements are efforts to preserve use values at the expense, if need be, of rents and profits." In other words, efforts to promote sustainability or environmental protection should be consistent with efforts that are detrimental to the dominant mode of production. If environmental or sustainability movements are organized in a way that still promotes the idea that exchange-values should be the leading factor in our decision-making, these movements are simply perpetuating the commodity-form capitalist system that is responsible for creating many of the environmental and sustainability problems that we need to solve.

There is a great deal of literature that uses political economy concepts to discuss the problems with the way we plan and design communities. Manuel Castells' (1996) analysis of the "network society" played a role in shaping this study, as well as his earlier work, such as *The Urban Question*. David Harvey's (2003) exploration of Paris as the capital of modernity, which plays off of Walter Benjamin's (1969) earlier work on Paris, also framed the way in which this project is conducted. Other important works that discuss the political economy of urban planning are Andy Merrifield's (2002) *Dialectical Urbanism*, Dear and Scott's (1981) *Urbanization and Urban Planning in a Capitalist Society*, and Henri Lefebvre's (2003) *Urban Revolution*. All of these important pieces of literature help frame this study.

All of those authors critique the perspectives held by certain groups of people, such as those who work for IBM, Intel, and Google, who adhere to the theory that new technology can be a tool to save us from the negative impacts of old technology. There is this belief that if society simply utilized the most productive and efficient technological

tools then many of our problems would be solved. In other words, as Moore (2007) would put it, these scholars put their faith in the "technocracy."

According to Moore (2007), "In the world imagined by technological rationalists such as the members of the Lerner regime in Curitiba, efficiency is presumed to be a public 'good.' It follows that inefficiency- the unconscious waste of resources- is a public 'bad'" (p. 199). Therefore, the technocracy would have you believe that the idea of communication corporations being involved in the community and regional planning process is a good thing because it could lead to efficient use of resources.

The technocracy sees sustainable urban transformation as a "design" problem on a grand scale. In other words, intelligently designed cities can respond to the major environmental, social and economic challenges of the twenty-first century (Rode, 2009). This directly contradicts Molotch & Logan's perspective.

There is a growing literature on the tensions underpinning 'techno-utopian' (Luque et al., 2014) visions of smart urbanism. According to Mone (2015), "The leading urban centers are not placing their technological futures in the hands of a company or a single university research group. Instead, they are relying on a combination of academics, civic leaders, businesses, and individual citizens working together to create urban information systems" (20).

One example of this is Songdo, Korea. Built on 1,500 acres of land reclaimed from the Yellow Sea and dubbed the Atlantis of the Far East, Songdo offers a glimpse into the future of urban design (Gale International). Gale International, a New York development firm, envisions it as a model to be replicated worldwide. Initial demand for housing in

Songdo, which was secured via a nationwide lottery system, was overwhelming, with an average of eight people vying for each unit (McNeil, 2009).

More than halfway toward its 2017-scheduled completion, the new city of 65,000 residents features a diverse array of innovations:

- More than 10,000 touch screens, developed by Cisco, will be installed in homes and offices and on street corners to enable home tutoring and video phone calls.

- Wireless sensors track road conditions and congestion, reroute traffic and adjust street lights accordingly.

- Rooftop vegetation absorbs excess heat and reduces storm-water runoff.

- A pneumatic waste-collection system sucks garbage from buildings through pipes.

- And to encourage fitness, parks and other greenery cover 40 percent of the city's footprint (Arthur, 2012).

With a price tag of $35 billion, it is officially the largest private real estate venture ever. That figure covers the master plan for the design and construction of Songdo's downtown, where some office tenants were lined up in advance. The Korean government is paying for highways, bridges, a subway extension from Incheon and other public infrastructure (Day, 2012).

As Songdo rises, other high-tech cities are sprouting elsewhere. About 10 miles from Abu Dhabi in the United Arab Emirates, the walled metropolis of Masdar lives, with a planned population of 40,000. Inspired by ancient cities in what are now Morocco, Syria and Yemen, Masdar broke ground in 2008 but won't be completed until 2025, at a cost that is estimated to potentially reach $19 billion. Its designers tout it as carbon-neutral and among the most sustainable places on the planet. Solar energy will power the

city, residential buildings will be designed to minimize water and electricity use and treated wastewater will be used for irrigation. If that wasn't enough, battery-powered, driverless pods that can each carry a few passengers run along magnetized tracks throughout the city (Glancey, 2011).

In northern Portugal, PlanIT Valley, a futuristic city is in the conceptual stage. According to Steve Lewis, CEO of Living PlanIT, the Portugal-based technology firm developing the community, it won't be ready until 2017 at the earliest, at a potential cost of $12.3 billion if all goes as planned. The city, with a projected 220,000 residents — half of them researchers, engineers and family members — will be a testing ground for urban projects that Living PlanIT is pursuing in China and other countries. It will be run by what Living PlanIT calls an "urban operating system" (OS) — software that controls everything from traffic flow to energy consumption (Hatch, 2012, 646).

Architecture also has dramatic impacts on our social interactions. Watkin (1977) says, "This is the belief that architecture expresses social, moral, and philosophical conditions, and that if one knows enough about these conditions in a given period one can therefore predict what its architecture will be and declare what it should be" (p. 8). In other words, Watkin is suggesting that citizens take the opportunity to understand the decisions made regarding how and why their physical environment came to be and to be an active participant in that process.

In short, a technocratic ideology only perpetuates the same problems that technology creates. Therefore, the notion of creating authentic public space needs to be the focus of environmental efforts, as opposed to just waiting for the next form of technology to save us from the problems that past forms have caused us.

According to Vollan and Ostrom (2010), "Sustainably managing common natural resources, such as fisheries, water, and forests, is essential for our long- term survival. Many analysts have assumed, however, that people will maximize short- term self-benefits - for example, by cut- ting as much firewood as they can sell - and warned that this behavior will inevitably produce a 'tragedy of the commons,' such as a stripped forest that no longer produces wood for anyone" (p. 923).

Google, IBM, and Intel all dominate what has come to be known as the "digital commons." Now, these same companies that control our digital public space want to also control our physical commons. In his influential analysis of 'the tragedy of the commons,' Garrett Hardin (1965) proposed that collective resources unprotected by private property rights are inexorably degraded by neglect. This perspective has, however, recently been challenged by a number of digital media theorists who propose that open source software discloses a "cornucopia of the commons" (Bricklin, 2001) or "inverse commons" (Raymond, 2001: 149), in which voluntary programming collectives produce more robust and inventive results than commercial developers.

More generally, Rheingold (2002: 35) has observed that digital media's ease of copying, speed of circulation, dissemination of digital authoring tools and networked conditions generate 'common pool resources' that tend to overflow privatized property rights. Drawing on Garret Hardin's notion of the "tragedy of the commons," which has been utilized to both oppose and advocate for privatization of public resources, this study looks at the issues that arise when private interests play a role in the planning and development of spaces (both digital and physical) that are supposed to be meant for the common use of the public.

However, "common use" can be a tricky thing to define, especially at a global level. Coleman & Dyer-Witheford (2007) believe that "the relation between commons and commodities remains fluid, fertile and unresolved." Smith (2001) makes the argument that there is no solid object known as the "global city" appropriate for researchers to ground insightful urban research.

His contention is that this is not an appropriate concept to ground urban research because there is "only an endless interplay of differently articulated networks, practices, and power relations best deciphered by studying the agency of local, regional, national, and transnational actors that discursively and historically construct understandings of 'locality,' 'transnationality,' and 'globalization' in different urban settings" (p.49).

There has been a lot of research on the ways in which advances in technology influence cultures around the world. There has also been a good deal of literature written about the ways in which global technological trends can impact community planning processes. Leyshon and Thrift's *Money Space: Geographies of Monetary Transformation* is an important piece of literature to review in order to understand global urban planning processes, as well as Deborah Parsons' (2000) *Streetwalking the Metropolis*, Michel Laguerre's (1999) *Minoritized Space,* and Saskia Sassen's (2001) *The Global City*. These pieces of literature reveal the ways in which people's everyday lives are influenced by global technological changes.

The next section discusses the emergence of the personal data economy and explores the impacts that digital identities have on our personal identities. As the data gathered from our actions becomes more valuable, does that value impact how we think about ourselves?

Digital Identity & the Personal Data Economy

According to Richards and King (2013), three paradoxes exist within the current

rhetoric about big data:

> First, while big data pervasively collects all manner of private information, the
> operations of big data itself are almost entirely shrouded in legal and commercial
> secrecy. We call this the Transparency Paradox. Second, though big data
> evangelists talk in terms of miraculous outcomes, this rhetoric ignores the fact
> that big data seeks to identify at the expense of individual and collective identity.
> We call this the Identity Paradox. And third, the rhetoric of big data is
> characterized by its power to transform society, but big data has power effects of
> its own, which privilege large government and corporate entities at the expense of
> ordinary individuals. We call this the Power Paradox. Recognizing the paradoxes
> of big data, which show its perils alongside its potential, will help us to better
> understand this revolution.

Ultimately, the questions surrounding the ways in which IoT technologies impact

our society center around the notion of identity. Big data companies see community

members as one-dimensional consumers and not as complex human beings. In the

emerging personal data economy, identity is the main commodity being sought by big

data companies. Therefore, owning and controlling one's identity will be a major

challenge for residents of "smart" cities.

"We instinctively desire sovereignty over our personal identity," Richards and

King (2013) claim. "Whereas the important right to privacy harkens from the right to be

left alone, the right to identity originates from the right to free choice about who we are.

This is the right to define who 'I am.'"

Crawford (2015) says, "Users are getting increasingly aware about their data

being aggregated by large companies, and are concerned about their lack of control over

how much information they then pass on." Simmonds (2015) adds, "In the digital world

we operate with many (digital) personas – in business, for online purchasing, on social websites, for personal email etc – so we need multiple digital personas, each with an appropriate level of (digital) identification. Today we create many disparate personas, generally unconnected in any way, each representing a (digital) identifier you need to use for the activity you're doing – in business, in the family, as a citizen, to the government, to your home utilities/services providers, in each club you belong to, in social networks, and so on. We over-share information about ourselves (typically date-of-birth, mother's maiden name, first school, first pet, etc), with much of this 'personal' information only being collected so that we can prove 'I am me' in the event of needing to get a password reset."

Beck (2015) stresses the fact that by using "tracking cookies and web beacons, online behavioral advertising uses code stored on machines to access users' Internet habits to customize advertisements and better market goods to consumers. This trend of tracking user movements has become concerning because the technologies used reveal personal information about the user to companies" (p.125).

Beck (2015) goes on to highlight the fact that we "live in an age of invisible digital identities where companies track our demographic information, habits, and online behaviors, and in some cases, sell this information to third-party companies for profit" (p.125). Strategically hidden within our computers are files that track our every movement on the web. Inside these files are "long strings of alphanumeric codes that do not reveal, on the surface, the kinds of personal information they contain. Concealed inside the code, such personal data includes housing type, age, sex, income, spending

habits, hobbies and interests, items bought, items you're interested in buying, if you're traveling soon, and other data that may be fairly revealing" (p.125).

There have been many studies on the subject of digital identity, including analyses of how identity online is connected with social identity (Blackmon, 2003), developing digital identity for young women (Blair, Dietel-McLaughlin, & Graupner-Hurley, 2010), sexual orientation associated with gaming and literacy (Alexander et al, 2007), and the limitations of templates driven by social media sites (Arola, 2010).

Beck (2015) believes these efforts need to filter into the classroom and how teachers engage with class assignments. "Talking about data collection and mining, digital and online surveillance, and various tracking technologies gives teachers points to consider not only when designing a course using the web, but also when asking students to participate in spaces that track their movements and collect user data" (p.126).

Accordingly, Reyman (2013) argued that we need to educate not only our students, but also our colleagues and ourselves about how data information operates online and how data collection efforts affect our digital spaces. Altogether, there are several issues at play with web use, including *visible* digital identities; however, it is also imperative that instructors turn their attention to the *invisible* identities created through these efforts.

McKee (2011) believes that there are three key policy issues that will have a profound effect on the future of the Web and Internet-based communications: net neutrality, corporate data mining, and government surveillance. As explained in the mission statement of the Open Internet Coalition (2010), a coalition of Internet

companies who support preserving an open Internet (or, as in the case of some companies

such as Google, claim to support):

> Internet openness (network neutrality) means that users are in control of where to
> go and what to do online, and broadband providers do not discriminate among
> lawful Internet content or applications. This is the fundamental principle of the
> Internet's design. It shouldn't matter whether you're visiting a mainstream media
> website or an individual's blog, sending emails or purchasing a song. The phone
> and cable companies that provide you with the access to the Internet should route
> all traffic in a neutral manner, without blocking, speeding up, or slowing down
> particular applications or content.

Much has been made of how the current open networks on the Internet enable

users to become producers, not just consumers of content (Anderson, 2003; Bruns, 2008);

however, "in a World Wide Web where authors must pay to deliver content, what

audiences would students find for their work if what they produce languishes on the

digital equivalent of slow, pot-holed, low-traffic back roads?" (McKee 2011, p. 280).

This is why maintaining net neutrality is essential.

Data mining for "interest-based ads" (Google's term) and "instant

personalization" (Facebook's term) is big business that is challenging the boundaries of

what online users will accept. It's no wonder that Google has patents on portable data

centers installed in shipping containers and on floating island data centers (Claburn,

2009). According to McKee, by 2020, "unless some efforts are made to rein in these

megabusinesses, everything we write with any digital device may be data mined and

'served' with 'personalized content' (e.g., ads)" (McKee 2011, p. 280).

According to Alecia M. McDonald (2009), an online privacy researcher at

Carnegie Mellon, if the average U.S. Internet user actually read the privacy policies of all

the sites she visited online, the time required would be between 181 and 304 hours per

year depending on how active an online user she was. Therefore, many users agree to have their data mined without consciously thinking about the consequences of that choice.

Mckee (2011) warns that, in a sense, the Internet serves as a panopticon. "Rather than bringing greater freedom as heralded in the first decades of the Internet, the Internet also potentially brings greater constraints. Like Bentham's prisoners in our cells (although we get to interact with each other rather than exist in total isolation), we go about our online lives with some level of awareness that our digital data could be collected and monitored. But the mechanisms and persons doing that collection are not—at least to the average Internet user—visible" (p. 285).

As Foucault (1995) explained, "The Panopticon is a machine for dissociating the see/being seen dyad: in the peripheric ring, one is totally seen, without ever seeing; in the central tower, one sees everything without ever being seen" (p. 201-202). McKee (2011) reminds us, however, that "just because we can't see the agents who may be observing us, doesn't mean that they are not there" (p. 285).

As almost every activity within the "smart" city becomes traceable because of IoT technology, we have to think about how that impacts our experience of reality. Richards and King (2013) point out, "Every Google user is already influenced by big-data-fed feedback loops from Google's tailored search results, which risk producing individual and collective echo chambers of thought." These types of problems will only become magnified as IoT comes to fruition.

There have been many academic studies that present a critique of the proliferation of big data technologies. In Hollands' (2008) pioneering paper, the smart city model is

interpreted as a contemporary high-tech innovation of urban entrepreneurialism, which plays down some of the negative effects the development of new technologies are having on cities. Looking at smart cities as the places where the concentration and interconnection of 'big data' in cities lies, Kitchin (2014) raises questions of technocratic governance, corporatization of city processes, and surveillance, while Wyly (2013) combines technology studies and political economy to argue that smart cities are to be interpreted in the context of the shift to "cognitive – cultural capitalism" boosted by the takeoff of automated data generation and mining, notably through social networks.

Taking a more Foucauldian perspective, Vanolo (2014) shifts the focus from data to citizens and discusses how the smart city model may be a powerful disciplinary tool to shape "smart citizens," who are compelled to be technologically literate. Bell (2011), presents a vision of smart cities that frames all urban questions as essentially engineering problems to be analyzed and solved using empirical, preferably quantitative, methods which give pre-eminence to urban phenomena that can be measured and/or deemed important enough to measure. In that same vein, Greenfield (2013) defines the dominant corporate discourse on smart cities as a return to the high modernism of the period 1880 – 1960, when some of the worst planning disasters of the 20th and 21st centuries occurred. Based on a more detailed argument, Townsend (2013) sees in IBM's smarter city discourse a resurrection of the urban cybernetics of the 1970s.

While some feel like issues surrounding privacy and surveillance will hold up IoT progress, others believe the market may have already found the right economic balance. "It seems like we have a working model where companies own our data and we're okay with that because of the free stuff, personalization, and convenience we get in return,"

says Gam Dias, CEO of First Retail, an e-commerce consulting company. "There's not a lot I'm going to do with my extra data anyway. I already know who I am and what I want" (quoted in Regalado and Leber, 2013).

In 2013, Intel felt that these questions concerning personal data were important enough to launch a "Data Economy Initiative," a multiyear study whose goal is to explore new uses of technology that might let people benefit more directly, and in new ways, from their own data, says Ken Anderson, a cultural anthropologist who is in charge of the project.

It's too early to say just what kinds of products might result for Intel, says Anderson. "When you talk about the data economy, it's really something that doesn't yet exist," he says. "There are people who [are] trying to control a lot of your personal data. But that's not an economy—that's just profit for one company" (quoted in Regalado and Leber, 2013).

Mobility is another key component of the emerging personal data economy. In order to truly create a digital identity beyond passive consumption of mass media content, the user must be able to be tracked regardless of location. So, not only do devices need to be traceable, they also need to be mobile.

"The Supreme Court," according to Hruska (2015), "has ruled in the past that mobile devices were different from other types of possessions precisely because the modern smartphone contains so much more information about a person than any pre-Internet piece of documentation. It combines business and personal contacts, a record of phone calls placed and received, notes, games, personal and work email, documents and images (both public and private) and a record of one's browsing history and activity."

By tying together these important theories and pieces of literature, this project greatly contributes to our understanding of how our communities are being planned and designed. It analyzes the privatization of Portland's planning processes in terms of how it impacts the lived experience of residents, how it impacts efforts to manage our natural resources sustainably, and how monopoly power within our capitalist system negatively impacts efforts to attain a true democracy. Not enough studies focus specifically on the role of UCTs within this phenomenon. Thus, it is an important endeavor to undertake and will contribute to both the fields of Media Studies and Urban Planning.

In order to conduct this study it will be important for me to engage with people who work for the private companies involved in Portland's planning process, Portland city planners, and residents. The next chapter outlines the methods for conducting this study.

CHAPTER IV

HOW TO STUDY "SMART" CITIES

Studying cities can be a major challenge for scholars. It is a complicated process that combines many different strategies for gathering information. This study utilized a number of different methods; however, the main procedures for conducting this study include document analysis, interviews, surveys, and participant observation.

Document Analysis as a Research Method

Document analysis is a major methodological component of political economy. In fact, documentary investigation was the main research tool of many classical sociologists. For example, "Marx made extensive use of the reports of the factory inspectors, Weber utilized religious tracts and pamphlets, and Durkheim employed official statistics on suicide" (Scott, 1990, p. 1).

The work of Adam Smith is seen as the origin of the political economy approach. Smith's classical political economy was founded on two main pillars of 18th Century Enlightenment scholarship: 1) Descartes's vision of rationality and 2) Bacon's approach to empiricism. In general, classical political economists, such as Smith, David Ricardo, and John Stuart Mill, sought to apply the principles of physics to the world of capitalism and determine the "economic constraints that constituted the stable, underlying reality for a world undergoing massive transformation" (Mosco, 2009, p. 38).

Marx and Engels extended upon these ideas and applied them to modern capitalist society. These concepts were then extended by Chicago School scholars, such as George Stigler, Richard Posner, and Gary Becker, as well as Frankfurt School critical theorists

Theodore Adorno and Max Horkheimer. Today, scholars such as Jurgen Habermas, Janet Wasko, Dan Schiller, Graham Murdock, Vincent Mosco, and Eileen Meehan are working on describing the major role that political economy plays when studying and analyzing communication.

In his preface to *Capital: A Critique of Political Economy* (1999), Marx outlines political economy's method of analysis. To Marx, the purpose of political economy is to analyze the capitalist economy, not as the sum of individual acts of exchange, but as a complex system, dominated by laws of its own which are as powerful as the laws of nature.

In order to truly understand the nature of documents there must be a "move away from a consideration of them as stable, static and pre-defined artefacts. Instead, we must consider them in terms of fields, frames and networks of action. In fact, the status of things as 'documents' depends precisely on the ways in which such objects are integrated into fields of action, and documents can only be defined in terms of such fields" (Prior, 2003, p.2). In other words, documents are always produced in social settings, and their dynamic meanings always take place within a specific context.

When analyzing historical documents, it is especially important to understand context. Primary sources are "the building blocks of historical research. They are the contemporaneous records related to the subject under study and they came into being during the time period the historian is studying" (Benjamin, 2006, p. 25). This means they take place within the particular context being studied, as opposed to secondary sources, which discuss the phenomenon from an outside context.

The most important and widely read early research on power was *Who Rules*

America?, which was originally written by G. William Domhoff in 1967. Domhoff suggests that the best strategy in conducting power structure research is to first create a network analysis. A network analysis traces out all the people and organizations that make up the power structure, and then figures out how they connect to and influence government. This is achieved by analyzing annual financial reports, and studying the people who sit on boards of directors or serve as high-ranking executives. Then, Domhoff suggests conducting a content analysis, which is the term for the systematic study of the power structure's ideologies, policies, and plans, which are learned about through the careful study of documents such as the texts for speeches, policy statements by organizations, and drafts of legislation (Dumhoff 2006).

