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**The Smart City: A Rhetorical Analysis of Actors and Their Smart City  
Narratives**

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**The Smart City: A Rhetorical Analysis of Actors and Their Smart City  
Narratives**

by

**Patrick James Russell, B.A., M.A.**

**Thesis**

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

**Master of Science in Community and Regional Planning**

The University of Texas at Austin

December 2016

## **Dedication**

To my wife, Nanami. Thank you for your enduring patience, your shrewd advice, and your most succulent and sustaining meals. With you, I have not climbed mountains alone.

## Acknowledgements

I enjoy meditating upon the connections that tie me to all my influencers. Primary among them are my advisors for this thesis, Robert Young and Steven Moore. Thank you for mentoring me through this process, and sharing ideas that keep me thinking long into the night. Most importantly, thank you for your patience. My humblest thanks to the Economics Research Institute at Rikkyo University in Tokyo, Japan, especially to Dr. Andrew DeWit and Dr. Kimihito Sakurai. Thank you for housing me in the summer of 2015 as a Visiting Researcher. There, my research into smart cities moved from the cursory to the more real. Many thanks to those who awarded me the funds to travel there—the School of Architecture, the Department of Asian Studies, and the International Education Fee scholarship committee. I would like to thank my previous academic mentors, too, at both the University of Texas and my preceding universities. Sarah Dooling, Michael Branch, Cheryll Glotfelty, Cathy Chaput, Deborah Achtenberg, Allison Wallace, Doug Corbitt, Nobert Schedler, Charles Harvey, Wayne Stengel—your lectures, writings, and meetings still sit with me, talking to me and sharing new ideas. Thank you.

And to everyone and everything I have ever met, whether through a book, a show, a poem or a lyric, a “meme,” or in person—I am partly the sum of these connections, and you help make who I am. I would not have written this thesis the way I did, if it were not for you, whatever and whoever you are.

## **Abstract**

# **The Smart City: A Rhetorical Analysis of Actors and Their Smart City Narratives**

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The University of Texas at Austin, 2016

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This thesis introduces and synthesizes the rhetorical narratives of smart cities—a burgeoning field of discourse and practice that adds another “layer” of infrastructure to urban form and function: information and communication technology (ICT). In this thesis, I will perform a rhetorical analysis of two primary actors involved in the smart city movement: corporate actors and academic observers. Rhetoric is discourse, and discourse wields power. Only by observing the multi-faceted rhetoric of the smart city’s arrival and development will we, first, come to lay bare what exactly is happening, and second, better direct and guide technological interventions in urban spaces towards goals that serve the greater good. Technology alone will not define the future; rather, urban futures will be determined by how competing social groups within heterogeneous societies and economies approach, embrace, and speak of the technology that increasingly defines urban form.

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## 1.0 Introduction

### 1.1 A Smart City Primer

[Smart City Scene 1]

It is a hot, summer day, and I have my AC thermostat set to sixty-eight degrees Fahrenheit. So do one million other households, altogether straining the electrical grid and energy provider, which pulls energy from every source available. Luckily every household has a smart meter, which allows for “demand response.” The utility provider sends a signal to all those AC units, all one million of them: “0110001010101,” code for “500,000 cycle on; 500,000 cycle off; rotate and repeat.” By cycling this energy demand, the utility is able to not only decrease peak demand, but, more importantly, able to maximize the efficiency of existing energy sources. Such cycling creates a *disincentive* to build any new power plants using fossil fuels; given the maximally efficient use of existing plants, new ones are now rendered superfluous.

[Smart City Scene 2]

I wake early on a Monday, following my morning routine before I commute to work. What will it be today—personal automobile? light rail? a ride-share through a popular Transportation Network Company such as Uber or Lyft? I grab my smart phone and open my local transit app to check the congestion pricing for the day. Because it is raining, I imagine more people will be driving to work. I’m right—the highway charge for the day has tripled. I rather save money and avoid the traffic by taking the rail. This variable pricing introduces a surcharge into the transportation market when the usage of public resources, such as roads, overshoots its limited supply. Because of the real-time pricing mechanism, commuters will rationally select the most convenient means of transit to work, with the preference oftentimes leaning towards public transit and other available alternatives.