Documents produced by the state, such as transcripts of government and legal proceedings, can also serve as valuable artifacts for document analysis. Many databases, including the University of Oregon Library, distinguish between government publications, which are disseminated by a government body for broad public use, and government reports, which are created or received by a government agency but usually maintained in a single copy and not intended for broader distribution. For researchers who are in the process of locating and analyzing documents, both government publications and government reports "facilitate and reflect the processes of government bodies in pursuit of their missions" (UO Library). Transcripts of government and legal proceedings represent a high level of credibility. Researchers conducting a document analysis find these types of artifacts to be valuable because there aren't any questions concerning authenticity.

Traditionally, most of the information that researchers needed to trace the webs of power in American society could be obtained only "through extensive library and archival research, close monitoring of the press, searches of government records and documents, and interviews with knowledgeable insiders. These remain important sources of data for power structure research, but today much of the information previously obtained in these ways can now be acquired more quickly and easily on the Internet" (Burris, 2010, p.1). Because of the internet, researchers have easier access to corporate financial reports and promotional documents.

For this study, the researcher looked at annual financial reports from communication companies such as IBM, Cisco, Disney, Google, Philips, and others that are becoming increasingly involved with the community and regional planning process. The goal of this analysis was to highlight how these documents promoted IoT and "smart" city efforts and to gain a sense of how much money was being generated from these efforts.

For example, Intel's 2014 annual report justified its expanded efforts into IoT by claiming that cities will spend $41 trillion in the next twenty years on infrastructure upgrades for IoT. It goes on to predict that, by 2020, four billion people will be connected to IoT and generating 50 trillion gigabytes of data by utilizing over twenty-five million apps (Intel 2014 Annual Report).

The researcher also analyzed the Comprehensive Plans (aka Master Plans) of many "smart" cities. These cities include: Portland, Songdo, Amsterdam, Atlanta, Baltimore, Rio de Janeiro, Christchurch, Melbourne, and other cities around the world.

As a result, the researcher gained an understanding of the goals that both the companies and the cities want to achieve.

Comprehensive Plans outline a city's vision of how it wants to grow and develop over the next few years. They usually contain a number of plans and ordinances that create regulations pertaining to certain types of urban development activities. For example, most cities have some sort of zoning procedure to designate particular areas of the city for certain uses. Understanding these documents is just as important as understanding a corporation's financial records. Both types of documents contain important information for this study.

The researcher looked at most of Portland's planning documents, including:

- Comprehensive Plan

- Transportation Plan

- Utility Protection Plan

- Citywide Infrastructure and Asset Management Plan

- Gentrification and Displacement Study

- visionPDX

- Infill Design Ordinance

- Economic Development Plan

- Citywide Environmental Overlay Zone Map

- Land Use Reviews

Analyzing these documents helped the researcher understand Portland's planning process and how companies such as Google, IBM, and Intel could potentially impact it. For example, Portland's Utility Protection Plan clearly states, "Construction excavation

within the public right-of-way or within [Portland Water Bureau] facility easements has the potential to undermine the integrity of adjacent water facilities" (p. 1). Yet, Portland is working with Google to help them develop utility cabinets in the public right-of-way along city sidewalks in order to allow Google to develop their fiber Internet infrastructure.

Examples such as this are precisely why document analysis is such a powerful research tool. It allows the researcher to compare documented policies, opinions, and actions to what they experience occurring in reality. Without this important step, a research project is missing important empirical evidence.

Interviews, Surveys, and Participant Observation

Although classical sociologists utilized document analysis as a main research tool, they also recognized other methods as useful tools for analyzing society. Geertz (1973) once said that he agreed "with Max Weber, that man is an animal suspended in webs of significance he himself has spun. I take culture to be those webs, and the analysis of it to be therefore not an experimental science in search of law but an interpretive one in search of meaning" (p.5).

Participant observation is a useful method because it allows a phenomenon to be perceived from a normal everyday setting. Cloonan (2011) noted that this method of analysis is great for researchers who are analyzing phenomena that take place in an open and public setting. This method allows for the researcher to observe a phenomenon without dramatically affecting it. This includes analyzing the four case study cities I plan to visit and analyze.

According to Gubrium and Holstein (1995), this is not the case for in-depth interviews. From their perspective, interviewers are deeply and unavoidably implicated in creating meaning within respondents. That is why McCracken (1998) says that every investigative interviewer "must take pains to see that the respondent is not overtly or subtly victimized by the interview process" (27). One way in which the interviewer can avoid influencing the respondents is by not being present when the questions are being answered. This is easily accomplished in the case of e-mailed surveys.

Using a mix of methods within a research project allows for a greater level of comparison and accuracy. This study utilizes political economic methods like document analysis, as well as other methods such as personal interviews, surveys, and participant observation. For example, the researcher visited communities such as Celebration and Atlanta to experience first-hand what these communities were like.

For this study, the researcher interviewed representatives from companies such as IBM, Cisco, Disney, Google, Intel, Philips, and others that are becoming increasingly involved with the community and regional planning process. The researcher also visited the main headquarters of IBM, Intel, and Google in order to talk with representative and to gain a sense of how they designed their physical environment.

As discussed in greater detail in the next section, city planners and administrators from many "smart" cities were also interviewed. Interviewing both planners and corporate employees provided the researcher with a thorough understanding of how each group interacts with one another and the power dynamics that exist within this newly evolving urban planning process.

<u>Procedures for Conducting this Study</u>

For this study, each research question required different methods to answer it. Therefore, in order to describe the procedures used to conduct this study, it is best to separate the methods by research question:

1. How are major communication corporations influencing Portland's planning processes?

In order to answer this question, the researcher analyzed a number of important documents including City Master Plans, annual reports from the major communication corporations, news sources, academic journals, and documentary films. Reviewing this information gave the researcher the context and background to understand the trend of private interests playing a larger role in urban planning processes. The researcher also interviewed people who are familiar with how Master Plans impact communities. For example, city planners and residents were interviewed in Celebration, Florida, the city that Disney created, and other communities that have experienced the privatization of their planning processes.

In April of 2014, the researcher travelled to both Atlanta and Celebration to study the planning and design of these communities. Atlanta, an IBM Smarter City, is a major metropolis surrounded by suburbs. Celebration, on the other hand, is a suburb of Orlando that is intimately tied to Disney's development of that area. The researcher held a number of interviews in Celebration with the city manager and community members. These interviews allowed the researcher to understand the relationship between municipalities and private companies.

For example, Celebration Town Hall houses the offices and personnel responsible for the Celebration Residential Owners Association, the Celebration Nonresidential

Owners Association, and the Celebration Joint Committee. Together, these organizations regulate property use within Celebration. The researcher was bale to interview Lori Rockel, the Director of Community Engagement for Celebration, in order to gain a better sense of how master-planned communities operate.

Celebration's Master Plan states, "Celebration has successfully combined education, health, community, technology and architecture into a community with a strong sense of self. World-renowned architects designed Celebration to be a new and exciting place to live, work and play." Doesn't this sound like a community everyone would want to live in? Or is the community's branding different than the lived experience?

Employees from major communication corporations who have worked on projects related to "smart" cities were also interviewed. This helped the researcher understand why these companies are entering this market and what their ultimate goals are, as well as help to compare what is happening in Portland to what is happening in other "wired" communities.

In March of 2015, the researcher had the opportunity to visit Jim Spohrer, the Director of the University Programs and Cognitive Systems Institute, at the IBM headquarters located just south of San Jose, California. Hidden in the Almaden hills, this state-of-the –art business campus utilizes many of the "smart" technologies that the IBM Smarter Cities Challenge promotes to participating communities.

While Jim recognized that there could be some potential conflicts if community members perceived the relationship between IBM and a given municipality to be problematic, he ultimately believed that the IBM Smarter Cities Challenge brought a ton

of major benefits to the communities they worked with. These sentiments were echoed by Sophia Tu, the IBM Corporate Citizenship Program Manager and Director of the Smarter Cities Challenge, when the researcher interviewed her earlier that month. She even added that, on top of the obvious benefits produced by the Smarter Cities project, this program generated many new, well-paying jobs for architects, engineers, construction workers, electricians, and many other professions.

For this study, some of the people who agreed to be interviewed are:

- Sophia Tu – IBM Corporate Citizenship Program Manager
- Jim Spohrer - Director, IBM University Programs and Cognitive Systems Institute
- Herman D'Hooge - senior principal engineer and innovation strategist at Intel
- Judith Mowry – Senior Policy Advisor at Portland Office of Equity and Human Rights
- Jim Hagerman – Interim Director of Portland Bureau of Environmental Services
- Josh Alpert – Portland Mayor's Director of Strategic Initiatives
- Michael Armstrong - Senior Sustainability Manager, Portland Bureau Planning & Sustainability
- Brendan Finn – Portland Commissioner Dan Saltzman's Chief of Staff
- Bobby Lee – Oregon Regional Solutions Team
- Denise Cheng - SF Mayor's Office of Civic Innovation
- Carmen Merlo – Director of Portland's Bureau of Emergency Management
- Katie Shriver - Office of Portland Commissioner Steve Novick
- Chris Tamarin – Telecommunications Strategist for the Oregon Business Development Department
- Lori Rockel – Director of Community Engagement for Celebration, Fl
- Janet Hillock – Regional Coordinator, Oregon IFA
- Lynn Schoessler – Oregon IFA Director
- Richard Foglesong – Professor at Rollins College
- Joseph Reyes – Resident of Celebration, Fl
- And many others list in the appendix

2. What are the major communication companies that are involved in Portland's planning processes?

Interviews were essential to answering this question. By talking to Portland city planners and policymakers, the researcher gained a sense of which major communication corporations are specifically involved in Portland's planning processes and to what degree. The focus was to uncover how the City of Portland perceives this relationship and to understand their ultimate goal in fostering this sort of business partnership with major communication corporations.

For every interview, the researcher recorded the interaction and took the recording home in order to take notes and incorporate information from the interviews into this document. This allowed the researcher to listen to each interview multiple times and to return to each interview after uncovering data from newer interviews or documentary investigations.

Josh Alpert, the Mayor of Portland's Director of Strategic Initiatives, spoke with the researcher at length about the process of applying to be a Google Fiber community and why "smart" city efforts could be a benefit to the City of Portland. He felt that the opportunity for Portland to brand itself with successful tech companies such as Google, IBM, and Intel was a special opportunity that could really increase Portland's worldwide notoriety and popularity.

Brendan Finn, Portland Commissioner Dan Saltzman's Chief of Staff, also agreed that this relationship was ultimately beneficial for Portland's future. Commissioner Saltzman was in charge of the Bureau of Planning & Sustainability when they were involved with IBM in the computer model project, so Brendan got to see first hand what the process was like. In his perspective, more interactions like this should exist between

private companies and municipalities. He truly believed that more relationships between private companies and municipalities could lead to positive results for our communities in terms of traffic congestion, water and electrical use, and other important urban planning issues.

Carmen Merlo, the Director of Portland's Bureau of Emergency Management, had a different take on "smart" city technology. She believed that UCTs had the potential to save lives. Katie Shriver, Portland Commissioner Steve Novick's Staff Member, shared those sentiments. She speculated that UCTs could greatly help emergency response efforts.

Judith Mowry, the Senior Policy Advisor at the Portland Office of Equity and Human Rights, sees this trend in a different light. As the co-founder of the Restorative Justice Project on Gentrification, she is worried about the implications of communities being designed specifically for demographics with access to "smart" technologies. While IoT innovations might make some people's lives easier, it doesn't do anything to address the social, political, and economic inequality issues that currently exist in each of our communities.

In fact, if anything, these "smart" cities are meant to benefit people who already fit into a higher socio-economic demographic. However, IoT innovations do nothing to address the wealth gap or to promote a more egalitarian perspective of society. Instead, it simply helps make the lives of groups of people, who already have relatively easy lives, even easier.

State Representative Lew Frederick shares similar concerns. Representing the northern district of Portland, Representative Frederick is concerned about the digital

divide and will be expanded within "smart" cities. He's already noticed a major gap in his community between families with access to computer technology and those without those privileges.

He says he constantly surprised to see how many people expect others to have easy access to computer technology. That is why Representative Frederick believes that every family should have access to the data gathered about them in order to be able to utilize it in meaningful ways. Instead, we see the data gathered about us controlled by powerful communication corporations.

The researcher also spoke with people who work for the major communication corporations that are involved with Portland's planning processes. Namely, the researcher reached out to people like Herman D'Hooge, an Intel employee who collaborated with University of Oregon to figure out ways to implement Intel products into Portland's long-range planning visions. This allowed for understanding of the ultimate goals of major communication corporations who want to be a part of Portland's planning processes. Representatives from Google and IBM were also interviewed, and the west coast offices of all three corporations were visited by the researcher.

While the interviews were open-ended, these were some of the questions asked during these conversations with corporate employees:

- What role do you play in your company's IoT efforts?
- Do you see the implementation of "smart" cities as a positive thing for our society? Pros and Cons of these efforts?
- Who are the major players involved in these IoT "smart" city efforts?
- What specific UCTs is your company working on?

Document analysis again was important for this question. After discovering which companies are involved in Portland's planning processes, the researcher needed to become extremely familiar with their corporate structure and business activities. Annual reports and city master plans again were a major component of answering this question.

Specifically, the researcher analyzed the annual financial reports from IBM, Intel, Google, Cisco, Philips, Infinity, Lexus, and other companies taking part in this "smart" city, IoT trend. Interviews with Oregon elected officials were essential to answering this question, as well. Some of those elected officials included: Senator Arnie Roblan, Representative Lew Fredericks, Representative Caddy McKeown, and many others.

Again, while the interviews were open-ended, these were some of the questions asked during these conversations with state agency employees and elected officials:

- Has your community been impacted by IoT "smart" city efforts? Positive or negative?

- In general, do you support these efforts? Why?

- Who are the people within Google, IBM, and Intel that you have worked with?

- How will these efforts impact the future of community planning processes?

- Are all population demographics impacted by these efforts similarly?

In general these interviews were very successful in terms of helping the researcher understand which communication corporations were impacting Portland's city planning processes.

3. What are the implications of major communication corporations becoming an integral part of Portland's planning processes?

This is the most important part of the study; therefore, the procedures are more complicated for answering this question than the other two. In order to understand the implications of this phenomenon, the researcher needed to engage with local community members. Therefore, the researcher collaborated with Judith Mowry, Senior Policy Advisor for Portland's Office of Equity and Human Rights, to create a survey that can be filled out by community members. These surveys were available at community meetings, as well as online. The researcher also worked with the Oregon Business Development Department's Infrastructure Finance Authority (IFA) to promote the survey on their website. The hope was that other city planners would also take part in disseminating the survey.

The survey measured residents' feelings about their planning processes being influenced by private interests. It measured whether it impacts their day-to-day lives in any meaningful ways and whether they feel it impacts their ability to democratically engage with local planning processes. Finally, it also helped measure residents' perspectives of public space in their local community. The surveys can be reviewed here: https://www.facebook.com/companytown

There was one survey for Portland community members and another survey for everyone else. The goals of the surveys were: 1) To gage to what degree people were aware of IoT efforts; 2) To understand if they were critical or receptive to the idea of "smart" cities; and 3) To examine how often community members engage with local planning processes.

For the survey Portland residents, they were asked questions such as:

- Google is planning to build fiber Internet infrastructure in Portland. What are your thoughts on this? Is this good for Portland?
- Do you consider yourself a person who is engaged with Portland's planning processes? Do you attend public hearings or meetings about important city planning decisions that impact you and your community? If so, how often? Do you engage with the community planning process in other ways?
- Are you aware of any other efforts by major corporations (such as IBM, Intel, or Cisco) to impact Portland's planning processes? If so, which companies, what are they doing, and what do you think about it?
- All survey questions can be found in appendix.

Over 200 people filled out this survey. While the results of this survey are discussed more in the Findings and Conclusion chapter, the general results of this survey revealed that many Portland residents were not aware of Google, IBM, and Intel's efforts to impact the planning and design of Portland, and most respondents were critical of these efforts.

For the survey of everyone else, they were asked questions such as:

- Google, IBM, Intel, and Cisco are all playing a role in the planning and design of Portland, Oregon. Does knowing this information change your perspective of Portland? When you hear that Portland is being planned by large private corporations, does that attract you to Portland or turn you off from it?
- In general, what are your thoughts on private companies (such as Google, IBM, Intel, Cisco, and Disney) playing a major role in the planning and development of our communities? Would it bother you to live in a city designed by a large private corporation?
- All survey questions can be found in appendix.

150 people from outside of Portland filled out this survey. Respondents in this survey were less critical of the idea of private interests playing an increased role in

community planning processes. Surveying people outside of Portland allowed the researcher to see whether Portland residents' perspectives of these issues was similar or different than people in other communities.

In short, this study used a wide range of research methods; however, interviews and document analysis were the two most important. The researcher needed to be familiar with all documents that discuss this phenomenon and needed to develop relationships with planners, policymakers, residents, and those who work for major communication corporations in order to understand their opinions and perspectives. A survey helped to gather a general understanding of how many Portland residents feel about their planning processes being impacted by private interests.

Significance and Limitations of this Study

As already mentioned, this project is important because of its contribution to our understanding of how our communities are being planned and designed. It analyzes the privatization of Portland's planning processes in terms of how it impacts the lived experience of residents, how it impacts efforts to manage our natural resources sustainably, and how monopoly power within our capitalist system negatively impacts efforts to attain a true democracy. Not enough studies focus specifically on the role of UCTs within this phenomenon. Thus, it is an important endeavor to undertake and will contribute to both the fields of Media Studies and Urban Planning.

This project is limited by the fact that it is only focused on one community. Therefore, it is hard to say that the conclusions of this study are easily generalizable to other cities. Access to important documents and knowledgeable people was also a

limitation of this study. However, the hope is that the findings and conclusions of this

study can help inform future explorations into how private interests, namely

communication corporations, influence community planning processes.

CHAPTER V

"SMART" CITY PLANNING

Drawing from the methods and procedures highlighted in the last chapter, Chapter V explores the findings from this research project. The first section analyzes the efforts of Google, IBM, and Intel to build smart cities and bring the IoT to fruition; the second section explores specific actions taking place in Portland, Oregon; the third section highlights how these findings help political economists reinterpret the notion of leisure time in the era of UCTs; and the final section discusses the experiences of residents who live in "smart" cities.

This next section discusses the main companies that were analyzed in this study: IBM, Intel, and Google. It gives a brief overview of each company's focus and why these specific companies are interested in being more involved with city planning processes.

IBM, Intel, and Google

The purpose of this section is to explore the history and evolution of the three major companies being analyzed in this study. It's worth noting that investing in "smart" cities seems consistent with these companies' previous business strategies. "Smart" cities might represent a slight evolution in the way these companies think about their products, but it makes sense that these specific companies would be major players in this movement.

IBM & Data

The term "smart" has frequently been used interchangeably with "wired," "digital," "telecommunications," "informational" and "intelligent" (Hollands, 2008). Dirks and Keeling (2009) define a smart city as one that deploys technology to transform core systems (people, business, transport, communication, water and energy) and optimize returns from finite resources.

On November 4, 2011, the trademark "smarter cities" was officially registered as belonging to IBM. This was an important milestone in a struggle between IT companies over visibility and legitimacy in the smart city market (Soderstrom, 2014). IBM's involvement with technological innovation, however, began well before 2011.

International Business Machines Corporation, or IBM, is the world's leader in information technology services. However, IBM's financial success is covered in controversy. IBM's reputation for being a leading innovator in the world of technology and "the ultimate master of vertical integration" in the world of business coincides with a legacy of unfair labor policies, a relationship with the Third Reich, and monopolistic acquisitions within the mainframe technology market.

Herman Hollerith invented IBM. Born in 1860, Hollerith's father died when he was only seven years old, leaving his mother to raise five children alone. At the age of fifteen Hollerith enrolled in the College of the City of New York. At nineteen he graduated from the Columbia School of Mines with a degree in engineering, and accepted an invitation from one of his Columbia professors to become an assistant with the US Census Bureau (Black 2001).

One night, soon after moving to Washington, DC, Hollerith was having dinner with John Billings, Director of Vital Statistics. Billings mentioned to Hollerith, "There ought to be a machine for doing the purely mechanical work of tabulating population and similar statistics." Hollerith was captivated by this idea, and spent the next five years of his life thinking of a solution. In 1884, a prototype was constructed and tested. Hollerith's design involved using punch cards to tally statistics, with each hole on the card representing a different trait (Black 2001). Sobel (1981) notes that it was basically a nineteenth century version of a bar code.

When the US Census Bureau sponsored a contest seeking the best automated counting device for its 1890 census, Hollerith's invention was the winner. His system could do more than just count numbers of people, it could also rapidly perform the most tedious accounting functions for any enterprise: from freight bills for the New York Central Railroad to financial records for Prudential Insurance. His design saved the US Census Bureau about $5 million, a third of its budget for the 1890 census (Black 2001:26). By the end of the year, census and statistical departments in Russia, Italy, England, France, Austria, and Germany all submitted orders for Hollerith's invention.

In 1896, Hollerith started the Tabulating Machine Company. However, while Hollerith was a great inventor, he was not a great business man. After the 1900 census, Hollerith's company began to flounder. After becoming disillusioned by lawsuits and potential competition, in 1910 he decided to start parceling off his interests. He started in Germany by licensing all of his patents to Willy Heidinger's firm, Demohag. The next year an embittered Hollerith decided to completely sell all of his assets to the international adventure capitalist Charles Flint. Hollerith sold his stock in the Tabulating

Machine Company for about $1.2 million, and signed a 10-year consulting contract worth $20,000 per year (Black 2001).

Charles Flint originally built his wealth by being a war profiteer. He sold weapons to both Peru and Chile when a border skirmish between them erupted, and both Japan and Russia during their various conflicts. He even licensed the manufacture of the newly invented Wright Brothers airplane to Kaiser Wilhelm and the Germans (Pugh 1995). In other words, Flint wanted money - on any terms. In 1911, Flint did not just purchase Hollerith's Tabulating Machine Company; he also purchased three other firms: International Time Recording Company (time clocks for hourly workers), Computing Scale Company (scales and meat slicers), and Bundy Manufacturing (key-activated time clocks). While these firms defied any apparent rationale for a merger, Flint explained it as "a synergistic combine that would bring ready cash and an international sales force to four seemingly viable companies stunted by limited growth potential or troubled economics" (Black 2001:31).

Flint named his new corporation the Computing-Tabulating-Recording Company, or CTR. In 1914, he hired Thomas J. Watson. Watson joined the company as its general manager, and helped run the business and financial side of the company until 1956. In 1922, Willy Heidinger's German firm Demohag was having trouble paying back their royalties for the equipment they had leased from CTR. Watson went out to Germany to meet with Heidinger and offered to keep Demohag afloat as long as CTR could control 90 percent of Demohag's stock. Backed into a corner Heidinger agreed, and Demohag became a CTR subsidiary (Black 2001).

In 1924, Watson decided to change the company's name from CTR to International Business Machines, or IBM, because he felt it better communicated the company's mission (Mercer, 1987). They were not dedicated to selling minor products like meat slicers and clocks; they wanted to be known for "producing vital business machines for a world market" (Black 2001:40). Watson became the face of IBM. In many places, 'Watson' and 'IBM' were inseparable.

When Hitler was elected as the German Prime Minister in 1933, every international business had to question whether trading with Germany was worth the economic risk or moral descent. While IBM was famous to Americans, their foreign subsidiaries like Demohag (Germany), Watson Belge (Belgium), Watson Italiana (Italy), and Svenska Watson (Sweden), were well below the American public's radar. Therefore Watson felt trading with Germany was well worth the risk.

While leasing equipment from IBM, Demohag was responsible for organizing the 1933 German census which first served to identify Jews, homosexuals, and Gypsies. This same punch-card technology could be found at most concentration camps. In fact, IBM workers trained Nazi officers how to use the equipment, as was protocol for any leased equipment. In other words, "IBM Germany, using its own staff and equipment, designed, executed, and supplied the indispensable technologic assistance Hitler's Third Reich needed to accomplish what had never been done before - the automation of human destruction" (Black 2001:8).

The fact that Hitler planned to extend his reign to other nations only magnified IBM's prospective profits. To Watson, this was called account growth. During Hitler's reign, despite an economic depression and the Roosevelt Administration's National

Recovery Act which "created a massive bureaucracy to assist the public and control business, IBM doubled its size" (Black 2001:46). This was, in large part, a result of their relationship with the Third Reich. Thus, we can see how IBM's products have long had an impact on our communities.

While IBM made its name in the 20th Century by manufacturing computers, the company is going in a new direction in the 21st Century. According to IBM's research, the market for data and analytics is estimated at $187 billion by 2015. In response to that prediction, two-thirds of IBM's work is now devoted to data, analytics, and cognitive computing (2013 IBM Annual Report). This explains why city planning has become an attractive market to IBM. It's a field rich with data and a need to organize that data efficiently.

IBM's efforts have resulted in the company becoming the top player in terms of Data Processing and Hosting Services. IBM's operations are divided into five business segments: global technology services (GTS), global business services, software, systems and technology and global financing. IBM competes in the Data Processing and Hosting Services industry via its GTS division, which provides IT infrastructure services and business process services. This segment provides strategic outsourcing services using cloud computing, analytics, and virtualization to help businesses meet their IT needs.

The fastest-growing portion of this division is cloud computing. The IBM SmartCloud delivers business and IT services over the network, changing the way that businesses use and store data. In 2012, an estimated $35.0 billion in commerce transactions were conducted in the IBM SmartCloud. IBM has helped clients integrate cloud computing into their business by making IT resources highly automated and

virtualized. Amid increasing demand for cloud computing, IBM has made itself a leader in the industry by heavily investing in this technology. The company holds more patents than any other US-based company, investing $6.0 billion annually in research and development (IBIS World, 2014a).

Profiting from the collection of data is IBM's main motivation for entering the realm of city planning. What does this mean to Portland's residents if their city planning processes are privatized in order to fulfill this goal? IBM has made it clear that they plan to change the way we live our lives and work at our professions by implementing data collection services in ways that can't be ignored. As IBM puts it, "Traditional computing systems, which only do what they are programmed to do, simply cannot keep up with Big Data in constant motion. For that, we need a new paradigm. This is the driver of IBM's first strategic imperative: To make markets by transforming industries and professions with data" (2013 IBM Annual Report).

One of the strategies for achieving this goal is IBM's Smarter Cities Challenge, which asks cities to apply to IBM with community planning projects that tackle a diverse array of issues, including protecting drinking water supplies, tackling food deserts, and reducing traffic congestion. To date, they have served over 100 cities with this program and have plans for more.

While IBM is the leader in Data Processing and Hosting Services, Intel dominates the Semiconductor and Circuit Manufacturing industry. The next section discusses the history of Intel and how privatizing Portland's city planning processes fits within Intel's current strategies.

Established in 1968, Intel Corporation is the world's largest semiconductor chipmaker, developing advanced integrated digital technology platforms for the computing and communications sectors. Currently, Intel employs more than 100,000 employees worldwide, with more than half of these workers located within the United States. The company also has offices in major cities across six continents, including one in Hillsboro, Oregon. In 2013, Intel's company-wide revenue totaled $52.7 billion (IBIS World, 2014b).

Intel's constant focus on developing new forms of microchip technology is reflected in their company's motto. According to Brian Krzanich, Intel's CEO, "The relentless pursuit of Moore's Law is Intel's foundation and continues to be our driving force. We lead the industry as the only semiconductor manufacturer in the world offering Tri-gate transistors and 22-nanometer (nm) technology-based products. The benefits of Moore's Law can be seen across our product lines in the form of higher performance, lower energy requirements, and lower cost per transistor" (Intel, 2014).

Moore's Law is the prediction that, in terms of computer hardware, the number of transistors in a dense integrated circuit doubles approximately every two years. This theory is named after Gordon E. Moore, co-founder of the Intel Corporation, who described this trend in his 1965 paper "Cramming More Components onto Integrated Circuits." In that paper, it is hard to deny Moore's ability to predict what the semiconductor and circuit industry would be like in the future. As he puts it, "The future of integrated electronics is the future of electronics itself. The advantages of integration will bring about a proliferation of electronics, pushing this science into many new areas.

Integrated circuits will lead to such wonders as home computers - or at least terminals connected to a central computer - automatic controls for automobiles, and personal portable communications equipment… But the biggest potential lies in the production of large systems. In telephone communications, integrated circuits in digital filters will separate channels on multiplex equipment. Integrated circuits will also switch telephone circuits and perform data processing" (Moore, 1965: 82).

In other words, Moore saw the potential in creating the microchips that other companies would need in order to operate their products. Intel has certainly modeled its business strategies after this perspective. They produce the microchips that IBM and other computer, phone, and electronics companies need to create their products.

However, Moore's Law is often utilized by financial analysts, as well. If circuit speeds can double every two years, why can't profits? Intel sees Moore's Law as more than just a theory that their scientists should adhere to; they also see it as a theory that should be central to their financial efforts.

In that sense, is this the type of company that we want planning our communities? While Moore's Law might be an appropriate framework for private interests who want to profit from the creation of new computer technologies, is it an appropriate framework for communities that want to be sustainable and resilient? Would integrating Intel products into the planning and design of Portland improve the community's efforts to reduce waste, or would it simply lead to more waste in the long run as the City would need to constantly reinvest in new forms of Intel's commercial products? In that same vein, do you want our communities to be planned by a company that's main focus is internet surveillance? The next section explores such a company: Google.

Google & Surveillance

Google is the world's leader in both Search Engine Services and Internet Publishing/Broadcasting. They own 27% of the Internet Publishing and Broadcasting industry, and they own 75% of the Search Engine Services industry. The company operates as an internet publisher through YouTube, as well as its social media platform Google+ and its blogging website Blogger. Google offers these services to users free of charge and generates revenue through selling advertising space. An estimated 90.0% of Google's revenue will be generated from advertising sales in 2014 with 42.3% of this advertising revenue coming from sales to customers in the United States. Additionally, total company revenue is forecast to reach $72.0 billion in 2014 (Hoopes, 2014).

Google's revenue in this industry is derived from its AdWords and AdSense programs. AdWords is an automated service through which advertisers bid against one another to place their ads next to content on Google sites and sites of members of Google's network. Third-party sites are admitted to Google's network through the AdSense program. With AdSense, Google places relevant ads generated from AdWords on independent websites and shares revenue with the operators of these sites. Currently, content publishers that participate in the AdSense program receive 68.0% of the amount Google collects from advertisers. As a result, Google helps generate revenue for many other companies in this industry (Hoopes, 2014).

Furthermore, by admitting independent websites into its AdSense network, Google is able to generate revenue from even the smallest of websites. Google has consistently established itself as the leading innovator in internet advertising; in 2012, the

company introduced Google Customer Surveys, a varying market research question that consumers are required to answer prior to viewing certain online content, such as articles or videos. Advertisers pay Google to run these surveys, and Google pays content providers $0.05 per response (Hoopes, 2014.). Given that YouTube alone gets an estimated four billion views per day, Google's advertising strategies have proven to be extremely successful.

In fact, their advertising strategies have been so successful that they've been accused of using their new Google Fiber internet infrastructure as a tool to increase their profits in this sector. For example, when it was first launched Google Fiber's terms of service stated that its subscribers were not allowed to create any type of server. Their original use policy read: "Your Google Fiber account is for your use and the reasonable use of your guests. Unless you have a written agreement with Google Fiber permitting you do so, you should not host any type of server using your Google Fiber connection, use your Google Fiber account to provide a large number of people with Internet access, or use your Google Fiber account to provide commercial services to third parties (including, but not limited to, selling internet access to third parties)" (Singel, 2013.). After receiving tremendous criticism for this and being accused of protecting their own interests at the expense of personal rights, the acceptable use policy for Google Fiber was modified to allow "personal, non-commercial use of servers" (Fenley, 2013).

What does it mean to the communities that have received Google Fiber if their Internet infrastructure is being built and designed by a company that's main objective is to generate advertising revenue through data collection tactics? Does this mean that the company that controls our rights on the internet will start to have more influence on the

rules and regulations that govern our everyday lives? Peter Thiel, cofounder of PayPal,

argues that Google is a monopoly. Despite the fact that Google owns 75% of the global

search engine market, Thiel says that Google frames itself as "just another tech

company," which allows it to sidestep scrutiny. However, Thiel still argues that Google is

a monopoly because competitors Microsoft and Yahoo lag at 18% and 11% market share

of the search engine market and you can't expect "to Bing" to enter the Oxford English

Dictionary like "to Google" has. Google has embedded itself in our culture the same way

that Disney and AT&T have. Thiel goes further:

> Google's motto - "Don't be evil" - is in part a branding play, but it's also
> characteristic of a kind of business that's successful enough to take ethics
> seriously without jeopardizing its own existence. Monopolists can afford to think
> about things other than making money; non-monopolists can't. In perfect
> competition, a business is so focused on today's margins that it can't possibly plan
> for a long-term future. Only one thing can allow a business to transcend the daily
> brute struggle for survival: monopoly profits (quoted in Baer, 2014).

In short, the rise of "smart" cities can, in many ways, be seen as consistent with

the previous business strategies of companies such as Google, IBM, Intel, and others that

are interested in being involved in city planning processes. IBM has a long history of

being interested in data management technologies; Intel has a long history of increasing

the capacity of microchip technology; and Google has made its name by managing data

in a way that has been proven to be extremely financially lucrative. Allow of these

activates will a play a vital part in the evolution of "smart" cities. These companies

already utilize a number of monopolistic business practices, and the urban planning

market helps to increase their potential use of synergy.

The Privatization of Portland's Planning Processes

Overall, the interviews and surveys conducted for this study were extremely successful in terms of gathering valuable data for this study. The researcher was able to connect with various stakeholders with different interests in the emergence of IoT "smart" cities.

As expected, most of the interviews with employees from Google, Intel, and other communication corporations produced a more positive outlook of IoT. In fact, Jim Spohrer, Director of IBM University Programs and Cognitive Systems Institute, said that "smart" cities could be the most important communication innovation this world has ever seen.

Sophia Tu, IBM's Corporate Citizenship Program Manager, definitely sees the benefits of the Smarter Cities Challenge. And, in many ways, it is hard to argue with her. IBM's program has helped many communities around the world with important planning issues such as tackling traffic congestion, reducing food deserts, and sustainable utility use.

Carmen Merlo, the Director of Portland's Bureau of Emergency Management, and Katie Shriver, Portland Commissioner Steve Novick's Staff Member, believe that UCTs had the potential to save lives. They speculated that UCTs could greatly help emergency response efforts by providing early warning systems and better mapping technologies.

Judith Mowry and Representative Lew Frederick, on the other hand, spoke about many downsides of this trend. As the co-founder of the Restorative Justice Project on Gentrification, she said that she is worried about the implications of communities being

designed specifically for populations with access to "smart" technologies. While IoT
innovations might make some people's lives easier, it doesn't do anything to address the
social, political, and economic inequality issues that currently exist in each of our
communities. In fact, if anything, these "smart" cities are meant to benefit people who
already fit into a higher socio-economic demographic. However, IoT innovations do
nothing to address the dramatic wealth gap or to promote a more egalitarian perspective
of society.

That is why Representative Fredrick believes that families should have control
over the data collected about them. Not only do we need to ask important questions about
what aspects of our lives we want tracked and monitored, we also need to start to asking
about who control that data and what they intend to do with it. Is it for our benefit? Or is
it for their profit?

The surveys found that a majority of people had heard of "smart" city efforts but
didn't necessarily know of any particular projects going on in their community. The
surveys also revealed that most people do not engage very often with local planning
processes. How are we supposed to plan our communities if we don't attend Planning
Commission meetings?

In an interview with Herman D'Hooge, he poised the question, "If you had never
heard of Intel's phrase "Internet of Things," how would you describe that phenomenon?
What would you call it?"

The Internet of Things, aka the Internet of Everything, is basically just a network
of RFID chips. In terms of the physical infrastructure that makes up an IoT "smart" city,
implementing UCTs with RFID capabilities is an essential part of the effort. In other

words, is "RFID" city another synonym for a "smart" or "wired city? To what degree will we connect with RFID chips?

"Smart" cities are also not polyrational in nature. Schwarz and Thompson (1990) promoted a new framework for policy analysis that took into account multiple perceptions. One of the main components of the political culture that Schwarz and Thompson desired was recognition of the four rationalities laid out in Cultural Theory: individualist, egalitarian, hierarchist, and fatalist.

In fact, they utilized these four rationalities to analyze a number of planning and public policy issues. In their view, "Each of the rationalities, when acted upon, both sustains and justifies the particular organizational form that goes along with it. The high-rise, system-built tower block, for instance, is the hierarchist's solution to the housing problem; gentrification, the individualist's; cooperative self-build, the egalitarian's; homelessness, the fatalist's" (p. 8).

"Smart" cities are also inconsistent with the notion of wicked problems. Hartmann (2012) defines a wicked problem "by the following properties: it cannot be definitively formulated, it has no 'stopping rule' and it is always unique (and so is its solution). A solution to a wicked problem is not 'true-or-false,' but 'good-or-bad'; such a solution cannot be tested, and there are no enumerable options of solutions. In addition, a wicked problem can be considered as a symptom of another problem, and the choice of explaining a wicked problem determines the problem's resolution" (2). In other words, a wicked problem is an issue that has no definitive answer. It involves a number of different stakeholders who have a hard time even defining the problem. Wicked problems

require "clumsy solutions" because a clumsy solution is polyrational by design (Hartmann, 9).

"Smart" cities promote the notion that if enough data is gathered about a community's actions we will be able to make substantive changes to the problems facing our society. The problem is, however, that many of these problems don't have substantive solutions. Therefore, the wicked problems facing our society cannot be solved by increased data analytics.

Data analytics will be one of the most important topics facing our society in the next few years. The information contained in the data being gathered by companies such as Google, IBM, and Intel is extremely valuable. It can (and will) be used to help those companies profit, as well as help individuals and governments make decisions that impact their communities. As Jara (2014) puts it, "Analysis of data from human beings will be one of the major revolutions in the following years in terms of knowledge generation and services enhancement. There are multiple research lines focused on the data analysis to build complex networks that address political, economic and social behavior" (p.1007).

It's estimated that IoT will come to fruition within the next five years; however, for that to happen, some major obstacles need to be overcome first. For example, "there's still infrastructure work to be done. Telecoms and governments have to create digital avenues that would let all software-powered items talk to one another. And we need super-techie advances with microprocessors and batteries that will last for years" (Heine, 2015).

Companies such as Apple are already trying to solve these problems. In fact, Apple's efforts have been so aggressive that they've had lawsuits brought against them. In June 2014, Apple began an "aggressive campaign to poach" employees from A123 Systems LLC, the Waltham, Massachusetts-based battery maker said in the lawsuit. Apple hired five people from A123 and has tried to hire battery experts from LG Chem Ltd., Samsung Electronics Co., Panasonic Corp., Toshiba Corp. and Johnson Controls Inc., according to the lawsuit.

"Apple is currently developing a large-scale battery division to compete in the very same field as A123," the battery maker said in a separate state-court filing. According to Higgins (2015), "The recent hiring effort at A123 began with Mujeeb Ijaz, a former Ford Motor Co. engineer, who founded A123's Venture Technologies division, which focused on materials research, cell product development and advanced concepts. He began at Apple in June and began hiring direct reports from A123's venture technologies division, which he had headed. Tesla CEO Elon Musk told Bloomberg *BusinessWeek* this month that Apple was seeking to hire away his workers, offering $250,000 signing bonuses and 60 percent salary increases."

Apple also has interest is making smart cars. However, their strategy in that realm, as it consistently is in most ventures, is to wait and let companies such as IBM, Intel, and Google introduce these innovations and figure out how they will be integrated into society before Apple comes in and attempts to make a better version of these companies' ideas. As Higgins (2015) explains:

> Apple, which posted record profit of $18 billion during the past quarter, has $178 billion in cash with few avenues to spend it. The Cupertino, California-based company's research and development costs were $6.04 billion in the past year, and Chief Executive Officer Tim Cook is facing increased pressure to return cash to

shareholders. The CEO has been pushing the iPhone maker to enter new categories to further envelop users' digital lives with Apple's products and services. Apple's possible foray into cars follows a similar path it's taken to break into other industries. The company wasn't the first to make a digital-music player or smartphone, and only entered those markets once it had a product that redefined those categories.

That is why studying IBM, Intel, and Google is so important. These companies, unlike Apple and many others, don't just create better versions of already existing ideas; these companies persuade society to think about their everyday interactions with their physical environment differently. They integrate their ideologies into the fabric of popular consumer culture in a way that makes it difficult to untangle. Their understanding their actions, and how they impact communities such as Portland, Oregon, is of the utmost importance.

Despite the hurdles that still stand in the way, IoT is coming very soon. A number of huge IoT advancements took place in 2013. Namely, the growth of smart sensors allowed the notion of the social structure of IoT to truly come into form. As Bonner (2015) puts it, "2013 was the watershed year where we witnessed the continuous invasion of sensor technologies into all 'things' – enabling 'smart' app-enabled technologies to blossom, creating opportunities for useful, converged (digital & physical) experiences to be delivered to us humans… Whether it's a haptic snowboard that can teach you how to properly carve a mountain, a very Star Trek-like tricorder that relays medical information to your mobile device, or even a smart carbon-monoxide and smoke detector to compliment your 'smart' thermostat; we seem to have an early and insatiable appetite for all things 'smart'. These products all share the same trait in that the sensor

technology is baked in to the product itself, forever altering how the product can interact with other technologies, applications, and humans."

When we think about how humans will interact with applications in IoT, we have to also consider the possibility that people might want to physically wear the sensors. As RFID technology continues to advance, this is definitely something we are likely to see in the near future. Bonner (2015) elaborates, "We are actively, and very willingly, embedding ourselves, our tools, and our toys with wearable sensors in order to gain new data and insights about our own performance metrics… This is where buildings can be transformed into social counterparts that enhance our experiences. This movement centers around the idea of creating frictionless physical experiences for humans by using social digital credentials. For example, physical access into buildings, the alleviation of lines by creating environments where services can be greatly streamlined and enhanced, the exceptionally timed delivery of social or media content, and much, much more."

This intimate connection with the sensors and applications that make up the structure of IoT has the potential to help individuals analyze data about themselves and make choices about actions. Known as the "quantified self," this notion allows large communication corporations to argue that IoT advancements are meant to benefit community members. As Bonner (2012) explains, "In its most concise form, self quantification is the tracking of daily activities through technologies, delivering back to the user some 'performance' analytics. The data and metrics help the user alter a behavior in order to self-improve. The soon to be assuaged behavior can be hyper-specific, like wanting to drive your car in the most efficient manner or it can be much more broad involving myriad health conditions and goals you are attempting to reach… There is a

reason the quantified self is comprised of the biggest tech trends and it's important to recognize that what is now niche will be dominating industries and sectors in short order."