[Smart City Scene 3]

My city would like to make a greater investment in green infrastructure, parks, and recreational opportunities for our residents, but we just don't have the financial resources to do so. As we undergo various capital improvement plans, we decide to see if investing in new technology, primarily information and communication technology (ICT), to replace our aging infrastructure of water pipes and street lights can save us money. After all, we lose fifty percent of our potable water to leaks (IBM), and our street lights remain turned on at times when no one is even using the streets! As these pipes and lights are replaced, ICT sensors are attached. The LED lights are now motion-activated, only turning on fully when a car or human approaches at a given distance, and dimming slightly when no motion has been detected for five minutes; and the pipes, also equipped with sensors, suddenly alert the water authority to any leaks, no matter how minor. Instead of addressing only major leaks that disrupt service and ignoring all other leaks, the water utility's operations have shifted to "preventive care." Together these investments significantly reduce the operating budgets of the city, all because of gains in efficiency. Our city now redirects the savings towards investments that will increase our overall well-being while minimizing the cost of service to urban residents.

[Smart City Scene 4]

My city has always claimed to be democratic, but we citizens feel that our representatives are out-of-touch with our demands and goals. Because of our lobbying and advocacy for grass-roots democracy, they have decided to employ the use of ICT to experiment with being an "e-democracy." With the help of our smart phones, we are now invited by the city to snap photos of places that we think need repair or maintenance—a crumbling sidewalk, a fallen tree, an ideal street for new bicycle lanes. The new city app not only uploads these photos to a public domain, but also pinpoints the GPS coordinates of where we take the photo, and invites users to post a short message of no more than 100 words about their photo. There are even rumors that City Council will begin soliciting feedback from us ordinary folk on important legislative matters, asking us to take surveys distributed through short message services (SMS) so that we, as the citizens of this place, can better direct their decision-making process.

[Smart City Scene 5]

It is a dreary Wednesday evening, but I decide to go for a walk anyways. My neighborhood might appear to be a bit rough around the edges, but this is my home, and this is where much of my family and most of my friends live. I know this place and feel comfortable here. As I turn the corner onto the main street of my area, I bump into a dozen or so police officers, who have five other men facing the wall of a derelict building as they frisk these “suspects.” I ask what’s going on, and get told to get against the wall, too. When I ask why or what I did wrong, one of the officers quips, “You meet our data profile, son, now get against the damn wall.” Of course, they find nothing on me, nor on the five other men. Two weeks later I was reading the newspaper when I saw a status report on a recent investment made by our police department. Apparently, the county authorized a trial subscription to IBM’s crime data analytics software, which purportedly predicts when and where crime will occur based on a host of variables, including even the weather and time of day. It’s then that I put two and two together and realized that I and those other men had been profiled because a computer program said so.

[Smart City Scene 6]

The war never stopped in our country, and I had no choice but to abandon my home, my career, and my network of friends and extended family in order to protect my children. My spouse and I decided that we would sell everything we could to raise enough money for the trip. We had heard that for \$10,000 per person, we could get to London, where there was no war, there was plenty of food, and my children could resume their studies. Hopefully my spouse and I could even find jobs after applying for refugee status. What we did not know before this trip began is that a xenophobic haze had fallen over England, and that the country had permanently suspended all of its immigrant programs, even for those seeking asylum from conflict at home. When we arrived in London in the back of a truck, hiding behind canisters of food destined for a warehouse, we began walking the streets. Confused and having no idea where we would go, I told my children to try and act as normal as possible, lest we attract attention to ourselves. Little did I know that we already had. Not ten minutes after jumping out of the tractor-trailer, half a dozen armored police cars sped to stop near my family and our fellow refugees. We were all handcuffed,

placed in the back of an escort truck, and transferred to a refugee facility that honestly looked like an old prison. On the way there, I overheard the soldiers sitting next to me expressing their awe at how fast and accurately the eye detection cameras installed throughout the city could recognize legitimate citizens and foreign, illegal immigrants. And I thought to myself how I had spent \$40,000 and traversed a war zone to get my family to safety, only to be deterred by a surreptitious eye scan.