In fact, according to IAB's 2015 "Marketer Perceptions of Mobile Advertising" report, which was conducted by Ovum and is based off answers from 200 marketing executives, "Marketers are clearly mindful of the potential opportunities presented by newer types of connected device along side established platforms in the shape of smartphones and tablets. Seventy-three per cent of brands gave connected TVs a high-end ranking of 3 or 4 (4 being the highest), which makes sense as these are the more prevalent and established type of next generation connected devices. But the newer connected platforms also received high scores. Sixty-nine per cent of respondents gave 3 and 4 scores to connected cars (i.e. with connected in-car dashboards for interactive services) while 66% gave the same high-end ranking to wearable devices such as smart watches, glasses and fitness devices" (p. 17).

On top of the examples already highlighted earlier in this paper, many other communication companies are working directly with cities to help make IoT a reality. For example, Cisco calls its own "version" of IoT the Internet of Everything. Barcelona, the capital city of the autonomous community of Catalonia in Spain, teamed up with Cisco to deploy city-wide IoT systems and services to better serve its citizens and visitors.

The Internet of Everything acts as the backbone around which technological initiatives are being undertaken in Barcelona, rather than doing projects in silo. A 500 Km long underground fiber network is being installed progressively as the city carries out routine maintenance to its roads and other underground services, which helps reduce

installation costs significantly. On top of that, "Barcelona's smart bus stops are connected to the city's fiber network. They display real time bus timetables, tourist information and digital advertising, offer USB charging sockets for mobile devices such as smartphones and tablets, and act as free WiFi hotspots, allowing people to connect to the Internet using their mobile devices while waiting for a bus. The city's smart parking spots are also connected to Barcelona's WiFi network. They detect the presence of cars through a combination of light and metal detectors, but do not currently work with motorcycles. Online searching and payment for the smart parking spots is possible using dedicated smartphone apps" (Boulos & Alshorbaji, 2014).

According to Antoni Vives, Barcelona's Deputy Mayor for Urban Habitat, the main rationale behind his city's embracement of IoT is to improve the quality of life of people. IoT was already credited with increasing financial efficiency because the city was able to make big savings in areas such as smart water (savings of €42.5 million [US $58 million] a year) and lighting and parking management (increased revenues of parking fees by 33% or €36.5 million [US $50 million]), besides creating 47,000 new jobs related to the smart city developments in Barcelona. In a video interview posted online in Novemeber 2013, Antoni Vives proceeds to describe his ultimate vision of a smarter Barcelona in ten years' time as "a city of culture, creativity, knowledge but mainly fairness and well-being; a place where people live near where they work; a city self-sufficient in energy; a zero emission city and a city hyperconnected to the world" (quoted in Boulos & Alshorbaji, 2014).

A city-wide network of sensors provides real-time valuable information on the flow of citizens, noise and other forms of environmental pollution, as well as traffic and

weather conditions. This enables the local authorities to streamline city operations

including better environmental management, reduce costs, and improve economic, social

and environmental sustainability. Barcelona's highly-energy-efficient streetlights are

connected to the city's underground fibre network. They have been fitted with multiple

features including CCTV (closed-circuit television), air quality monitoring sensors

and WiFi, and are capable of dynamically managing the level of lighting depending on

surrounding conditions to save energy (e.g., dim lights when no motion or pedestrians are

detected in the street).

Barcelona's wirelessly-connected garbage bins are fitted with sensors that monitor

trash levels (future versions of the sensors are expected to also detect the presence of

hazardous materials that might be dumped in the bin). The data reach the city council's

team in charge, enabling the team to plan the optimal routes for garbage collection,

update garbage truck drivers in real time regarding which routes to take, and in this

way optimize productivity and reduce waste management service costs (Boulos

& Alshorbaji, 2014).

According to Boulos & Alshorbaji (2014), "With the emergence of the

'information society', the smart cities concept started to become a reality, as more cities of

the world in general and in Europe in particular realized that to become healthier they

have to go digital. 'Digital economy', 'information economy' and 'knowledge society' all

began to be recognized as integral concepts and components of city planning and

sustainable development. Smart cities share common characteristics as they move from

focusing their investment on traditional, physical infrastructure to more emphasis on

digital infrastructure, including information and communications technology (ICT) to support the knowledge economy."

They (Boulos & Alshorbaji, 2014) go on to note, "According to Roberto Saracco, Chair of IEEE's (Institute of Electrical and Electronics Engineers) Future Directions Committee and EIT ICT Labs Italian Node Director, 'The city of the future will be self-aware, much like a being. It will be able to dynamically reconfigure itself, based on what is currently happening and what can be predicted to occur.' Saracco describes two versions of cities: one made of atoms (humans, vehicles, buildings, etc.) and a mirror version made of bits. The two versions are connected to one another via sensors."

High-performance green infrastructure takes things a step further, by anticipating demand for water storage and preparing a system accordingly. For example, "in seven projects deployed in St. Louis and one in New Bern, North Carolina, Geosyntec integrated a building's rainwater catchment system with software that uses weather predictions from the Internet to know when a basin should be partly emptied to accommodate incoming stormwater" (Fast Company 2015).

Given the important role "smart" cities will play in IoT, it is vitally important to study communities such as, Portland, Oregon. Google, IBM, and Intel have all played a role in planning Portland's future. However, in order to truly have a clear understanding of how their actions influence Portland's planning processes, it's imperative to first analyze the makeup of the Portland community and the structure of its government.

Portland has over 620,000 residents, making it by far the most populated city in Oregon. Known for always keeping things interesting, Portland has become a hot spot for young hip adults to move to. A lot of Portland's popularity definitely has to be

credited to its city planning processes. Portland is known as one of the most bike friendly communities in the nation and also utilizes an extremely efficient public transportation system that covers the urban center as well as suburban areas around Portland.

Portland's reputation for promoting sustainable city planning strategies and embracing the use of new technologies makes it the perfect community for companies such as Google, IBM, and Intel to focus their UCT efforts on. The culture of Portland's residents already embraces the idea of introducing efficient ways of utilizing urban space. Now, all these companies need to do is convince Portland that their products are bets suited for turning Portland into the "smart" city it is destined to be.

The structure of Portland's government also makes it an ideal place for these companies to focus on. The City of Portland is made up of 27 bureaus, ranging from things like police and fire departments to community planning and environmental service agencies. The City Council consists of four elected City Commissioners, who are all elected at-large. This means that the City Commissioners do not represent a specific region or district of the city; they are voted into office by the entire city. The Mayor of Portland is also elected at-large by the entire city.

When the City Council makes decisions, all five members' (four Commissioners + one Mayor) votes are of equal value. The Mayor's vote is of no more importance than any of the Commissioners. The most important power that the Mayor does have is to decide who will run each of Portland's Bureaus. You see, all of Portland's 27 Bureaus are headed by either the Mayor or a City Commissioner. This government structure produces some interesting results.

For example, City Commissioners do not run for office based on the idea that they will focus on one specific aspect of city government. Instead, Commissioners run a generic election campaign and don't receive their actual assignment until voted into office. Many times, the Mayor chooses Bureau leaders based on personal strengths, but this isn't always the case. Political relationships play a major role in deciding who runs each Bureau.

Currently, Portland's leadership structure looks like this: Commissioner Nick Fish serves as Commissioner-in-Charge of the Portland Water Bureau and the Bureau of Environmental Services, and as Council liaison to Elders in Action, Age-Friendly Cities, the Regional Arts and Culture Council (RACC), Venture Portland, and the Governor's Regional Solutions Advisory Committee. Commissioner Amanda Fritz is assigned to Portland Parks & Recreation and the Bureau of Development Services (BDS). Commissioner Dan Saltzman currently manages the Portland Housing Bureau, Portland Fire & Rescue, the Gateway Center for Domestic Violence Services, and the Portland Children's Levy. Commissioner Steve Novick was given responsibility for the Portland Transportation Bureau and the bureaus of Emergency Management and Emergency Communications. Finally, the Mayor currently runs the rest of the bureaus.

The structure of Portland's government makes it increasingly attractive to companies that want to be involved in the community's planning processes. Because Portland's unique government structure has just one Commissioner running each of the city's bureaus, companies such as Google realize that they only need to build a relationship with one government representative in order to possibly impact an entire bureau. For example, if IBM wants to collaborate on a project with Portland's Bureau of

Planning & Sustainability, they only need to build a relationship with one Commissioner, as opposed to having to deal with an entire City Council.

This is potentially one of the reasons that Google chose Portland to be one on the next cities to receive its fiber internet infrastructure. As you can see from the image below, Google fiber is already in three metro areas, and there are plans to expand to nine more very soon. Given the unique structure of Portland's government, as well as the community's culture of embracing new forms of digital technology and innovative city planning strategies, choosing Portland as one of the next communities to receive Google's fiber internet infrastructure seems extremely logical.

Figure 2. Google Fiber Plans.
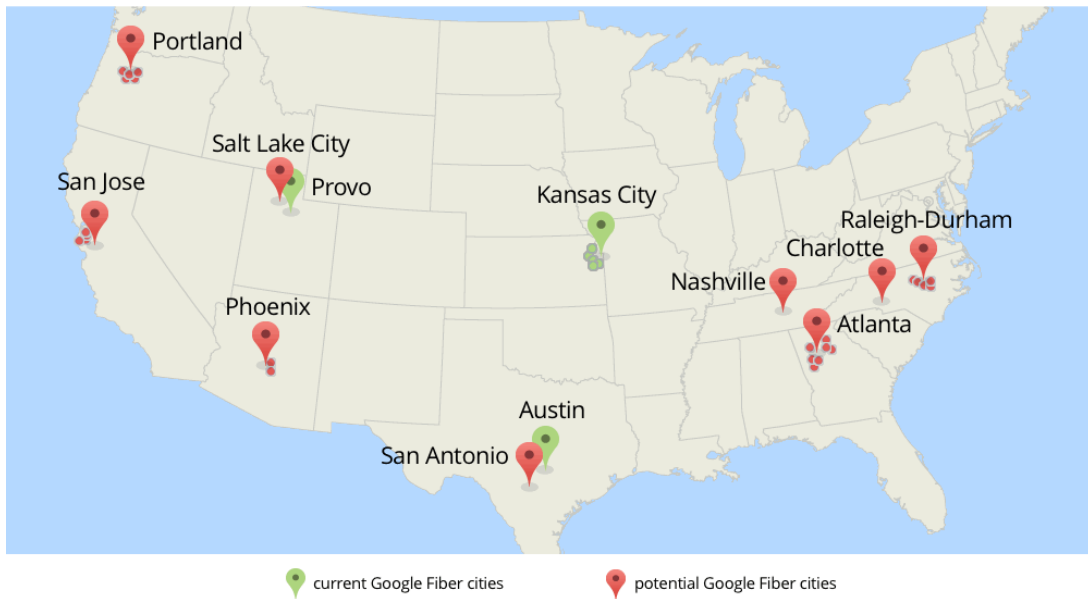
Brendan Finn, who is currently Commissioner Dan Saltzman's Chief of Staff, was working for the City of Portland in 2010 when they applied to be the first Google Fiber community. At the time, Google was skeptical of Portland's government structure and, therefore, chose Kansas City as its first location. Now that they understand the value of

connecting with a community with a political infrastructure as Portland has, they are willing to work with Portland.

Portland has also undertaken a number of efforts to open its doors to Google. In fact, it has already changed a number of policies in order to make Portland seem more attractive to the data analytics giant. For example, Google would like to be able to install utility cabinets in the public right of way along the city's streets. Traditionally, Portland has not allowed such fixtures on public streets. Google Fiber wants to put 200 such cabinets – 2x2x4-feet each – around the city to create an ultra-high-speed, fiber-optic network that brings faster Internet connections to Portland homes. Google says the cabinets divide its fiber into small bundles that run to the individual homes it would serve.

In an attempt to compromise between traditional planning ethics and Google's request, Portland's new rules would generally allow these cabinets the benefit of the doubt on larger, commercial streets throughout the city, but restrict them along neighborhood streets, according to Alex Bejarano, the Portland Bureau of Transportation manager (Rogoway 2014). This is just one example of Portland compromising its traditional planning ethics in order to help Google feel comfortable installing its fiber internet infrastructure.

Google has also received a number of tax exemptions in order to try to persuade the company to start construction in Portland as soon as possible. Historically, Oregon tax law has a clause that says a company can be taxed on 'intangible' assets, like the value of their brand. This is to protect Oregon's communities from being exploited by a powerful company that is bringing in huge profits while utilizing Oregon's workforce.

Therefore, for a global icon like Google, that meant the potential for a massive tax bill was on the table.

However, a new law was recently passed that exempts 'Gigabit' internet services like Google Fiber from the existing tax laws. The bill was approved 30-0 by the state Senate, 60-0 in the House, and signed into law by Governor Kate Brown (Swanner 2015). This shows that even the State of Oregon sees the value of changing existing policy language to ease Google's entrance into Portland's internet infrastructure.

Another interesting venture that Google is looking at is the infrastructure that carries reusable water. Known as "the purple pipe project," this piping system carries water that has already been used, but it has been recycled for certain purposes. The piping infrastructure is colored purple to make sure it is not confused with drinking water infrastructure, thus its name.

The purple pipe project has become increasingly popular around the world, especially in privately-owned, master-planned communities. For example, the "Irvine Ranch Water District in Orange County, Calif., which prides itself as purple pipe pioneer, has over 400 miles of violet conduit serving more than 4,500 metered connections, where it's often used to irrigate golf courses or school grounds" (Schmid 2013). This is yet another example of Google trying to figure out the most valuable data that they can gather.

Google has already been open about their interest in creating automobiles and bifocals. If they are able to introduce those products alongside their fiber internet infrastructure and water piping, they are going to have a pretty strong argument for being at the table when a city makes important planning and policy decisions. Therefore, cities

such as Portland need to be critical of the impacts of allowing Google to implement their fiber internet infrastructure in their communities.

The City of Portland has already developed a reputation for being a city that is looking to collaborate with major communication corporations in order to promote efficient use of the city's space and resources. In late 2009, before Google introduced their first fiber internet infrastructure to Kansas City, the City of Portland was approached by IBM to see if the city was interested in testing IBM's new System Dynamics for Smarter Cities model, which was designed to help mayors and other municipal officials reduce the unintended negative consequences of municipal actions on citizens, as well as uncover hidden beneficial relationships between municipal policies (Hannon, 2011).

IBM was attracted to Portland's reputation for pioneering efforts in long-range urban planning. Therefore, IBM's model would be used to support the development of metrics for the Portland Plan, the city's roadmap for the next 25 years. To kick off the project, in April of 2010 IBM facilitated sessions with over 75 Portland-area subject matter experts in a wide variety of fields to learn about ways that Portland's planning processes could be more efficient. Later, with help from researchers at Portland State University and systems software company Forio Business Simulations, the city and IBM collected approximately 10 years of historical data from across the city to support the model. The year-long project resulted in a computer model of Portland as an interconnected system that provides planners at the Portland Bureau of Planning and Sustainability with an interactive visual model that allows them to navigate and test changes in the city's systems (Hannon, 2011).

"By overcoming silos in the way we think, we are able to better visualize how our city systems work together and develop policies that achieve multiple objectives to help realize the full potential of our city," said Sam Adams, former Mayor of Portland. "By collaborating with IBM and applying the power of innovation, we have created an exploratory model that arms our city leaders with ways to explore decisions. In turn, that can help us become a Smarter City" (quoted in Hannon, 2011).

According to Michael Littlejohn, Vice President of Strategy for Smarter Cities at IBM, "The City of Portland serves as a living laboratory to explore how complex city systems behave over time. While other analytical approaches rely on breaking a problem down into smaller and smaller pieces, the model we've created recognizes that the behavior of a system as a whole can be different from what might be anticipated by looking at its parts. Using this model, the City of Portland can experiment with different scenarios to see how their decisions might affect various parts of the city over the next 25 years" (quoted in Hannon, 2011).

As an example of how the model could be used in practice, recently the City of Portland laid out plans to achieve a 40 percent reduction in carbon emissions by 2030, and an 80 percent reduction by 2050. The City already knew that shifting some trips away from driving to active forms of transportation, such as walking and biking, would be a part of how Portland meets its goals. However, when the IBM model was used to explore other relationships to active transportation, it revealed an interesting connection. "The model reflects that, on average, obesity levels decline as more people walk and bike. Similarly, if obesity levels go down, active transportation becomes a more attractive option to more people. Essentially the tool highlighted a reinforcing feedback loop that

could be used to jump start a continued cycle of improvement. Since shifting to walking and biking reduces driving trips, the obesity/active transport loop could be a self-reinforcing policy lever to address carbon goals" (Hannon, 2011).

Portland's vision for the year 2050 is important because by that time it's estimated that about three quarters of the world's population will live in cities. Therefore, it is vital that we understand who controls the resources that our communities rely on to operate and how those processes are being planned and managed. What impact does IBM's influence over the Portland Plan have on the community's residents? How does it impact their ability to play a role in the city's planning processes?

IBM, however, is not the only major communication company to play a major role in shaping the Portland Plan. In the fall of 2012, Herman D'Hooge, Senior Principal Engineer and Innovation Strategist at Intel, taught a course in the University of Oregon's School of Architecture that he described as a "Smart Cities Workshop." As D'Hooge explains, the focus of the course "was to explore the space of possibility created by the adoption of information and communications technology (ICT) in the urban environment" (quoted in Poole, 2013).

The final deliverable from the course was a document that D'Hooge called the "Smarter" Portland Plan. In essence, this planning document examined the goals laid out in the city's original plan and highlighted areas where Intel products could be utilized to help satisfy that goal. Therefore, it's beneficial for both the company and the city to share this relationship because, while the city gets the perspective of topnotch innovators, the company gets to advertise its products.

Michael Armstrong, the Senior Sustainability Manager for Portland's Bureau of Planning & Sustainability, has been a part of a number of meetings with communication companies that want to be more involved in the Portland's city planning processes. He says that most of those meetings result in ideas that are super interesting, yet not very useful. According to Armstrong, this is a result of how the communication companies engage with communities. Instead of understanding a community's needs and processes and coming in with an idea that fits into that structure, they come in solely with an understanding of their own needs and processes and try to promote ides that serve those goals. From his perspective, their engagement strategies are surprising unsophisticated and reveal a lack of experience collaborating with the public sector.

Josh Alpert, the Mayor's Director of Strategic Initiatives, says that the blame can't all be put on the private sector for not engaging enough with the public sector. In his view, it's a "chicken or the egg" argument about which side is more to blame for the lack of collaboration. He can even see the benefit of sometimes keeping things out of the bureaucratic processes that govern the public sector; however, this is only a benefit if the private sector truly has the public sector's best interest in mind.

Given the history of Google, IBM, and Intel, it's hard to believe that their efforts to engage more with the public sector is truly in the interest of local residents. Instead, it seems as though the motivation for being more involved with Portland's planning processes is to gather data for profit. The next chapter discusses how they are able to achieve this goal and why this is an important trend for communication scholars to study.

Moving Beyond the Audience Commodity: "Smart" Cities, Big Data, & Digital Identities

The audience commodity presents an excellent framework for understanding the role that powerful communication corporations play in controlling what our society knows to be leisure or non-work time. It allows communication and media scholars to highlight how corporate interests are able to profit from the actions of community members without paying the community members who supplied the data for the corporate interests to profit from. The audience commodity presents the notion that users/consumers of media content are the actual commodity being sought.

As the Internet of Things becomes a reality and we continue to see the rise of "smart" cities, this concept takes on a new level of importance for communication and media scholars. Now, instead of the audience commodity only applying when a consumer is engaged with a particular mass media, almost every activity by a "smart" city community member is a form of unpaid labor. Companies such as Google, Intel, and IBM aim to profit by utilizing UCTs to gather data about residents' living habits. Therefore, turning on your sink can be seen as an example of unpaid labor. The route you take to work every morning is a form of unpaid labor. Choosing a restaurant to eat at is unpaid labor. All of these activities will be gathered into a digital profile by UCTs to be used by municipalities and corporations to influence the plan and design of communities.

In that sense, there is a need to move beyond the "audience" commodity to a concept that more appropriately captures the phenomenon of the everyday actions of residents becoming unpaid labor. When it comes to interacting with the urban environment, the data commodity being sought by companies such as Google, Intel, and

IBM is "identity." Therefore, a concept that warrants more attention by communication and media scholars is the "identity commodity."

Beck (2015) highlighted the fact that we "live in an age of invisible digital identities where companies track our demographic information, habits, and online behaviors, and in some cases, sell this information to third-party companies for profit" (p.125). Strategically hidden within our computers are files that track our every movement on the web. Inside these files are "long strings of alphanumeric codes that do not reveal, on the surface, the kinds of personal information they contain. Concealed inside the code, such personal data includes housing type, age, sex, income, spending habits, hobbies and interests, items bought, items you're interested in buying, if you're traveling soon, and other data that may be fairly revealing" (p.125).

What is of major concern here is that community members are not consciously aware of the information they are giving up, when they are giving it, and to whom they are giving it. McKee (2011) reminds us, however, that "just because we can't see the agents who may be observing us, doesn't mean that they are not there" (p. 285).

Mckee (2011) also warns that, in a sense, the Internet serves as a panopticon. As Foucault (1995) explained, "The Panopticon is a machine for dissociating the see/being seen dyad: in the peripheric ring, one is totally seen, without ever seeing; in the central tower, one sees everything without ever being seen" (p. 201-202).

In order to be citizens in a democratic society, community members must buy into the system in some form or another. This investment could be financial, such as taxes, or it could come in other forms. In order to be a citizen in the new digitized-"smart" city-Internet of Things society, and to receive the rights that come along with being a citizen

in this society, the investment that must be made comes in the form of a digital identity. In order to fully engage this society, a citizen must be willing to create a digital identity for free that powerful communication corporations can use to profit from.

There is another subtle, yet extremely important, difference between the notion of an audience commodity compared to an identity commodity. With the audience commodity, the concept refers to media corporations tracking how many viewers were engaging with a particular mass media, namely television programs. The identity commodity however, takes it one step further.

Instead of only tracking what programs an audience member engages with and minimal demographic information, communication corporations are now attempting to create digital profiles that include detailed information about a consumer's life. Now, watching television is not the only time you are doing unpaid labor that supplies communication corporations with valuable data. This occurs during almost every activity within a "smart" city. Choosing a route to work, turning on your sink, or grocery shopping can now contribute to your digital identity. Therefore, at the center of "smart" cities movement is the commodification of identities.

In that sense, we need to ask ourselves: "What is a smart city? And do I want to live in one?" A "smart" city promises its residents the chance to live in a community that is planned and designed to individually meet each residents' needs. A "smart" city promises its residents the chance to live in a sustainable, green, resource efficient community. A "smart" city promises its residents the chance to engage as a citizen in a democratic system. But does it truly do any of things?

IBM and Intel are two companies that have profited tremendously from the notion of planned obsolescence. Intel, particularly, prides itself on modeling itself after Moore's Law. Moore's Law is the prediction that, in terms of computer hardware, the number of transistors in a dense integrated circuit doubles approximately every two years. According to Brian Krzanich, Intel's CEO, "The relentless pursuit of Moore's Law is Intel's foundation and continues to be our driving force. We lead the industry as the only semiconductor manufacturer in the world offering Tri-gate transistors and 22-nanometer (nm) technology-based products. The benefits of Moore's Law can be seen across our product lines in the form of higher performance, lower energy requirements, and lower cost per transistor" (Intel, 2014).

In other words, Intel believes that it can double its products' capabilities every two years. However, these predictions also comes with the desire to increase financial profits at a similar pace. Therefore, there is no motivation for Intel to create products that last more than two years. If Intel believes it can double its products' capabilities every two years and wants to profit financially at a similar pace, then it's imperative that consumers feel the need to discard their current products in order to buy the new version.

This is achieved through a strategic combination of planned and perceived obsolescence. Planned obsolescence involves engineers designing products that won't last more than a few years. In that sense, planned obsolescence focuses on the physical engineering of a product. Perceived obsolescence, on the other hand, involves an advertising and marketing campaign aimed at making consumers feel like their current products are outdated and need to be replaced. In other words, perceived obsolescence focuses on the cultural and social perception of a product.

We can, therefore, conclude that it is unlikely that IBM or Intel would want to introduce UCTs that would last more than a few years. Instead, their relationship with cities is more likely to be consistent with their relationship with consumers. Their relationship with consumers isn't motivated by supplying consumers with sustainable, long-lasting products; it's motivated by getting consumers to fetishize a brand to the point they will repeatedly consume it.

In terms of city planning, this makes it difficult to view IBM and Intel as allies in the quest to create resource efficient communities. We already know that ICTs can negatively affect our environment and our health. This is not only because of its operational usage, but more so because of the electronic waste generated at the end of the useful lifecycle of an ICT gadget. This waste is a direct result of these powerful companies' use of planned and perceived obsolescence. Not only do they engineer their products to be obsolete within a few years, they also run extensive advertising and marketing campaigns aimed at convincing consumers that their current possessions aren't as valuable as the new commodities being promoted. Therefore, why would we believe that their interaction with UCTs would be any different? Why would we believe that these companies would introduce UCTs that won't be obsolete within a few years? Their financial success has traditionally been ties to planned and perceived obsolescence and there is no reason to believe that anything has changed in that regard as they attempt to play a larger role in the way we plan and design our communities.

This raises the question about what the form and structure of a "smart" city will look like. If a "smart" city always utilizes the most up to date forms of technology, then how long can a "smart" city go without having to replace its infrastructure? For example,

if Portland implements IBM, Intel, or Google technology in its planning efforts, what does Portland do if a new, better version of the same technology comes out a year or two later. Can it truly claim to be a "smart" city if newer versions of the same technology already exists?

If the answer is that "smart" cities need to be dynamic and constantly changing as technologies evolve, then what does that mean in terms of the economic investment in creating "smart" cities? Is a "smart" city a city that constantly reinvests in new forms of technology? Or is a "smart" city only "smart" for a small period of time?

Given the enormous amount of investment that it would take to build these unsustainable "smart" cities, it raises the question whether these types of communities are intended for everyone or just specific communities with certain socio-economic demographics. For instance, while "smart" cities certainly present many new opportunities for consumers of other "smart" devices, they don't seem to do much to address issues regarding economic class inequality. For residents who don't focus much of their attention on consuming "smart" products and changing their lifestyle along with that consumption, "smart" cities don't seem offer anything other than simple conveniences.

However, it can't be denied that IoT innovations will also benefit residents who don't support it or are even conscious of it. For example, even the most "unwired" or "unplugged" resident will benefit from increased efficiency of local public transportation services. Knowing exactly when your bus will arrive is a convenience that even the most "disconnected" resident can benefit from. Also, more efficient use of finite resources can have positive impacts to our natural environment that undeniably benefit every single

living creature on this planet. Therefore, it is unfair to argue that having communication corporations such as Google, IBM, and Intel play a role in the planning and design of our communities will only have negative affects on our lives. There are certainly some concrete potential benefits to this trend that cannot be denied.

However, it also can't be denied that this trend presents some definite inequity issues that need to be addressed. "smart" cities represent a city full of more choices for someone with the economic capacity to fully engage with the IoT culture, but it doesn't present many outlets for engagement with community member who don't possess the economic ability to consume "smart" products at an appropriate rate to keep up with cultural norms. In that sense, the "smart city, IoT reality that seems to be coming to fruition is a reality that only increases the socioeconomic inequality issues that traditionally existed in company towns. Residents are seen more as consumers of commodities, or as commodities themselves, instead as being seen as residents who have the right and the ability to democratically engage with the planning and policy decisions that impact their lived experience of reality.

While the notion of viewing residents more as consumers or commodities than as citizens might seem subtle or arbitrary, this distinction has major ramifications when one starts to consider the increasingly blurred boundaries that exist between public and private space. While private space is an area generally controlled by personal, commercial, capitalist interests, public space is meant to be sections of the community that serve the general public. Therefore, public space shouldn't be areas where upper economic classes feel more comfortable than lower classes. Public spaces are meant to

exist for the general benefit of every community member, regardless of their ability to engage in a capitalist market place.

However, as cities become "smarter," public space decreases. As IoT innovations allow almost every action and movement to be tracked and stored, few spaces in "smart" cities are truly public and meant for the general benefit of a community's residents. Instead, almost every space becomes privatized, and residents are viewed as consumers and/or commodities.

In this regard, Garret Hardin's notion of the "tragedy of the commons" becomes increasingly important and complex. While Harden applied his theory specifically to natural resources such as water and air, today we need to consider how his work can be applied to urban space. As almost every space on our planet gains the potential to be used to benefit private interests, a redefinition of public space is needed.

If you possess a "smart" phone, is any space where your phone has reception truly public? Or can you argue that any space where your actions and movements can be tracked for data is ultimately private? Your actions, which you do during your leisure/non-work time, are used to generate tremendous profits. Therefore, any space where your unpaid labor is being used to generate others profit is ultimately private.

That raises the questions as to how green or sustainable these "smart" cities really are. We've already discussed that in order to be considered "smart," a city must constantly keep up with new forms of technology. Therefore, a "smart" city can't be sustainable in the sense of being able to use materials for long periods of time. A "smart" city is naturally a victim of planned and perceived obsolescence and must constantly consume the most recently released products.

On top of the natural need to constantly consume new materials, "smart" cities also lack the motivation to create truly public spaces. If public spaces are meant to allow residents to exist in areas where they aren't targeted by private interests, then "smart" cities have a natural motivation to remove such areas. The natural motivation of "smart" cities is to increase the geographical area where residents' actions and movements can be tracked and gathered for data. Therefore, there is no motivation to create spaces where residents can escape private interests. Instead, it's in the interest of "smart" cities to increase the space where residents actions can be tracked and reduce public space.

In that sense, we have to raise the question as to whether residents are truly able to engage with the processes that determine the planning and design of their communities. If the cities are set on becoming "smart," then that means they are also set on reducing public space and increasing the area where residents actions and movements can be tracked for data. Therefore, what motivation would they have to truly allow residents to democratically engage with planning processes?

Instead, community members will need to get used to seeing their public space diminish as their city becomes "smarter." Traditional ways of engaging with planning and policy processes won't be as effective as they once were because the notion of public and private space needs to redefined in an IoT reality. The next section of this paper discusses the impacts that this trend has on the everyday lived experience of community members.

In this IoT reality, cities are motivated to create more spaces where residents' actions can be tracked and gathered for data. Google, IBM, Intel, and other companies that are playing an integral role in this trend will argue that Iot innovations are in the

benefit of a community's residents because of the increased efficiency of advertisements and other services. However, this increase in efficiency comes at a price. Residents who live in "smart" cities must give up a certain level of privacy in order to fully enjoy the benefits of this type of community. Residents who are worried and skeptical about having their every action and movement tracked and gathered for data won't be able to fully engage with the benefits that a "smart" city offers. Only residents who fully feel comfortable creating a digital profile that is open for proprietary use will be able to fully enjoy living in a "smart" city.

While we all create digital profiles either consciously or unconsciously when engaging with the Internet, a major question we need to ask ourselves as IoT becomes a reality is: "For what purposes am I comfortable having my digital profile used?" Every time we use the Internet or our "smart" phones, our actions and movements are gathered in order to create an individualized digital profile. This profile is used for advertising and security purposes, and it is generated from the users own personal actions. Therefore, the tracking and gathering of data can certainly be seen as a strategy to take advantage of unpaid labor.

Dallas Smythe pointed out that audiences are the true commodity being sought after by advertisers and, therefore, by mass media corporations. In that same sense, the goal of this research project is to point out that digital identities are the true commodity being sought after by advertisers and digital security organizations and, therefore, by digital communication corporations such as Google. Therefore, there is a need to understand how the notion of the audience commodity has evolved since Smythe introduced it. Instead of worrying about the audience commodity, political economists of

communication should now be focused on understand the "identity commodity" and how urban communication technologies (UCTs) play a role in the IoT, "smart" cities that are currently being developed all around the world.

As Smythe pointed out when discussing the audience commodity, the importance of this discussion doesn't solely lie in the realm of communication and mass media. Instead, understanding this phenomenon is important in order to understand the entire field of leisure/non-work time. The identity commodity is a concept meant to highlight the decreasing presence of public space and the increase in spaces where your actions and movements can be gathered into a digital identity that can be used for profits by powerful communication corporations.

Similar to how the audience commodity allowed critical communication scholars to deepen their understanding of mass media practices, the goal of introducing the notion of an identity commodity is to help critical communication scholars deepen their understanding of big data and the role that digital identities and UCTs play in the tracking and gathering of community members. The introduction of this term helps critical communication scholars understand how powerful corporations such as Google, Intel, and IBM perceive their consumers. In order for the ultimate IoT, "smart" city vision to come to fruition, these corporations must increase the amount of space in our communities where our actions and movements can be tracked, gathered, and stored.

Introducing this concept also helps community members understand how these corporations view them. Similar to how the audience commodity helps audience members understand the power and agency they do have within this political economic system, the identity commodity helps community members realize that heir actions and

movements actually carry a tremendous amount of value and the choices that each

resident makes actually has major ramifications on our society. Therefore, the goal of

introducing the identity commodity is not to help powerful communication corporations

better conceptualize how to target consumers. Instead the introduction of this concept is

meant to help critical scholars and community members understand the value of the data

gathered from our actions and the importance of being conscious about the digital

profiles we create.

"We instinctively desire sovereignty over our personal identity," Richards and

King (2013) claim. "Whereas the important right to privacy harkens from the right to be

left alone, the right to identity originates from the right to free choice about who we are.

This is the right to define who 'I am.'"

The next section will discuss how this trend impacts local residents. Specifically,

the next section will focus on how powerful communication corporations have impacted

the lived experience of residents in Portland, Oregon. Portland is a great example to

highlight because Google, IBM, and Intel have all played a role in the community's local

planning and policy processes.

Living in a "Smart" City

The State of Oregon has always been at the forefront of community planning

efforts. In 1973, Oregon passed important legislation that has allowed the State to

maintain a strong statewide program for land use planning. The foundation of this

program is a set of 19 Statewide Planning Goals. These goals express the state's views on

land use and related topics, such as citizen involvement, housing, and natural resources.

Oregon´s statewide goals are achieved through local comprehensive planning. State law requires each city and county to adopt a comprehensive plan and the zoning and land-division ordinances needed to put the plan into effect. According to the Oregon Department of Land Conservation and Development (DLCD):

> *The local comprehensive plans must be consistent with the Statewide Planning Goals. Plans are reviewed for such consistency by the state´s Land Conservation and Development Commission (LCDC). When LCDC officially approves a local government´s plan, the plan is said to be acknowledged. It then becomes the controlling document for land use in the area covered by that plan. Oregon´s planning laws apply not only to local governments but also to special districts and state agencies. The laws strongly emphasize coordination -- keeping plans and programs consistent with each other, with the goals, and with acknowledged local plans.[1]*

As previously noted, the City of Portland is made up of 27 bureaus, ranging from things like police and fire departments to community planning and environmental service agencies. The City Council consists of four elected City Commissioners, who are all elected at-large. This means that the City Commissioners do not represent a specific region or district of the city; they are voted into office by the entire city. The Mayor of Portland is also elected at-large by the entire city.

When the City Council makes decisions, all five members' (four Commissioners + one Mayor) votes are of equal value. The Mayor's vote is of no more importance than any of the Commissioners. The most important power that the Mayor does have is to decide who will run each of Portland's Bureaus. You see, all of Portland's 27 Bureaus are headed by either the Mayor or a City Commissioner. At the moment, Mayor Charlie Hales runs the Portland Bureau of Planning and Sustainability, the Bureau tasked with managing the City's planning documents.

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[1] http://www.oregon.gov/LCD/Pages/goals.aspx

The residents of Portland have mixed opinions when it comes to the relationship their city government is building with these powerful private interests. According to an anonymous survey conducted of a few hundred Portland residents, the main fear seems to stem from an understanding that these companies are suggesting edits to Portland's planning documents. One Portland resident has "[b]ig concerns since they tailor the projects to meet codes which they have had far too much influence in creating. There is a lack of broader input from the community due to planners ignoring the real stakeholders: the public" (Survey Response).

While the Portland Bureau of Planning & Sustainability is required by Oregon's Statewide Planning Goals to hold public forums whenever a code or ordinance is going to have language adjusted, these meetings are poorly promoted and, therefore, poorly attended by the public. This results in sentiments from residents that Portland's government is not engaging with the public or acting in their best interest. However, this does not mean that all Portland residents are totally turned off by the idea of having private interests play some role in the planning and design of their community, as long as there are checks and balances.

As a Portland resident puts it, "I prefer a city designed and managed by people who are aesthetically savvy and have the economic and cultural interests of ALL its citizens in mind for all decisions. If the corporation put their money to good use, I would be for it, so really it just depends what that means in practice. Will they support an economically & culturally diverse, creative, ecologically sound, seventh-generation plan?" (Survey Response.)

This response represents a growing sentiment amongst Portland residents, as well as residents of other "smart" cities. Ultimately, most people want to reside in livable, healthy communities. If a private corporation can help achieve that goal, many people would feel comfortable with that. The skepticism and animosity arises when residents feel like a private interest is acting in a way that is detrimental to the community's goal of becoming more livable.

Many times, gentrification is seen as the direct result of private interests becoming more involved in a particular area. Portland Resident B is already "seeing the second wave of gentrification of my inner SE neighborhood. The middle income home is swiftly becoming a thing of the past, and this used to be a solid working class neighborhood. I like neighborhoods that are economically diverse & culturally rich."

In other words, if private companies such as Google, Intel, and IBM could prove that their impact on Portland would result in a more livable, healthy community, then many residents would feel fine with that relationship. However, many residents are skeptical of Google's power over the way Portland functions. According to Portland Resident A, "There is a need for high-speed broadband, but I have concerns about monopoly by Google. There needs to be competition that keeps the cost affordable."

Portland's engagement with Google also impacts the way nonresidents perceive the community. In an anonymous survey of non-Portland residents, one person said, "I would need to learn more about the role that these companies are playing in the planning of Portland before I can develop an opinion on whether it makes it more or less appealing. However, it certainly changes my perspective of Portland. I have a

romanticized ideal of Portland as a leftist utopia in the Pacific Northwest that conflicts

with the narrative of Portland being planned by large multinational corporations."

This is a concern for the City of Portland. It's "Keep Portland Weird" motto

doesn't really work if the community is planned by the same powerful interests that

control other economic markets. Portland's atmosphere rests on a notion that the

community is very resident-centric, meaning that decisions made regarding how the city

will function have traditionally been motivated by the well-being of local residents. If

Portland goes from a community known for promoting local products to a city branded

by Google, it changes the entire image of Portland.

As one survey respondent put it, "Through media like the TV show *Portlandia,*

Portland is often portrayed as a very liberal, relaxed, and free-thinking city and big

private corporations do not match this reputation. [Knowing that private interests are

increasingly playing a role in the planning and design of the community] does not attract

me to Portland because I feel that Portland may lose some of its laid-back charm if big

companies took control of it."

Another respondent supported this sentiment, "I think knowing that companies

like these are beginning to play a larger role in the planning of the city turns me off to the

idea of living in Portland. What attracted me to the city was that I thought Portland had a

more 'local' and 'community-based' approach to making decisions that affect its

residents. Hearing that large companies will have a large say in how the city is run does

concern me."

What if *Portlandia*, instead of portraying hipsters drinking coffee and worrying

about whether their locally grown chickens were free-range and organic, portrayed

Portland as a "smart" city where Google had installed the community's internet, where Intel helped write the city's planning documents, and IBM created software to help the city make decisions? That would most likely have dramatic impacts on the way people perceive Portland.

For example, when asked if it would bother them to live in a city designed by a large private interest, one response was, "In general, I feel that having private companies plan and develop/own the infrastructure of cities is a very dangerous trend. It enables companies to engineer the experiences of residents that are aligned with their interests-increasing shareholder value & profit. It would bother me greatly to live in a city designed solely/substantially by a large private corporation."

Supporting this sentiment, another participant responded, "I would avoid living in a planned community at all costs. Obviously the priority of private companies is their shareholders and profits. Where is democracy in a privately planned community? Community? Social justice?"

As Portland further engages with communication corporations, it needs to think about how this relationship not only impacts the lived experience of residents, but also how it changes the way in which others perceive Portland. Will it continue to be a vibrant community that supports its local interests? Or will it become a branded "smart" city?

In this new emerging data economy, identity is the main commodity being sought. From the perspective of major communication corporations, the goal of creating "smart" cities and bringing IoT to fruition is to track the actions of residents in order to gather valuable data. As data about almost every activity that a resident participates in is

tracked, a digital profile is created and serves as a representation of the resident's identity.

Aristotle is famously quoted for contending, "We are what we repeatedly do." In other words, our actions represent who we are. Therefore, tracking our actions allows communication corporations, advertisers, and governments to gain a glimpse into who we are. In order to track the actions of residents, UCTs must be put in place all around the city. The implementation of UCTs is essential for IoT to become a reality. Basically, UCTs are what make "smart" cities "smart."

While IBM, Intel, and Google are focusing on how community's can adjust their planning efforts in order for easier UCT access, other companies are working hard on creating UCTs. For example, Belkin has come out with a home automation system that can monitor and control other Belkin smart wall switches and plugs, LED light bulbs, motion sensors, and lighting devices, and the entire system is controlled from your browser or smartphone app. This is similar to TCP's home lighting automation system, which includes a device that plugs into your home router, a wireless remote control, a mobile app, and two smart LED bulbs that can control up to 250 lamps (Mitchell, 2014).

Canary has introduced an all-in-one home security system that includes an HD video camera and sensors for air quality, motion, sound, temperature and vibration in one unit. After learning normal patterns for such things as temperature and ambient noise levels when people are home, the system sends alerts to a mobile app is something changes. Grid Connect, an established player in the industrial sensor market, also offers the a home security system, called ConnectSense. It works with your home Wi-Fi router

and other ConnectSense-branded motion, light, temperature, humidity, water, door and window sensors to monitor the security status of your home (Mitchell, 2014).

Icontrol Networks has come out with a smart home security system that includes an integrated 180-degree wide-angle HD camera with two-way audio with embedded sensors that detect motion, temperature, humidity, light and sound. From the mobile app, you can control the camera. While each company's home security system currently can't be integrated with others, Revolv is working to create a unifying smart hub for monitoring and controlling every smart device in your home, regardless of brand, type of product or communications protocol used (Mitchell, 2014).

One of the most interesting UCTs on the market is the Sen.se Mother. As Mitchell (2014) describes:

> This maternally themed smart home suite includes a "Mother" (the hub) and "Cookies" (wireless sensors) that you attach to objects or people and then program to monitor and analyze movements, temperature and location.
> The small, battery-powered sensors can be attached to anything from your front door, to monitor for intrusions, to toothbrushes, to make sure children are brushing regularly. Activity history is tracked online, and can be configured to send alerts. Mother doesn't work with other smart devices, but the reprogrammable, general purpose cookies can be used to add smarts to any device in the home.