[Smart City Scene 7]

Food, you know, is what keeps you alive. This might seem so obvious that you find me crazy for even mentioning it; but I mention it because it is so obvious that most of us forget! And why would we not forget? Hell, no one grows food anymore! I tried to be a farmer, just like my mother and father. They dedicated their lives I tell ya to trying to make a living from the fruit of the Earth. From sunrise to sundown, they would be out there in the field, tending to the vegetables that we would sell at local markets. They even got a grocery store in a nearby city to carry their produce. Put their pictures up on the wall, too, so that people knew where their food was coming from and who was growing it. But by the time I tried to take over, those big companies had already figured out how to grow food without people. There had been rumors that they were testing drones and using these advanced computer programs to monitor and manage crops, but you always imagine that stuff happening in a lab and not being about “real life.” Boy was I caught off guard. I just couldn’t compete with the cost. With just a few drones, some irrigation lines, an advanced software program called “iCrop,” and an automated, solar-powered combine, one company could farm a thousand acres. And that’s considered nowadays to be a small operation. So, millions of farmers like me are out of work . . . but at least your food is cheap, right?

Welcome to the smart city—a recent discourse about urban space that has yet to completely define what it is and what it will lead to. The qualifier “smart” has overrun just about every facet of our lives—smart phone, smart watch, smart car, smart house, smart economy, smart *everything*! But why is it here? Why are we seeing a host of conferences dedicated to it, from the annual Smart City Expo World Congress held in

Barcelona, Spain to an increasing number of smart city conferences in the United States, including Smart City Week in Washington D.C. (September 2015), San Jose's VERGE conference (October 2015), and Austin's recent Smart Cities Innovation Summit (June 2016). Why have we seen the US Department of Transportation's widely popular Smart Cities Challenge, the winner of which (Columbus, Ohio) received a \$40 million grant to become "the country's first city to fully integrate innovative technologies—self-driving cars, connected vehicles, and smart sensors—into their transportation network" ("U.S. Transportation Secretary Foxx Announces Seven Finalist Cities for Smart City Challenge")? Why has the University of Pennsylvania's City and Regional Planning program created a SMART Cities concentration ("City and Regional Planning")? Why are there a host of non-profits and advocacy groups dedicated to the smart city movement, with the most prominent being Smart Cities Council (*Smart Cities Council*)? And why have dozens of companies devoted significant R&D to this field, and, noticing that, why have academics devoted an increasingly significant amount of due diligence to the literature on smart cities? In short, why has the smart city become such a big movement (or buzz word) in such a short amount of time?

Table 1.1: The Explosion of Smart City Scholarship: A Sample of Publications

The "Explosion" of Smart City Scholarship: A Sample of Publications		
Author(s) / Editor(s)	Title / Publication	Year
C.F. Calvillo et al.	"Energy Management and Planning in Smart Cities."	2016
Walter Castelnuovo et al.	"Smart Cities Governance: The Need for a Holistic Approach to Assessing Urban Participatory Policy Making."	2016
Francesco Bifulco et al.	"ICT and sustainability in smart cities management"	2016
Andrea Caragliu & Chiara F. Del Bo	"Do Smart Cities Invest in Smarter Policies? Learning From the Past, Planning for the Future"	2016
Alexander Prado Lara et al.	"Smartness that matters: towards a comprehensive and human-centered characterization of smart cities"	2016
Susan Christopherson & Amy Glasmeier (editors)	<i>Cambridge Journal of Regions, Economy and Society: The Smart City</i> (special issue)	2015
Antoine Picon	<i>Smart Cities: A Spatialized Intelligence</i>	2015
Jong, Martin de et al.	"Sustainable—Smart—Resilient—Low Carbon—Eco—Knowledge Cities; Making Sense of a Multitude of Concepts Promoting Sustainable Urbanization."	2015
Soumaya Ben Letaifa	"How to Strategize Smart Cities: Revealing the SMART model."	2015
Alan Wiig	"IBM's Smart City as Techno-Utopian Policy Mobility."	2015
Margarita Angelidou	"Smart Cities: A Conjunction of Four Forces."	2015
Tim Bunnell	"Smart City Returns."	2015
DeRen Li et al.	"Big Data in Smart Cities."	2015
Albert J. Meijer et al.	<i>"Smart City Research: Contextual Conditions, Governance Models, and Public Value Assessment."</i>	2015
Rolien Hoyng	"From Infrastructural Breakdown to Data Vandalism: Repoliticizing the Smart City?"	2015
Tan Yigitcanlar	"Smart cities: an effective urban development and management model?"	2015
Paolo Neirotti et al.	"Current Trends in Smart City Initiatives: Some Stylised Facts."	2014
Anna Kramers et al.	"Smart Sustainable Cities—Exploring ICT Solutions for Reduced Energy Use in Cities."	2014
Margarita Angelidou	"Smart City Policies: A Spatial Approach."	2014
Jung Hoon Lee et al.	"Towards an Effective Framework for Building Smart Cities: Lessons from Seoul and San Francisco."	2014
Mark Deakin (editor)	<i>Smart Cities: Governing, Modelling and Analysing the Transition</i>	2014
Anthony Townsend	<i>Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia</i>	2013
Adam Greenfield	<i>Against the smart city (The city is here for you to use Book 1)</i>	2013
Federico Cugurullo	"How to Build a Sandcastle: An Analysis of the Genesis and Development of Masdar City."	2013
Michael Batty	"Big data, smart cities and city planning"	2013
Tim Campbell	<i>Beyond Smart Cities: How Cities Network, Learn, and Innovate.</i>	2012
Ozge Yalciner Ercoskun (editor)	<i>Green and Ecological Technologies for Urban Planning: Creating Smart Cities</i>	2012
Lena Hatzelhoffer et al. (editors)	<i>Smart City in Practice: Converting Innovative Ideas into Reality</i>	2012
Michael Batty et al.	"Smart cities of the future"	2012
Mark Deakin (editor)	<i>Journal of Urban Technology: Creating Smart-er Cities</i>	2011
Mark Deakin & Husam Al Waer	"From intelligent to smart cities"	2011

There has been an explosion of smart city scholarship in academic journals focused on urban planning. Two special issues have been released thus far—one in 2011 and one in 2015.

Table 1.2: The Explosion of Smart City Scholarship: Conferences

The "Explosion" of Smart City Scholarship: Very Recent and Future Conferences		
Conference	Institution / Sponsor	Year
Internet of Things World Forum	n/a	2016
Smart Cities Connect	US ignite	2016
Smart Cities Week	Smart Cities Council, Synergy	2016
IEEE Smart Cities	Institute for Electrical and Electronics Engineers	2016
Smart City Expo World Congress	n/a	2016
Smart Cities Summit	Knect365	2016
Smart Cities Summit: The Future of the Digital Society	Nexus Media Communications	2016
Smart City InFocus 2016: Yinchuan	City of Yinchuan	2016
Smart Cities NYC 17'	Global Futures Group, Smart Cities NYC	2017
Australian Smart Communities Conference	n/a	2017
IoT Expo (Global, Europe, and North America Conferences)	IoT Tech Expo	2017
Smart Cities International Symposium & Exhibition	Smart Grid Observer	2017
Smart Cities India Expo	n/a	2017

An upsurge in conferences focused on smart cities is also very noticeable. Many of these conferences seem to be sponsored by and targeting municipal actors, suggesting that “smart city” is already an established discourse (and sometimes practice) among some urban planners / managers.