The Sen.se Mother represents an important aspect of these UCTs: mobility. Mobility is what will allow IoT to become a reality. As UCTs become more mobile, the notion of public space will become a thing of the past. Mobility and public space will be discussed in more detail in the next chapter.

As previously discussed, utility use is a major activity that communication corporations want to monitor. Therefore, there are a number of efforts under way to make that goal a reality. Neurio is working on an energy surveillance system that works by

embedding a sensor inside your home's electrical panel and identifying individual devices and appliances by their energy output. It monitors power use, breaks down activity by device, uses machine learning to interpret that activity, and can inform you when something important happens, such as when you leave the oven turned on. It can also send a text message via an included app to alert you when, for example, the oven is preheated, and it can control other connected devices (Mitchell, 2014).

In short, there are many companies working on smart devices and UCTs. Even Staples, the office supply retailer, offers its own Staples-branded home automation system that includes a smart hub and mobile app. Staples Connect can monitor and control a select list of smart door locks, smoke alarms, thermostats, lighting, window shades and other devices from more than a dozen participating brands. However, for the purpose of this study, it was important to understand how Google, IBM, and Intel plan to integrate these UCTs created by other companies, as well as what UCTs are they created themselves.

Intel's IoT efforts have been vast. They have been working on creating the integrated platform that "smart" cities could potentially run on. Therefore, their IoT efforts run the gamut from processors, to controllers and chipsets, to operating systems, to even cars and buildings.

Intel is working a car that they claim will improve fuel efficiency, reduce pollution, and cause less congestion by integrating a number of smart devices into its design. The image below represents their vision for how cars will be integrated into IoT:
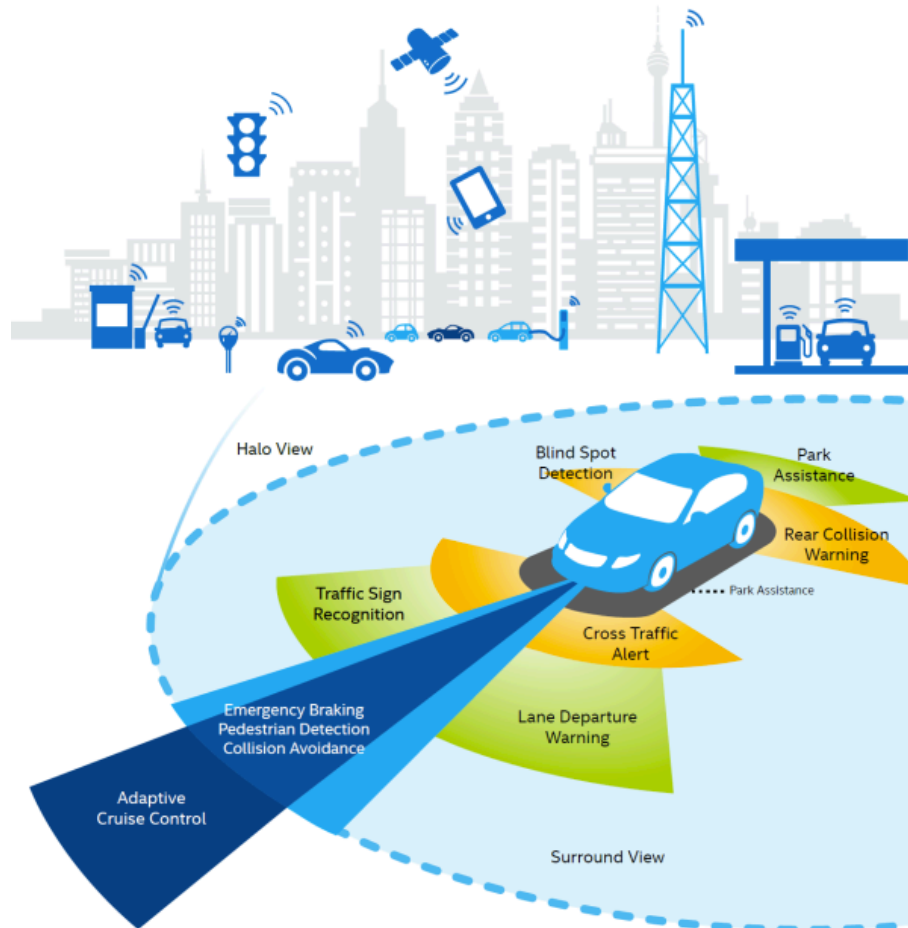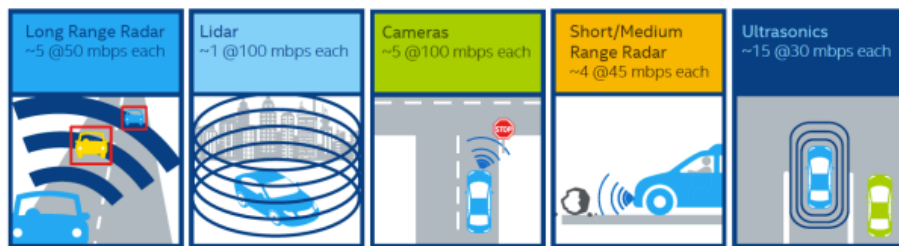
Figure 3. IoT Model. (Lamagna, 2015)

Intel is also working on a smart tiny house. As McKinney (2015) explains:

Facial recognition technology, including True Key by Intel Security, provides convenient, hands-free security allowing access to trusted friends and neighbors based on preset rules. It can also provide parents and pet owners with suspicious activity alerts when they are not at home. The home can also be set to go into away mode, turning off lights and locking the door, when no occupant presence is detected. The tiny house's home automation system is also capable of being set to detect when glass breaks or a smoke alarm is triggered, and could even be programmed to alert to the sound of a crying baby.

On top of the Smarter Cities Challenge, IBM is also working on a number of other IoT efforts. The IBM Internet of Things Foundation is a fully managed, cloud-hosted service that makes it simple to derive value from other IoT devices. It can utilize almost any device with a sensor, and using what IBM calls "recipes," you can get it connected and start sending data securely.

IBM's IoT recipes are basically just strategies for getting many different devices to connect on one platform and be able to transmit data to each other. As noted previously, a main obstacle of IoT is the development of a single platform. Google, Intel, and IBM are competing hard to be the first company to introduce the first viable IoT platform.

IBM has also teamed up with Sprint to create a smart car that can continue to transmit data even when the engine is off. That goal is made more feasible by working with IBM's MQTT (Message Queuing Telemetry Transport) protocols for Sprint's offering. MQTT specializes in handling large amounts of data from sensors and devices—up to one million sensors and 13 million messages each second—at low bandwidth and battery drain. That makes it a natural fit for always-on features in appliances and vehicles. Experts agree that basic smart features will soon be commonplace in most cars, such as safety monitoring and phone connectivity.

In fact, Google is even working on a self-driving car. Google estimate that 94% of accidents involve human error; therefore, self-driving cars could potentially save lives. Also, people would be able to engage in other activities when travelling besides driving.

In other words, smart cars will be a reality in the near future and will play a big role in bringing IoT to fruition.

Google is also working on introducing smart home products through its subsidiary Nest. Unlike smart cars, however, companies are skeptical whether smart homes will catch on in the near future. Only about 13% of U.S. households with broadband report owning at least one smart home device, according to a report published by Parks Associates and the Consumer Electronic Association, and 62% are unfamiliar with smart home products (Thompson, 2015).

Here is a chart documenting the decline in smart home hype:
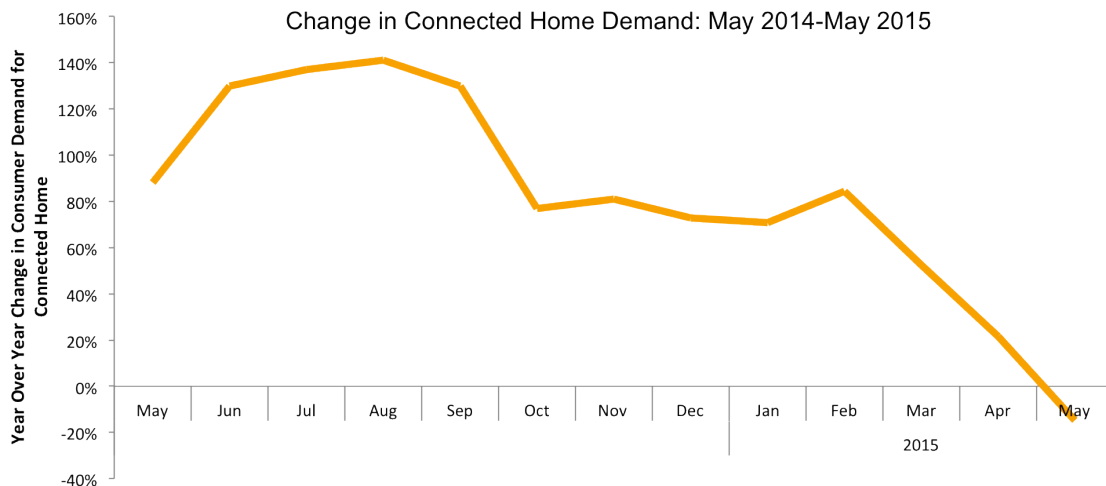
Figure 4. Smart Products Demand. (Thompson, 2015)

In other words, every aspect of the IoT, "smart" city has not been completely figured out by either the public or private sectors. Companies are still wondering how certain smart products will fair economically, while others seem ready to be implemented immediately. We are living at an important moment in the history of our human civilization, where the decisions we make today regarding how our communities are

planned and designed will have major ramifications on how future generations experience life.

However, if a company such as Google can introduce products that track our utility use, enable people to transport themselves without driving, provide us with "smart" glasses, and gather data about our everyday actions, it is going to have a pretty strong argument for why it should be at the table when decision are being made regarding the policies that govern how our communities are planned and designed. On top of that, by tracking almost all of our actions and movements throughout the day, these companies will be able to create a digital profile of their consumers. As a result, they will be able to think about which identities are more valuable in an IoT, "smart" city.

The next chapter discusses this notion of "identity" and the ways in which it has become a fetishized commodity. It also discusses the ways in which "smart" cities impact a community's sense of private and public space, as well as offers insights into how the community planning process is now being manipulated by the private sector's interest in gathering data.

CHAPTER VI

OWNING YOUR IDENTITY IN A DATA ECONOMY

While the audience commodity is an excellent framework for starting this political economic analysis, that concept only helps 21st Century scholars begin this conversation. Its insights into how our leisure time has been taken over by private interests is still an important point that needs to continue to be acknowledged today; however, the notion of "audiences" being the main commodity being sought by communication corporations today can be debated. Instead, "identity" is seen as the main commodity being sought in the emerging data economy.

This chapter highlights the ways in which the notions of leisure time, public space, and democracy are impact by "smart" city planning efforts. As IoT continues to roll out in the form of new consumer products, we need to be critical of our engagement with UCTs and work to control our identities. Ultimately, we are not just data points; we are human beings, and our community planning processes should consciously acknowledge that fact.

Community Planning & UCTs

In general, the five main areas of community planning that will be impacted by UCTs the most are:

1. Transportation and Mapping Systems
2. Energy and Utility Services
3. Digital Consumption Practices
4. Civic Engagement
5. Personal Privacy

As mentioned earlier, the "smart" city trend certainly has the potential to supply our communities with innovative forms of technology that truly do create positive change. For example, it's hard to argue against the benefits of using sensors to reduce traffic congestion. That would have positive implications on our social lives, as well as helping to mitigate the impacts of environmental degradation.

"Smart" technology can reduce car trashes, increase efficiency of public transportation, and provide travellers with important locational information. However, it also increases the amount that community members' movements are tracked. How comfortable are you knowing that Google knows what route you take to work each morning?

The same can certainly be said for technologies that help us use our utilities more efficiently. Given the unsustainable way in which our natural resources have been managed historically, it's hard to argue that it wouldn't be in our best interest to use UCTs in a way that helps us manage our finite resources better. Water use and electrical capacity are two major issues facing our society, and UCTs can play a role in helping solve some of these very important problems.

On the other hand, it's extremely important that public resources remain in the hands of the public. As the "tragedy of the commons" continues to play out, it is vital that our communities hold on to as much control over important utility services as possible. Despite the fact that many of these services are already ran by public-private partnerships, UCTs represent a concerted effort by communication corporations to increase privatization of community planning processes by convincing municipalities to fetishize the idea of being "smart."

However, for IoT to truly come to fruition, community members must also fetishize the notion of being "smart." A major motivation for promoting "smart" city planning efforts is to promote consumption. Google gained its success and notoriety by being able to track consumers' habits and provide advertisers with valuable data about target audiences.

UCTs will be valuable to companies interested in understanding daily trends and rituals that potential consumers are taking part in. It will supply these companies with information about the products consumers buy for their home, the places they visit most frequently in their community, the cultural genres they connect to the most, and other people they know.

While storing data about our consumption practices could be useful in some cases, the notion of every consumptive action being a repetition of our last is very concerning. Many companies seem to be focusing on using technology to pre-order their products before they run out or to allow consumers to quickly and easily repurchase their brand.

For example, Amazon recently released the Dash Button. A consumer can place a button anywhere in their home/business and simply push the button when the product needs to be refilled. For consumers, this supplies an easier purchasing experience. For product manufacturers, this increases the chances that consumers will repeat their purchase.

A major issue with "smart" cities is that it increases some community members' ability to engage with civic processes, but it also decreases others'. For example, "smart" systems, such as the Dash Button, are put in place for consumers with access to

computers. But, what about community members who don't have easy access to computers?

The introduction of "smart" cities raises many questions in regards to civic engagement. First of all, it reifies many of the criticisms that Judith Mowry and Representative Lew Frederick presented during interviews with the researcher. Many of people with "smart" cities won't be able to engage with any of the new innovations. In fact, the introduction of UCTs puts them at an even greater disadvantage because their digital identity isn't as valuable (or existent) as those with easier access to computer technologies.

Balancing personal privacy with Internet security is a major challenge facing our society, and "smart" cities bring that conflict to light even more. As IoT comes to fruition, almost all of our action will tracked and monitored and gathered into valuable data sets. To what extent, though, are we comfortable with our lives being gathered into data sets?

There doesn't seem to be a clear line segregating the types of activities we are comfortable having monitored and the types of activities we would rather not keep stored digitally. At this point, there is no line. All of our activities are up for grabs, with powerful communication corporations trying everything they can to introduce UCTs to track our activities.

As more and more UCTs are introduced, these five themes (Transportation and Mapping Systems, Energy and Utility Services, Digital Consumption Practices, Civic Engagement, and Personal Privacy) will be some of the main issues that continue to arise within IoT "smart" cities.

Monopoly Power within "Smart" Cities

Here are some of the UCTs that Google, IBM, and Intel are introducing:

Table 1. UCTs.

Company	Business Focus	UCT Efforts
Google	Surveillance and Data Mining	Google Fiber
		Google Glasses
		Google Car
		Nest Cam Home Surveillance
		Google Phone
		Purple Pipe Project
IBM	Data Storage	Smarter Cities Challenge
		Embedded Software
		Cognitive IoT: Where digital meets physical
Intel	Microchips	City Master Plans
		Processors
		Foundational IoT Technologies

Domhoff (1967) suggests that the best strategy in conducting power structure research is to first create a network analysis. A network analysis traces out all the people and organizations that make up the power structure, and then figures out how they connect to and influence government. This is achieved by analyzing annual financial

reports and studying the people who sit on boards of directors or serve as high-ranking executives.

Here are some of the people we should be aware of in this regard:

Table 2. Major Players

Company	Program	Key Personnel
IBM	Smarter Cities Challenge	Sophia Tu (IBM Corporate Citizenship Program Manager)*
	Cognitive Systems Institute	Jim Spohrer (Director)*
Intel	Internet of Things Group	Joe D. Jensen (General Manager)
	Eco-Technology Program	Herman D'Hooge (Senior Principal Engineer/Innovation Strategist)*
Google	Fiber Internet Infrastructure	Jared Nusinoff (Product Manager)
	Self-Driving Car	Chris Urmson (Director)

* Denotes that the researcher was able to interview this person.

Then, Domhoff suggests conducting a content analysis, which is the term for the systematic study of the power structure's ideologies, policies, and plans, which are learned about through the careful study of documents (Dumhoff 2006). For this study, annual reports from IBM, Intel, and Google were studies extensively in order to understand the similarities and differences between the ways each companies conceptualized IoT.

Intel coined the phrase "Internet of Things" and has focused its efforts on the foundational technologies needed to implement this vision. In other words, Intel doesn't necessarily focus on manufacturing UCTs as much as they focus on producing the technologies needed for other companies to create UCTs. For example, Intel's focus on processors is evidence of this. On top of that, Intel is involved in a number of efforts to connect with the planning processes of certain communities. Intel's IoT vision is what allows companies such as IBM to create UCTs.

While IBM is still dedicated to providing customers with data storage devices, the Smarter Cities Challenge represents the most aggressive move by a powerful communication corporation to connect with planning processes worldwide. They have also started to work on embedded software programs that react to their experiences. IBM calls this "Cognitive IoT."

Google has started to introduce many different UCTs. From their Google Fiber internet infrastructure to their Purple Pipe Project, Google is making a strong case for why they should be at the table when communities are making important planning decisions. If Google can track our routes (phones and glasses), provide our transportation medium (cars), and helps us better manage our utility services (Google Fiber and Purple Pipe Project), then why wouldn't municipalities look to Google for advice and guidance when trying to plan sustainable, efficient communities?

This is where understanding the impacts of monopoly power is pertinent. While these companies could certainly introduce products that help society on some level, their economic dominance of the industry thwarts whatever social progress they claim to be

making. In other words, true societal change cannot occur under the rule of finance-based, monopoly-focused capitalism.

In the media industry, we can certainly see the impacts of monopoly power. In terms of mass entertainment content production and distribution, five major corporations basically run the show: The Walt Disney Company, News Corporation, Time Warner, CBS Corporation and Viacom. The myth is that they compete against each other. The truth is that the intertwining of these big corporations through joint ventures gives each participant an interest in the success of the specific venture but also an active concern for the health of its partner. Therefore, while the rhetoric of the proponents of deregulation glorifies a free market, deregulation policies, in reality, create less competition and lead to the concentration of power and control.

This relates to what is occurring in Portland in a number of interesting ways. The relationship between Google, Intel, and IBM is very similar to the relationship that dominant companies have with each other in other markets. While they might be competing against each other on some level, they have an active concern for the health of their partners because of their similar interests. Therefore, planning policies and regulations must address this notion of monopoly power when considering how to interact with private interests. If they don't, city planning could simply become another market dominated by just a handful of corporations. As noted in the previous chapter, this has negative impacts on the lived experience of a community's residents.

When political economists use the term "monopoly," they do not use it in the very restrictive sense to refer to a market with a single seller. According to Bowles and Edwards (1985), "Monopoly in this sense is practically nonexistent. Instead, we employ

it as it has often been used in economics to refer to firms with sufficient market power to influence the price, output, and investment of an industry - thus exercising 'monopoly power' - and to limit new competitors entering the industry, even if there are high profits" (141).

The entire "smart" city, IoT effort seems to have a lot to do with limiting competition. For example, "smart" cities and IoT could exist while maintaining a completely open data storage system that allows the public to access it. Instead, they want a system in which only powerful corporations such as Google, IBM, and Intel can participate.

Power and control is central to any understanding of modern society and "any adequate analysis of the distribution of power and of the process of legitimation must necessarily include an analysis of the mass media" (Murdock and Golding, 1973, p. 224). Political economists understand that power is located at different levels. It can be held within specific ownership structures, hierarchies and political alliances within media corporations, and, also, in access and reception. For this project, access is important to focus on.

Data collection through "smart" devices is not necessarily a new trend. This has been occurring for years now. However, what is different is the focus on creating physical infrastructure within cities to assist with these efforts. These efforts are touted as important for increasing efficiency. However, given these companies' dedication to planned obsolescence, it is hard to believe they are truly dedicated to created sustainable communities.

Instead, this "smart" city effort is about increasing efficiency and limiting competition for a few powerful corporations. Google, IBM, and Intel are not creating UCTs that allow for open data use. Instead, they are implementing a vision of IoT in which they dominate and control it by having communities rely on them for the physical infrastructure that allows it to function.

Policy Implications: The Right to not be "Smart"

Balancing the notions of open data and proprietary data will be a major challenge facing our society in the years to come. This "smart" city, IoT trend opens the door for many conflicts in this regard. When valuable data about our actions are gathered, who gets to decide if that information becomes open to the public or closed only to private interests?

It is the responsibility of policy makers to implement regulations that allow our data to remain open and usable to the public. The Oregon Legislature and the Portland City Council repeatedly make decisions that make this goal difficult to achieve. From tax breaks to language changes, Oregon and Portland have supported the efforts of these communication companies to pay a larger role in our city planning processes. While this could certainly bring some positive results to our communities in the short-term, long-term impacts of this trend need to be considered.

The European Union has accepted the right to be forgotten as a credible argument worth hearing. This refers to the notion that citizens have the right to not have their data stored digitally. However, what if we took it a step farther? Instead of promoting the

right to be forgotten, we should demand the right not to be "smart." Why should we have to be wired and tracked in the first place?

As we witness the disappearance of leisure time and public space, individual community members need to begin to ask themselves: Do I want to be "smart"? Do I want my actions to be tracked? How much of my identity do I want connected to IoT via UCTs? How much of my personal identity is a result of who I am as a person, and how much of my personal identity is a result of how valuable I am as a mass media commodity?

Social Implications: "I am not just data! I am a human being!"