That depends on whom you look to. Unsurprisingly, the authors who romanticize the possibilities of the smart city dwell upon its purpose more so than those who critique its rhetoric and trajectories. Among this more hopeful crowd of enthusiasts, three hopes become apparent when reviewing their literature: 1) democratic revolution, empowered by the new channels of communication and learning made possible through ICT; 2) carbon-neutral economies (commonly referred to as “net-zero” emissions), achievable through the decentralization of networks (transportation, energy, water, heating and cooling, food), which is made possible (perhaps *only* made possible in the world as we know it today) through the communicative, data-driven power of information and communication technology (ICT); and 3) efficient municipal governance, enabling the cheaper and more effective delivery of public services through the analytical power of big data. A world of radically empowered citizens going about their lives in a radically sustainable economy—this is the goal of smart city advocates and some academics.

But other interpretations exist, and the political and ideological ramifications of those interpretations depend on the observer’s positionality. Knowing that it could potentially be a \$650 billion market/year (Townsend epilogue), corporations like IBM, Cisco, Accenture, Panasonic, Hitachi, and Siemens sell the smart city as the great, new infrastructure development of the 21st century, one that instrumentalizes the entire city as if it were a machine to be operated effectively and efficiently. Scholars and public

intellectuals, steeped in the theory (and reality) of neoliberalism, interpret that “corporate opportunity” as a potential threat to public spaces and services.

While coined as a concept and practice around the year 2005 (Picon 9), the “smart city” movement has been slow to coalesce around a definitive mission, a specific definition, and a cohesive community of scholars, practitioners, companies, and enthusiasts. While the narratives remain numerous and, oftentimes, can be seen as mutually exclusive, what has become apparent is that the smart city is indeed different from the “sustainable city,” the “eco-city,” and the “green city.” Each of these latter movements concern themselves with design—eco-cities might favor passive solar homes and public plazas showcasing native permaculture; green cities explore the features of natural infrastructure systems that augment the resilience of ecosystems within urban centers; sustainable cities have given us solar and wind energy, and advocate for community gardens, composting, and bicycling. Each movement, that is, addresses the form, structure, and display of the city. But the smart city concerns itself with an invisible style of urban management that nevertheless has a substantive impact upon the visible world of our cities. It involves a socially constructed world of data, analytics, and information processing. This design we do not necessarily see, but it is certainly just as real. If it is already having an effect, should we not clarify what might be happening?

## **1.2 Research Question**

Because of the competing definitions and technologies either provided by or (at this point) imagined by actors, what the smart city actually is, and what it is to become, remains clouded in ambiguity. These actors tend to be defined by their perspective and positions in the smart city space, and include federal and municipal governments, corporations, academics, journalists, public intellectuals, and DIY techno-enthusiasts. We should ask and explore how their conceptions of the smart city differ. Around each actor exists a rhetorical space—the accumulation of a few years of stated and ulterior motives, assumptions, actions, and philosophies. This paper will seek to answer the following question: when closely examined, what vision of cities does each discourse suggest? How do these competing—or perhaps occasionally complimentary—modes of speaking about



technology and urban space vie for the rhetorical power to guide not only public talk, but also the physical and spatial outcomes of future urban development?

Sustainability, equity, economic development, safety, efficiency—these are common, laudable goals that city officials around the world will quickly speak of as they work to protect and improve the quality of life for their residents. And yet, beneath these ideals, cities are also sites of capital accumulation, where a steady labor pool and a frenzied pursuit of technological innovation permits the continued exploitation of their residents. The city as a contested space of gyrating forces applies just as much to any rhetorical movement supposedly here to “save the day,” as is commonly said of the smart city.

Only by observing the multi-faceted rhetoric of its arrival and development, however, will we, first, come to lay bare what exactly is happening, and second, better direct and guide technological interventions in urban spaces towards goals that serve the greater good. Technology alone will not define the future; rather, urban futures will be determined by how competing social groups within heterogeneous societies and economies approach, embrace, and speak of technology. The scales of this rhetorical tension will tilt more favorably towards one social group—the group that can most effectively “conquer” the meaning of the smart city as perceived by the public and all other actors. By alerting audiences in advance to the fact that “language matters” (Dryzek) for smart cities, I hope to tilt those scales towards an urban future that best serves public interests.