This study looked at the ways in which IoT and "smart" city efforts are impacting Portland's city planning processes. It began by examining IBM, Intel, and Google, three large communication corporations that are directly affecting Portland's planning processes, before highlighting specific efforts these companies are making in the realm of IoT and "smart" city design. Finally, this project analyzed what it is like to live in a "smart" city and how it changed residents' perspectives of Portland and themselves.

Being told that you are a commodity can have two very different results on individuals. On the one hand, it might help you understand the ways in which powerful capitalist corporations perceive you. It could help residents understand the contradictions between how they perceive their lives and how corporations perceive them. It might also help inspire critical thoughts about the ways in which our economic system influences our experience of reality.

On the other hand, however, it could have a much less empowering result. Instead of allowing residents to better understand themselves within the context of monopoly capitalism, referring to people as commodities might result in those people actually starting to view themselves as commodities. Using capitalist vocabulary to discuss communities could be seen as simply reifying the dominant commodity-form economic system.

I would argue, though, that allowing people to understand that they are seen more as commodities than as citizens is very important as we enter the IoT age. As more and more people begin to live in "smart" cities, they need to be aware of why particular decisions have been made regarding the planning and design of their communities. What is the motivation for implementing IoT and "smart" cities?

The "identity commodity" concept is meant to help people understand that private interests have played a major role in the development of their "smart" community, and many decisions made in regard to the planning of their community were made with the financial interests of private companies being valued more than the general well-being of the people who actually live in the community. Instead of justifying those behaviors, the identity commodity helps to provide a critique of how those behaviors impact society.

As our communities continue to be designed in order to track our actions and gather information about our lives into digital profiles, our ability to own and control our identities becomes an increasingly important endeavor. Especially when you start to think about the economics that govern this trend. The audience commodity provided insight into how we were actually engaging in a form of free labor when we consume a mass media product. The media company that created that product sells its consumer to

advertisers; therefore, the time and energy we spend giving media products value only results in financial gain for the media company and not the people who actually worked to give that product value.

A similar trend exists today. As our cities are planned to utilize UCTs to track our everyday activities, valuable data will be gathered about our behaviors that will be sold to advertisers and municipalities. In this sense, the identity commodity points out that as we spend our time and energy generating valuable data, we will not receive financial compensation for that labor. We will spend our leisure time generating profits for private companies.

These private corporations will argue that citizens will be benefitted by increased efficiency in a number of aspects of their life, similar to the arguments made about why companies should be able to survey your television and Internet preferences. However, are these suggestions made by private corporations, based on your previous actions, even helpful to you? For example, just because you consume something once, or even a number of times, doesn't mean you don't want to experience anything other than that ever again. The concept of "efficiency" is used by these companies to represent a narrowing of choices. Is that even something we want?

We also have to consider how the planning of "smart" cities changes our understanding of leisure time. The audience commodity served as an excellent concept in the late 20th Century to help us understand how our leisure time was being impacted by mass media practices. In the 21st Century, however, an evolved form of that concept is necessary to understand how our leisure time is controlled in a "smart" city. Thus, the

identity commodity helps us understand how UCTs serve a role in the elimination of true leisure time.

The audience commodity served as a tool for critical communication scholars to analyze the ways in which leisure time had been corrupted by powerful capitalist interests and turned into a time when we are really just doing unpaid labor. In our non-work time, we provide value to mass media content by consuming it, and the mass media corporations sell their audiences to advertisers for tremendous profits. However, none of those profits are received by the individuals actually doing the labor to create value for the content: the audience.

Today, the identity commodity can serve as a tool for critical communication scholars to understand this manipulation of non-work time within an IoT reality. As "smart" cities become more popular, more of our actions are being tracked and gathered into valuable data that is sold to advertisers, digital security companies, and municipalities. In that sense, almost all of our activities that take place during our non-work time are being used to generate profits for communication companies, and none of these profits are received by the individuals actually doing the labor to create these valuable digital identities: community members.

A large factor in being able to track and gather community members' activities is the disappearance of public space. In order to build a "smart" city, there needs to be a concerted effort to rid the city of spaces where people can move freely without being under surveillance. Thus, the emergence of UCTs within "smart" cities represents a significant threat to the existence of public space.

While balancing public and private space has always been an obstacle for community planners, this task becomes increasing difficult as we enter the IoT era. In a "smart" city where all of our activities are monitored, public space would only truly exist if the only institution that was able to gather data about you in a particular area was a municipality. For example, if Portland decided to create a part of the city where only the Bureau of Planning and Sustainability had access to the data gathered in a particular area of town, that space could be seen as public. However, if private interests are profiting from actions taking place in a particular part of town, how can that space still be considered public?

As public space becomes a thing of the past and more of our actions are tracked by private interests, people's right to privacy will become a much debated topic in the years to come. On the one hand, people have become accustomed to the excellent resources that the Internet provides. For example, many people utilize the Internet for banking and financial services. How can these services be safe and guarded without a strong level of surveillance?

On the other hand, though, how much surveillance is too much? As public space becomes increasing sparse, this will result in more surveillance of our activities. The emergence of "smart" cities and IoT represent a complex challenge to communities that are worried about making planning decisions that benefit residents' rights to privacy. Tough decisions must be made pertaining to how much freedom and autonomy people have within "smart" cities.

The concept of mobility will play a large part in this discussion. The emergence of "smart" phone technology around the world has made it easier for communication

corporations to track consumers' actions and gather data about their preferences and habits. The ability of consumers to provide data about their habits through mobile devices is a key aspect of IoT.

This notion of mobility plays a major role in the disappearance of truly public space. If a space can never be truly be public if your actions in that space are used for others' profits, how can any space you go to with a "smart" phone ever truly be public? In other words, the emergence of mobile data gathering devices represents a significant threat to the existence of truly public space.

In that sense, it also represents a legitimate threat to democratic practices. As more of the community planning process is engulfed by the motivations of powerful private interests, the spaces that most community members engage with won't be designed for their benefit. Instead, the mass majority of spaces within a "smart" city will be designed to allow for communication corporations to track residents' actions and gather data about their habits.

For community residents interested in maintaining the small amount of truly public space that exists today, there must be an effort to engage with local planning processes in ways that disrupt this trend. This involves gaining knowledge about local ordinance and planning processes, as well as contacting elected officials and city staff who play a decision-making role in these efforts. If community members don't take advantage of the small amount of agency they possess today, they may find themselves waking up tomorrow with no real voice in how their communities are planned and designed.

The notion of standardization is central to this project, as well. As occurs in every industry dominated by monopoly power, design and production becomes standardized as consumers' choices are narrowed. The "smart" city is no exception to this. As the IoT becomes a reality, companies such as Google, IBM, and Intel will find their specific niche.

Instead of competing against each other by releasing similar products, they will discover what each company can do well that contributes to the oligopoly's overall vision and goals. It will be similar to what occurs with other products, such as laptop computer, where each company focuses on dominating a different sector of the industry. Standardization occurs as each company works together to eliminate potential competition.

Lew Fredericks serves in the Oregon House of Representatives and represents the northern region of Portland. He will be taking over a Senate seat this upcoming November. Representative Fredericks, who has worked towards a PhD in Urban Planning and Communications, definitely recognizes the potential impacts that IoT, "smart" technology brings to his community. He can see both the positives and negatives of this trend.

He certainly recognizes the positive potential changes that UCTs could bring to disenfranchised populations in his district. However, he is more concerned with who is being left out of this framework. Who isn't "smart" or privileged enough to benefit from IoT innovations?

He points out that the majority of community planners tend to come from the middle or upper class; there are very few community planners from lower socio-

economic populations. Representative Fredericks believes that is the reasons that most planning and policy decisions don't take these groups onto account. The most obvious example of this is gentrification.

Portland has been so susceptible to gentrification efforts that *The Oregonian* actually keeps an updated map on "Portland neighborhoods at risk of gentrification." According to the online newspaper, "Portland planners have used housing and demographic data to predict which neighborhoods are at risk of gentrification — urban revitalization that leads to mass displacement of poorer residents and ethnic minorities — and commissioned Portland State University assistant professor Lisa Bates to suggest possible policy solutions." The map also highlights what are called "Landing Spots" by saying, "These neighborhoods are seeing an opposite trend: Rising numbers of poor Portlanders, ethnic minorities and people with lower education levels than the citywide average."

In an interview with the researcher, Representative Fredericks spoke at length about some of the challenges people in his community face in regards to communication technology. He believes that "families should have their data." In his view, one of the main problems with gentrification of a community is that it promotes a trickle-down perspective of how technological innovation pervades our social lives.

In other words, gentrifying "smart" city efforts are meant to benefit wealthier socio-economic demographics initially, with the idea being that culture changes within that demographic would eventually impact all the others. While this sometimes might be true from a business perspective, Representative Fredericks sees some grave implications for planning communities based on this strategy.

The problem with planning from a top-down approach is that it only endorses one perspective. As was discussed preciously, planners should adhere to a framework that endorses dialogue over individual advocacy. As previously noted, advocacy planning is about making your own personal argument prevail. "Dialogue on the other hand is not about winning or making your own view prevail. When someone's mistake is uncovered in dialogue, everyone gains..." (Innes, 121). Planners should be less interested in acting as advocates and engaging in persuasive arguments, and they should be more interested in adhering to Habermas's notion of the ideal speech situation and engaging in mutual dialogue.

"Smart" cities are also not polyrational. They are designed to serve a very monolithic perspective of society. Therefore, "smart" cities are not consistent with Schwarz and Thompson's (1990) theory of polyrationality. "Smart" cities implement UCTs in a way that disregards the fact that many people won't be able to engage with this level of technology in a meaningful, conscientious way. Instead, IoT technology with be introduced to serve one specific rationality, while the others struggle to live in "smart" communities.

In a way, a goal of this project was to serve as an intervention for community members, city planners, policymakers, and private corporations in order to rethink the growing excitement that exists around "smart" cities and UCTs. By conducting interviews with people from all of these different sectors, the hope was to plant at least some critical thought into their minds about the ways in which this trend impacts our lived experience of reality.

While it is unclear whether this intervention was successful or not, it is clear that many people are aware of the critiques made against "smart" cities and UCTs. While some groups are open to the critique of this trend, others see IoT as an inevitable reality we must start to prepare for, instead of analyze. This means that more investigative research and intervention is necessary in order to truly impact the perspective of "smart" city proponents.

In other words, as UCTs move from fringe dreams to mainstream realities, a critical perspective of these technologies must also accompany that transition. Gartner, an IT analytical firm, calls this "the hype cycle." Basically, the hype cycle reflects the notion that new ideas can often start by existing only in fringe communities. As those fringe ideas start to become fetishized and generate subcultural capital, there is often a dramatic shift from the fringe to the mainstream.

According to Gartner, a technological hype cycle consist of five time periods: a technology trigger, a peak of inflated expectations, a trough of disillusionment, a slope of enlightenment, and a plateau of productivity. The technology trigger represent a breakthrough that can't be ignored. At this point, there are usually no usable products available and no real commercial viability present, but "proof-of concept" stories often trigger media publicity.

Following most major technological innovations is a period of peak inflated expectations. This occurs when the technology has evolved enough to produce a number of significant success stories that result in inspiring the imaginations of consumers and manufacturers. Many companies start to invest in new technologies during this period of the hype cycle.

After the market becomes flooded with companies trying to profit from this new technological innovation, there is often a period of disillusionment, as experiments and implementation projects fail to deliver to the level expected by consumers and manufacturers. At this point, many companies give up on the new technology, while others work to fix the problems and rethink its use in society.

As more examples of how this new technology can be utilized by society come to fruition, second and third generation products begin to appear. In other words, the technology has evolved at this point to represent a traditional commodity. This period of enlightenment is precisely where we are today with IoT. While many companies have bought into the notion of IoT and "smart" cities and are starting to develop their own UCTs, more conservative companies are still waiting to see how consumers react to these new forms of technology.

Finally, the technology officially moves out of the fringe when mainstream production takes off. In this stage, the criteria for measuring the viability of certain products are more clearly defined, and the relevance of the new technology becomes obvious (Gartner, 2015). For example, IoT will move into this stage once a single platform has been established. Until then, we will see some companies working hard on UCTs, while others wait to make sure they are viable consumer products.

A major aspect of UCTs becoming viable consumer products is their integration into community planning processes. Because most cities are not yet designed to fully engage with all aspects of IoT, we haven't seen "smart" cities truly move into mainstream consciousness. However, as communities allow communication corporations to play larger roles in their planning processes, a single IoT platform will emerge that

connects all UCTs and allows for "smart" cities to become an obvious part of our everyday reality.

This evolution from fringe idea to mainstream reality is important for a number of reasons. First, as already mentioned, this hype cycle is also true about critiques of new forms of technology. If we care about making sure that community planning processes don't eliminate public space, we have to make sure that critical perspectives of technology and capital accompany the success stories being told about IoT, UCTs, and "smart" cities.

It is also important from a marketing and promotions standpoint. While powerful communication companies such as IBM, Intel, and Google certainly engage with direct forms of marketing, they also engage in a strategy known as "mind share." This refers to subtle forms of engagement with consumers that result in increased loyalty to certain brands or products. In terms of UCTs, we've certainly seen these new forms of technology evolve through the hype cycle. Also occurring, however, are consumers subtly becoming used to having UCTs advertised to them. As UCTs enter mainstream consciousness, a critical perspective of this technology must also accompany them. If not, decisions made regarding consumption habits and community planning processes will be motivated by the financial interests of private companies.

A large part of how community members will respond to the development and introduction of UCTs is based on the narrative they receive about this technology. If the narrative they are told and believe is based on the benefits that UCTs can bring to their increasingly digital lives, then it is likely they won't find any reason to be critical of "smart" city planning. However, if the narrative they are told and believe includes

information about the disappearance of true leisure time and public space in their increasingly digital lives, then it is likely they will view UCTs and "smart" city development through a more critical lens. In other words, it comes down to whether community members view themselves as consumers or residents within an IoT, "smart" city.

The standardization that occurs within this context should be of major concern to many Portland residents. Mass consumerism fortifies this process, in that "the sacrifice of individuality, which accommodates itself to the regularity of the successful, the doing of what everybody does, follows from the basic fact that in broad areas the same thing is offered to everybody by the standardized production of consumption goods" (Adorno, 1991: 40).

While communities should certainly utilize UCTs to help make decisions about how to use resources more efficiently, efficiency should not become the overriding fctor for each and every experience in our lives. As Google, IBM, and Intel work to produce a single standardized IoT platform for millions of RFID chips to connect to, we need to ask ourselves if that's the type of community we want to live in and whether these are the types of lives we want to live.

This is the challenge facing Portland today. The Bureau of Planning and Sustainability needs to think about the impacts that these communication corporations can have on community members' lifestyles. Their decisions should be based on benefitting the residents they serve, not the powerful private interests who want to take advantage of them because they see a new emerging market. Portland's community members deserve to be viewed as residents, as opposed to consumers and commodities.

The notion of company towns was previously discussed. While contemporary "smart" cities don't necessarily mirror these traditional company towns in the strict sense of being run by a single business interest, they do share many similar characteristics. Mainly, the idea of viewing community members as consumers and commodities, instead of residents, is present in both examples.

The vision of society laid out by these communication corporations is one based around the idea of efficient consumption. They want to provide consumers with a narrowed set of choices to choose from in order to find guaranteed success in terms of advertising. Similar to the ideas laid out in Dallas Smythe's analysis of the audience commodity, the goals of advertisers have become a central element to the communication industry. In effect, as communication corporations play a larger role in the planning and designing of communities, the goals of advertisers play a larger role in the physical environments we interact with throughout our everyday lives.

Cities such as Portland have to consider to what extent they want the infrastructure of their communities to be influenced by the emerging personal data economy. Within this economy, where personal data is exchanged for resources, identities are the main commodity being sought. Therefore, UCTs are being implemented throughout communities in order to bring the IoT, "smart" city vision to fruition. This results in the elimination of truly public space as communities focus on making more spaces able to track the actions and habits of community members in order to harvest that information into valuable data.

UCTs will become increasingly common in the next few years. As Intel, IBM, Google, and other communication corporations test different products and ideas, the idea

of interacting with UCTs will be become familiar and common. While some UCTs are implemented in order to help municipalities make better planning decisions, there will also be many UCTs implemented in order to help private interests. In the years to come, cities such as Portland will have to balance to what degree they invest in these technologies and to what degree they invest in the notion of truly public and democratic spaces.

Residents need to start proclaiming to their community leaders, "I am not just data! I am a human being!" The purpose of introducing the concept of the identity commodity is meant to help scholars and community members analyze the impact that private interests are having on our community planning processes. As identities continue to be the main commodity being sought within this new personal data economy, the development and implementation of UCTs within our communities needs to be viewed with a critical eye.

Advertisers would like to narrow the choices we make in our everyday lives in the hope that less choices means more people choose to consume their product. If we continue to allow communication corporations to play an integral role in the planning and design of our communities, the amount of choices we can make within our physical environments will be narrowed. We will only be able to consume products connected to the Internet of Things.

Therefore, as UCTs are increasingly used within our communities to track our actions and gather data about our consumption habits, we have to make the effort to own our identities. However, we never truly own our identities in the Internet of Things. Instead, our identities are used as commodities within our "smart" cities.

APPENDICES:
A. INTERVIEWS

IBM
Sophia Tu – IBM Corporate Citizenship Program Manager – 3/6/15
Jim Spohrer - Director, IBM University Programs and Cognitive Systems Institute –
3/20/15

Intel
Herman D'Hooge - senior principal engineer and innovation strategist at Intel- 3/6/15

Google
Wilson White – Senior Policy Counsel – 4/22/16

Cisco
Dave Evans – Chief Technologist for Internet Business Solutions Group (IBSG)
Rachael McBrearty – Director of IBSG

City Management
Judith Mowry – Senior Policy Advisor at Portland Office of Equity and Human Rights –
2/6/15
Jim Hagerman – Interim Director of Portland Bureau of Environmental Services – 2/6/15
Josh Alpert – Mayor's Director of Strategic Initiatives – 2/6/15
Michael Armstrong - Senior Sustainability Manager, Portland Bureau Planning &
Sustainability – 2/6/15
Brendan Finn – Portland Commissioner Dan Saltzman's Chief of Staff – 2/6/15
Bobby Lee – Oregon Regional Solutions Team – 3/6/15
Denise Cheng - SF Mayor's Office of Civic Innovation – 3/19/15
Carmen Merlo – Director of Portland's Bureau of Emergency Management – 3/27/15
Katie Shriver - Office of Portland Commissioner Steve Novick – 3/27/15
Chris Tamarin – Telecommunications Strategist for the Oregon Business Development
Department – 3/27/15
Lori Rockel – Director of Community Engagement for Celebration, Fl – 4/30/14
Janet Hillock – Regional Coordinator, Oregon IFA – 3/27/15
Lynn Schoessler – Oregon IFA Director – 3/27/15

Other
Richard Foglesong – Professor at Rollins College – 4/29/14
Joseph Reyes – Resident of Celebration, Fl – 4/29/14
Mark Lakeman – Community Organizer, OR
Lew Fredericks – Oregon State Senator
Arnie Roblan – Oregon State Senator

B. SURVEYS

Survey 1 (of Portland residents):

1. Google is planning to build fiber internet infrastructure in Portland? What are your thoughts on this? Is this good for Portland?
2. IBM, Intel, and Cisco are also working on projects that could impacts Portland's city planning processes. In general, what are your thoughts on private companies (such as Google, IBM, Intel, Cisco, and Disney) playing a major role in the planning and development of Portland? Would it bother you to live in a city designed by large private corporations?
3. In general, do you have any experiences of being impacted by this trend? Do you predict being impacted by this trend in the near future, positively or negatively?
4. Do you consider yourself a person who is engaged with Portland's planning processes? Do you attend public hearings or meetings about important city planning decisions that impact you and your community? If so, how often? Do you engage with the community planning process in other ways?
5. Are you aware of any other efforts by major corporations (such as IBM, Intel, or Cisco) to impact Portland's planning processes? If so, which companies, what are they doing, and what do you think about it?
6. Are you aware of any other cities where a private company played a major role in the planning and developing of the community? If so, which ones?

Survey 2 (of people outside of Portland):

1. Google, IBM, Intel, and Cisco are all playing a role in the planning and design of Portland, Oregon. Does knowing this information change your perspective of Portland? When you hear that Portland is being planned by large private corporations, does that attract you to Portland or turn you off from it?

2. In general, what are your thoughts on private companies (such as Google, IBM, Intel, Cisco, and Disney) playing a major role in the planning and development of our communities? Would it bother you to live in a city designed by a large private corporation?

3. Do you consider yourself a person who is engaged with your community's local politics and planning processes? Do you attend public hearings or meetings about important city planning decisions that impact you and your community? If so,

4. How often? Do you engage with the community planning process in other ways?

5. In general, do you have any experiences of being impacted by this trend? Do you predict being impacted by this trend in the near future, positively or negatively?

6. Are you aware of any other cities where a private company played a major role in the planning and developing of the community? If so, which ones?

REFERENCES CITED

ABI Research. (2011, July 6). Smart city technologies will grow fivefold to exceed $39

    billion in 2016. *ABI Research News.*

Adorno, T. (1941/1990). On popular music. In S. Frith and A. Goodwin (Eds.), *On*

    record: Rock, pop and the written word (pp 301-314). London: Routledge.

Alexander, J, et al. (2007). A real effect on the gameplay: Computer gaming, sexuality,

    and literacy. In Cynthia L. Selfe, Gail E. Hawisher, & Derek Van Ittersum (Eds.),

    Gaming lives in the twenty-first century: Literate connections. New York, NY:

    Palgrave Macmillan.

Ahmed, E. (2012). Green cities: Benefits of urban sustainability. In Richard Simpson &

    Monika Zimmermann (eds.) *The Economy of Green Cities.* Dordrecht : Springer.

Anderson, D. (2003). Prosumer approaches to new media composition: Consumption and

    production in continuum. *Kairos*, 8(1).

Arola, K. (2010). The design of Web 2.0: The rise of the template, the fall of design.

    Computers and Composition, 27, 4–14.

Arthur, C. (2012). The thinking city. *BBC Science Focus*, January 2012.

Aziz, K; Richardson, S; Azlina, N; et al. (2011) Universities as key actors for cluster

    development: A case study of the Glasgow–Edinburgh corridor. In *2010*

    International Conference on E-business, Management and Economics. Hong

    Kong: IACSIT Press, pp. 297–301.

Baer, D. (2014, September 16). Peter Thiel: Google as insane perks because it's a

    monopoly. *Business Insider*: http://www.businessinsider.com/peter-thiel-google-

    monopoly-2014-9.

Bartling, H. (2004). The Magic Kingdom syndrome: Trials and tribulations of life in

    Disney's Celebration. *Contemporary Justice Review, 7,* 375-393.

Beck, E. (2015). The invisible digital identity: Assemblages in digital networks.

    Computers and Composition, 35: 125–140.

Bell, D. (1974) *The coming of post-industrial society*. London: Heinemann.

Bell, S. (2011.) System city: Urban amplification and inefficient engineering. In

    Urban Constellations, edited by M. Gandy, 71 – 74. Berlin: Jovis.

Black, E. (2001*). IBM and the Holocaust*. NY: Random House, Inc.

Blair, K. et al. (2010). Looking into the digital mirror: Reflections on a computer camp

    by girls for girls. In Sharon R. Mazzarella (Ed.), *Girl wide web 2.0: Revisiting*

    girls, the Internet, and the negotiation of identity. New York, NY: Peter Lang.

Blackmon, S. (2003). "But I'm just white" or how "other" pedagogies can benefit all

    students. In Pamela Takayoski, & Brian Huot (Eds.), *Teaching writing with*

    computers: An introduction. (pp. 42–102). Boston, MA: Houghton Mifflin Co.

Bowles, S, and Edwards, R. (1985). *Understanding Capitalism*. New York: Harper and

    Row.

Bricklin, D. (2001). The cornucopia of the commons. pp. 59–63 in A. Oram (ed.)

    Peer-to-peer: Harnessing the Power of Disruptive Technologies. Cambridge,

    MA: O'Reilly.

Brooks, J. (1976). *Telephone: The first hundred years*. Harper & Row.

Bruns, A. (2008). *Blogs, Wikipedia, Second Life, and beyond: From production to*

    produsage. New York: Peter Lang

Buck, N. and While, A. (2015). Competitive urbanism and the limits to smart city

    innovation: The UK Future Cities initiative. *Urban Studies*. p. 1-19.

Camagni, R. (1998). Sustainable urban development: definition and reasons for a

    research programme. *Int J Environ Pollut* 10: 6–26.

Castells, M. (1979). *The urban question*. Cambridge: The MIT Press.

Castells, M. (2000). *End of millennium*. Second edition. Vol. 3. *The Information Age:*

    Economy, Society and Culture. Malden, MA: Blackwell.

Chen, R. (2016). AT&T: We'll connect everything you own and everywhere you go.

    CES.

Chudacoff, H. (1988). *The evolution of American urban society.* Upper Saddle River, NJ:

    Prentice Hall.

City of Anaheim. (2014). *2014 Annual Report,* Report, City of Anaheim, December

    2013.

Civic Committee of the Commercial Club of Chicago. (2009, June). *Still left behind:*

    Student

    learning in Chicago public schools. Chicago: Author.

Claburn, T. (2009). Google granted floating data center patent. *Information Week*.

Coleman, S. & Dyer-Witheford, N. (2007). Playing on the digital commons:

    collectivities, capital and contestation in videogame culture. *Media, Culture &*

    Society, 29(6): 934-953.

Crawford, D. (2015). Huge rise in use of online privacy tools reported as fears of privacy

    erosion grow. *BestVPN*.

Crawford, M. (1999). The 'new' company town. *Perspecta, 30,* 48-57.

Davy, B. (1990). *Essential injustice: When legal institutions cannot resolve environmental and land use disputes*. Wien: Springer.

Day, J. (2012). Songdo in South Korea leading charge to become city of the future. *Metro* (U.K.), Jan. 10, 2012.

Dinius, O; Vergara, A. (2001). *Company towns in the Americas: Landscape, power, and working-class communities.* Athens: University of Georgia Press.

Dirks, S; and Keeling, M. (2009). *A Vision of smarter cities: How cities can lead the way into a prosperous and sustainable future*. New York: IBM Institute for Business Value.

Domhoff, W. (2006). Who rules America? http://sociology.ucsc.edu/whorulesamerica/

Drucker, P. (2001). A century of social transformations: emergence of knowledge society. In: *The Essential Drucker*. New York: HarperCollins.

Ewen, S. (1988). *All consuming images.* New York: Basic Books.

Faulkner, C. (2000). Archeological evidence of parasitic infection from the 19th century company town of Fayette, Michigan. *The Journal of Parasitology,* 6, 846-849.

Fenley, J. (2013, 15 October). "Google Fiber has changed its terms of service...". GoogleProtest.com.

Fishman, R. (1987). *Bourgeois utopias.* New York: Basic Books.

Flyvbjerg, B. (1998). *Rationality and power: Democracy in practice*. Univ. of Chicago Press.

Flyvbjerg, B. (2012). Why mass media matter to planning research: The case of megaprojects. Journal of Planning Education and Research, 32, 169-181.

Foray, B. (2009). Introduction, setting the stage for a green economy transition. *Green economy*.

Foster, J; and McChesney, R. (2011). Monopoly and competition in twenty-first century capitalism."*Monthly Review, 62.11*.

Foucault, M. (1995). *Discipline and punish: The birth of the prison*. New York: Random House.

Fuchs, C. (2012). Capitalism or information society? The fundamental question of the present structure of society. *European Journal of Social Theory,* 16(4), 413–434.

Gale International. (2012). Korea's Songdo International Business District — One of Asia's largest green developments — Surpasses milestone of 13 million square feet of LEED certified space. Press Release, June 27, 2012

Gandy, O. (2014). Book review: The audience commodity in a digital age: Revisiting a Critical Theory of Commercial Media. *Journalism & Mass Communication Quarterly.* 91: 842-844.

Gartner. (2015). The Gartner Hype Cycle. http://www.gartner.com/technology/research/methodologies/hype-cycle.jsp#.

Gentile, G. (2002). On-field success of Anaheim Angels could hasten sale of team. Associated Press, 19 September.

Glancey, J. (2011). Inside Masdar City: a modern mirage. *The Guardian*, May 10, 2011.

Greenfield, A. (2013). *Against the smart city*. Do Projects: New York.

Griffiths, D. (2013, December 2). City cynic: 'Against the smart city' By Adam Greenfield (Review). *Forbes:*

http://www.forbes.com/sites/danielnyegriffiths/2013/12/02/city-cynic-against-the-

smart-city-by-adam-greenfield-review/

Google Support. (2015). Service plans and pricing. Google Support:

https://support.google.com/fiber/answer/2657118?hl=en.

Habermas, J. (1984). *The Theory of Communicative Action*. Beacon Press

Hardin, G. (1965) The tragedy of the commons, *Science* 162: 1343–8

Hartmann, T. (2010). Reframing polyrational floodplains: Land policy for large areas for

temporary emergency retention. *Nature and Culture*, 5, 15-30.

Hartmann, T. (2012). Wicked problems and clumsy solutions: Planning as expectation

management. *Planning Theory*, 0, 1-15.

Harvey, D. 2005. *A brief history of neoliberalism*. Oxford: Oxford University Press.

Harvey, D. 2003. *Paris, Capital of Modernity*. New York: Routledge.

Hatch, D. (2012). Smart cities. CQ Researcher: CQ Press 22(27), 645-668.

Hannon, M. (2011, August 9). "IBM and City of Portland Collaborate to Build a Smarter

City." IBM Press Release: https://www-

03.ibm.com/press/us/en/pressrelease/35206.wss.

Healey, P. (1992) Planning through debate: The communicative turn to planning theory.

Town Planning Review, 63(2): 143-162.

HM Treasury. (2006). *Science and innovation investment framework 2004–2014: Next

Steps*. London: HM Treasury.

Hodson M and Marvin S. (2010). *World Cities and Climate Change: Producing Urban

Ecological Security*. Maidenhead: Open University Press.

Hollands, R. (2008). Will the real smart City Please Stand Up? *City*, 12 (3): 303–320.

Hoopes, S. (2014, August). Internet publishing and broadcasting in the US. *IBIS World.*

IBIS World. (2014a, October). Data processing & hosting services in the US.

      Ibisworld.com.

--------------. (2014b, December). Semiconductor & circuit manufacturing in the US.

IBM. (2014). *2013 IBM Annual Report.*

Innes, J. and Booher, D. (2010). *Planning with complexity: An introduction to*

      collaborative rationality. Routledge Press.

Intel. (2014). *2013 Intel Annual Report.*

Jacobs, J. (1961). *The death and life of great American cities.* Vintage Books.

Jacobs, M. (1991). *The green economy: environment, sustainable development and the*

      politics of the future. UBC Press, Vancouver.

Kitchin, R. (2014.) The Real-time city? Big data and smart urbanism. *GeoJournal* 79: p.

      1– 14.

Kourtit and Nijkamp. (2012). Smart cities in the innovation age. *Innovation: The*

      European Journal of Social Science Research, 25, 2. p. 93-95

Laguerre, M. (1999). *Minoritized space.* UC Publishing.

Lamagna, S. (2015). Building the next-generation car with Intel IoT. *IoT@Intel.*

Lefebvre, Henri. 2003. *The urban revolution*. Minneapolis: University of Minnesota Pres.

Legner M, Lilja S (2010). *Living cities: an anthology in urban environmental history*.

      FORMAS, Stockholm.

Leyshon and Thrift. (1997). *Money/Space: Geographies of monetary transformation*.

      Routledge Publishing.

Lipman, P. (2011). *The new political economy of urban education: Neoliberalism, race, and the right to the city.* NY: Taylor and Francis.

Logan and Molotch. (2007). *Urban fortunes: The political economy of space.* UC Press.

Luque A, McFarlane C and Marvin S (2014). Smart urbanism: Cities, grids and alternatives? In Hodson M and Marvin S (eds) *After Sustainable Cities*? London: Routledge, pp. 74–90.

Magnet Lab. (2014). Transatlantic telegraph cable. *National High Magnetic Field Laboratory:*

http://www.magnet.fsu.edu/education/tutorials/museum/telegraphcable.html.

Marshall, D. (2014). History of the Internet: Timeline. *Net Valley:*

http://www.netvalley.com/archives/mirrors/davemarsh-timeline-1.htm

McBane, M. (2011). Whitening a California citrus company town: Racial segregation practices at the Limoneira Company and Santa Paula. *Race/Ethnicity: Multidisciplinary Global Contexts, 4*, 211-233.

McCarthy, T. (1984). *Jurgen Habermas*. Beacon Press.

McChesney, R. (2004). *The problem of the media: U.S. communication politics in the Twenty-First century*. New York: Monthly Review Press.

McCormick, K. (2012). Sustainable urban transformation and the green urban economy. In Richard Simpson & Monika Zimmermann (eds.) *The Economy of Green Cities*. Dordrecht : Springer.

McDonald, A. (2009, September 17). Online privacy: Industry self-regulation in practice. *Google Talk*.

McGuigan and Manzerolle. (2014). *The audience commodity in a digital age: Revisiting a critical theory of commercial media*. Peter Lang Publishing Inc.

McKee, H. (2011). Policy matters now and in the future: Net neutrality, corporate data mining, and government surveillance. *Computers and Composition*, 28(4), 276–291.

McKendry, C. (2012). Environmental discourse and economic growth in the greening of postindustrial cities. In Richard Simpson & Monika Zimmermann (eds.) *The Economy of Green Cities*. Dordrecht : Springer.

McKinney, D. (2015). Intel unveils tiny smart house at Intel IoT Insights 2015. *IoT@Intel*.

McNeill, D. (2009). New Songdo: Atlantis of the Far East. *The Independent*.

Medin, M. (2011, March 30). Ultra high-speed broadband is coming to Kansas City, Kansas. *Google Blog*: http://googleblog.blogspot.com/2011/03/ultra-high-speed-broadband-is-coming-to.html.

Medin, M. (2014, February 19). Exploring new cities for Google Fiber. *Google Blog*: http://googleblog.blogspot.com/2014/02/exploring-new-cities-for-google-fiber.html.

Meehan, E; Torre, E. (2011). Markets in theory and markets in television. In Wasko, Murdock, and Sousa (Eds.), *The Handbook of Political Economy of Communication* (pp. 62- 82). Blackwell Publishing.

Mercer, D. (1987). *IBM: How the World's most successful corporation is managed*. London: Kogan Page.

Miège, B. (1989) *The Capitalisation of cultural production*. New York: International General.

Mitchell, R. (2014). The Internet of Things at home: 14 smart products that could change your life. *Computerworld.com.*

Mone, G. (2015). The new smart cities. *Communications of the ACM,* Vol.58(7), pp.20-21.

Monstadt J (2007) Urban governance and the transition of energy systems: Institutional change and shifting energy and climate policies in Berlin. *International Journal of Urban and Regional Research* 31(2): 326–343.

Moore, GE. (1965). Cramming more components onto integrated circuits. *Electronics*, p. 114–117.

Moore, S. (2007). *Alternative routes to the sustainable city.* Lexington Books.

Murdock and Golding. (1973). For a political economy of mass communications. In R. Milliband and J. Saville (eds). *Socialist Register.* London: Merlin Press. P. 205-234.

Nam, T; and Pardo, T. (2011). Conceptualizing smart city with dimensions of technology, people, and institutions. In *The Proceedings of the 12th Annual International Conference on Digital Government Research*. New York: ACM, pp. 282–291.

Nix, E. (2014). 5 famous company towns. *History.*

Oredero, K. (2012). New urban spaces: The emergence of green economies. In Richard Simpson & Monika Zimmermann (eds.) *The Economy of Green Cities.* Dordrecht: Springer.

Paris Tech. (2012, May 9). The three faces of the city 2.0. *Paris Tech Review*: http://www.paristechreview.com/2012/05/09/the-three-faces-of-the-city-2-0/.

Parsons, D. (2000). *Streetwalking the metropolis.* Oxford Univ. Press.

Peck, J., Brenner, N., & Theodore, N. (2008, June 7). City as lab. *AREA Chicago, Art/Research/Education/Activism,* 6.

Poole, S. (2013, July 23). Herman D'Hooge and smart cities: Innovations for The Portland Plan. *A&AA Blog:* http://blogs.uoregon.edu/aaablog/2013/07/23/herman-dhooge-and-smart-cities-innovations-for-the-portland-plan/.

Porteous, J. (1970). The nature of the company town. *Transactions of the Institute of British Geographers, 51*, 127-142.

Porter, ME, & van der Linde, C. (1995). Toward a new conception of the environment-competitiveness relationship. *J Econ Perspect* 9(4): 97–118.

Pugh, E. (1995). *Building IBM*. Cambridge, Massachusetts: The MIT Press.

Raymond, E. (2001) *The cathedral and the bazaar: Musings on Linux and open source by an accidental revolutionary*. New York: O'Reilly Media.

Regalado, A. and Leber, J. (2013). Intel fuels a rebellion around your data. *MIT Technological Review.*

Reyman, J. (2013). User data on the social web: Authorship, agency, and appropriation. *College English*, 75(5), 513–533.

Rheingold, H. (2002) *Smart mobs: The next social revolution*. Cambridge, MA: Perseus.

Richards, N. and King, J. (2013). Three paradoxes of dig data. *Stanford Law Review,* 41.

Rittel, H. and Webber, M. (1973). Dilemnas is a general theory of planning. *Policy Sciences, 4,* 155-169.

Rode, P. (2009). City making as climate policy. In: Proceedings of the urban age conference, Istanbul, Turkey, 4–6 November 2009.

Rode P, Burdett R. (2011). Cities: investing in energy and resource efficiency. In: *UNEP. Towards a green economy: pathways to sustainable development and poverty eradication.*

Roderick, R. (1986). *Habermas and the foundations of Critical Theory*. St. Martin's Press.

Rodgers, S. (2009). Urban geography: urban growth machine. In *The international Encyclopedia of Human Geography*. 12: 40-45. R. Kitchin and N. Thrift (eds). Oxford: Elsevier.

Rogoway, M. (2014, November 6). Portland drafts new utility cabinet rules for Google Fiber and others. *The Oregonian's Oregon Live:* http://www.oregonlive.com/silicon-forest/index.ssf/2014/11/portland_drafts_new_utility_ca.html.

Ross, A. (1999). *The Celebration chronicles.* Ballantine Books.

Sassen, S. 2001. *The global city.* Princeton University Press.

Schmid, J. (2013). Water industry pushes 'purple pipes' for proposed business park. *Journal Sentinel.*

Schwarz, M. and Thompson, M. (1990). *Divided we stand: Redefining politics. Technology and Social Change.*

Shapiro, J. (2015). Smart cities: Quality of life, productivity, and the effects on human capital. *National Bureau of Economic Research.*

Simmonds, P. (2015). The digital identity issue. *Network Security.*

Simpson, R. (2010). A green economy for cities. Available via: http://www.stakeholderforum.org/sf/outreach/

Simpson, R. (2012). Introduction: A green economy for green cities. In Richard Simpson & Monika Zimmermann (eds.) *The Economy of Green Cities*. Dordrecht: Springer.

Singel, R. (2013, 30 July). Now that it's in the broadband game, Google flip-flops on Network Neutrality." *Wired.*

Smith, L. (1999). *Decolonizing methodologies: Research and indigenous peoples*. Dunedin, New Zealand: University of Otago Press.

Smythe, D. (1977). Communications: Blindspot of western marxism. *Canadian Journal of Political and Society Theory*, 3, 1–28.

Sobel, R. (1981). *IBM*. NY: Truman Talley.

Söderström et al. (2014). Smart cities as corporate storytelling. *CITY*,18, 3, p. 307–320.

Stehr, N. (1994). *Knowledge Societies*. London: Sage.

Stoneman (ed) (1995). Policy design and intervention in the innovation diffusion process: the case of China's communication sector. Available via: http://pubs.e-contentmanagement.com/doi/ abs/10.5172/impp.2006.8.1-2.113?journalCode=impp

Sukhdev, P. (2009). Green economy for an urban age. In: *Proceedings of the urban age conference*, Istanbul, Turkey, 4–6 November 2009.

Svec, H. (2015). On Dallas Smythe's "Audience Commodity": An Interview with Lee McGuigan and Vincent Manzerolle. *Communication, Capitalism, and Critique,* 13 (2).

Swanner, N. (2015). Google Fiber cleared for landing in Portland with tax law

    amendment. *Slash Gear:* http://www.slashgear.com/google-fiber-cleared-for-

    landing-in-portland-with-tax-law-amendment-17379661/.

Sweezy, P. (1972). *Modern capitalism and other essays*. New York: Monthly Review

    Press.

Thompson, J. (1984). Universal pragmatics. *Critical Debates*. MIT Press.

Thompson, M. (1990). Cultural theory. Boulder: Co: Westview Press.

Toffler, A. (1980). *The third wave*. New York: Bantam.

Touraine, A. (1974). *The post-industrial society. Tomorrow's social history: Classes,

    conflicts and culture in the programmed society*. London: Wildwood House.

Townsend, A. (2013.) *Smart cities: Big data, civic hackers, and the quest for a new

    utopia*. New York: W. W. Norton & Company.

UN-Habitat. (2008). State of the world's cities 2008/2009: harmonious cities. Earthscan,

    London.

 UN-Habitat (2010) State of the world's cities 2008/2009: bridging the urban divide.

    Earthscan, London.

Vanolo, A. (2014.) Smart mentality: The smart city as disciplinary strategy. *Urban

    Studies*, 51 (5): 883– 898.

Verweij, M; and Thompson, M. (eds.). (2006). *Clumsy solutions for a complex world:

    Governance, politics and plural perceptions*. Houndmills: Palgrave Macmillan.

Vollan and Ostrom. (2010). Cooperation and the commons. *Science,* 330(6006): 923-924.

Watkin, D. (1977). *Morality & architecture.* Clarendon Press: Univ. of Michigan.

Weber, M. (1958). The rational and social foundations of music. Carbondale: Southern.

Webster, F. (1995) *Theories of the information society*. London: Routledge.

Webster, F. (2002) The information society revisited. In: Livingstone S and Lievrouw L (eds) *Handbook of New Media*. London: Sage.

Werna, E. (2012). Working in green cities: Improving the urban environment while creating jobs and enhancing working conditions. In Richard Simpson & Monika Zimmermann (eds.) *The Economy of Green Cities*. Dordrecht : Springer.

Wyly, E. (2013). The city of cognitive – cultural capitalism. *City* 17 (3): 387 – 394.

Zigterman, B. (2013, December 13). How we stopped communicating like animals: 15 ways phones have evolved. *Boy Genius Report*: http://bgr.com/2013/12/13/telephone-timeline-a-brief-history-of-the-phone/.

Zimmerman and Simpson. (2012). Green urban economy: Agenda setting for the urban future. In Richard Simpson & Monika Zimmermann (eds.) *The Economy of Green Cities*. Dordrecht: Springer.