### **1.3 Methodology**

In this thesis, I will perform a rhetorical analysis of two primary actors involved in the smart city movement. Rhetoric is discourse, and discourse wields power in a twofold manner: 1) discourses “condition the perceptions and values of those subject to them, such that some interests are advanced, others suppressed, some people made more compliant and governable” (Dryzek 10); and 2) discursive power, especially in regards to the rhetoric of technology and urban space, literally has material implications for how cities come to be developed and redeveloped (Aibar and Bijker).

I have chosen to assess the rhetoric of those that provide technological apparatuses bearing this smart city label—corporations—and those charged with describing and assessing events that unfold in our world—academics. For the former actor, I have also included municipal pilot projects that, while technically cities, are nevertheless corporately developed ones, and must therefore be included under this category. Each of these actors, writ large, represent a collection of smaller actors, and they, too, may have differences. Each group can be seen as heterogeneous, where disagreements and debates surely break out in city halls, corporate boardrooms, journals and at conferences. Nevertheless, their position in the smart city space suggests a foundational commonality that allows us to differentiate among them, looking for differences and similarities in the rhetoric they employ to describe smart city technology.

Each group can also be seen as loosely homogenous given their centripetal concerns and commonalities, with cities having to ensure the public welfare and safety of their populations, corporations having to capitalize on opportunities and turn a profit, and academics having to report on the events of our world and provide frames for better making sense of it. Whereas attention will be given to multiple discourses underway in each group, a dominant rhetoric does reach across each group's spectrum of sub-actors and voices. And this rhetoric, as my theory will explain in detail, *matters*, in the most material sense of that word. Each of the “technological frames” associated with these actors compete and “strive for dominance” in the smart city space (Aibar and Bijker 15). The dialectical tension among these actors carries material implications. Mapping the current balance among these factions will guide my rhetorical analysis.

For corporate actors, I have selected IBM and Panasonic, two actors that occupy much of this for-profit space, but I will fill in my “corporate profile” with observations and anecdotes from other prominent companies, namely the companies behind the smart city developments of Songdo in South Korea, Masdar City in the U.A.E., and PlanIT Valley, or now referred to as Living PlanIT, in Portugal. While many corporations currently advocate their smart city interventions and are seeking to better position their products, IBM and Panasonic have already been involved in several pilot projects and have adopted the smart city as a path towards their respective corporate growth. For a quasi-municipal actor, I have selected a smart city development in Japan called Fujisawa

Sustainable Smart Town (FSST), constructed by Panasonic. Japan offers us a perspective from a fully developed country. My analysis of FSST and Panasonic stems from an actual visit there and online research, both of the company's literature and other third party analyses.

For academics, where the literature is quickly becoming more expansive, I have organized my research according to two guiding questions: 1) What are the most read and cited books and articles on smart cities? I will assess the few monographs in English on smart cities, the most recent and critically acclaimed of which are Antoine Picon's *Smart Cities*, Anthony Townsend's *Smart Cities*, and Adam Greenfield's pamphlet *Against the Smart City*; and 2) Where have conversations focused on smart cities occurred in an urban planning, academic context? I have located two journals in the urban planning space that recently published special issues on smart cities—Volume 18, Issue 2 (2011) of the *Journal of Urban Technology* and Volume 8 (2015) of the *Cambridge Journal of Regions, Economy and Society*. These special issues will be rhetorically reviewed. My familiarity with smart cities is also informed by my reading of a few planning-related journals that have published an article here and there on smart cities. I have primarily looked to the journals *Cities*, *City*, and *Dialogues in Human Geography* for these occasional articles. While not necessarily rhetorically assessed in this thesis, they inform my scholarship. I have included these sources under “Additional References,” in case my reader wishes to pursue more academic scholarship on smart cities.

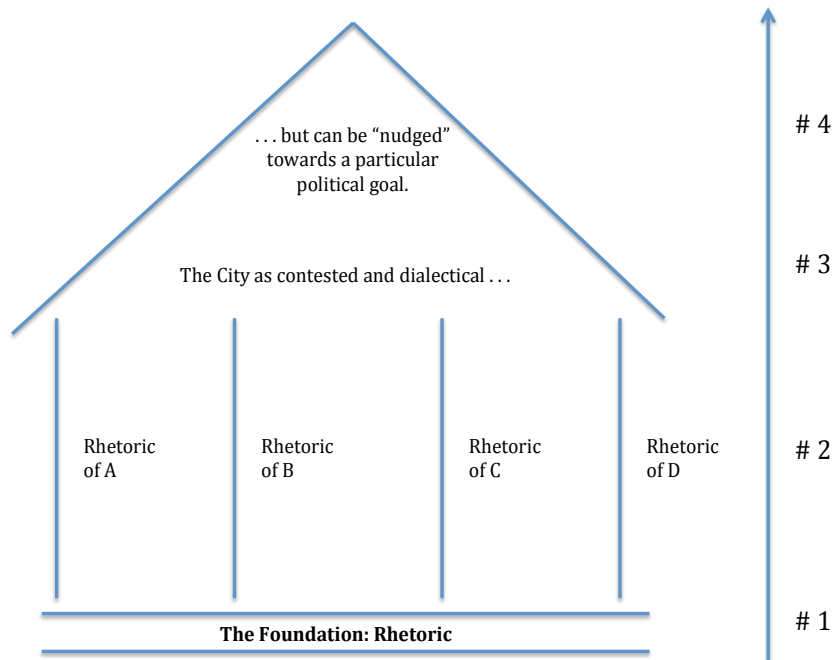
These actors by no means capture all actors—whether real or potential—involved in the smart city space. I have selected corporations, and some of their pilot projects, and academics in order to narrow my research focus and to explore the interactions of what my research suggests are two broadly-defined “heavyweights” for smart cities. That said, one could also include many other actors in a rhetorical analysis of smart cities, especially those actors in civil society and the already developed cities that wonder if smart city ICT can help to solve persistent, wicked problems. Writ large, civil society actors include “the public”—how smart cities might be discussed in social circles in cities, at local conferences and networking events, on social media and digital platforms, and throughout other loosely defined but certainly impactful networks of social influence. One could also point to more clearly defined civil societies, such as professional

networks (as a fictitious example, imagine a *Society of Smart Cities* network), regulatory NGOs that might christen a technology or project as warranting the “smart city” label (consider an entity similar to LEED, for example), and trade groups that seek to stoke investment—both public, through universities or chambers of commerce, or private, through corporate R&D—in smart city development. All of these actors have had and will continue to have a measurable impact in the space of smart cities. It is my hope that this preliminary rhetorical analysis of some actors will spur further studies, so that collectively, our understanding of the discourse shaping technological urbanism today will continue to widen and expand, affording our community more depth and understanding.

#### **1.4 Theory**

Any inquiry into the fabric of our physical habitat warrants an explication of my underlying theories, a “showing my hand” so to speak. The structure of my analysis can be said to reflect the structure of a physical house or building. I have sought to lay a solid foundation, upon which I build everything else. I have support beams, frames, and stairways that allow us to move up, to make progress in assessing the smart city. And I have a roof, embellished with a rooftop deck that allows us to see far and wide, to place everything into context, and to understand the purpose of our analytical journey. Here is my “house of theory”:

Diagram 1.3: House of Theory



My foundation is that rhetoric and the way we talk or chat *matters*. Different actors, or groups of actors, compete in the public sphere through rhetoric. From the conflict over race and Jim Crow between the late-nineteenth and mid-twentieth centuries to the recent decision by the Bush administration to invade Iraq in 2003 and topple

Saddam Hussein, competing actors' differences were first and foremost circumscribed through words. If the tension remained unresolved, words often concurrently transformed into physical actions, whether violent or non-violent. Martin Luther King marched peacefully in the streets of southern cities; after his assassination, protestors burned cars and buildings. If one actor or an alliance of actors with semi-mutual interests successfully "crowded out" competing actors, marking their arguments as inaccurate, weak, delusional, etc., then the discursive victors marched forward full-steam-ahead. At the start of the US invasion into Iraq, George W. Bush and his administration had seventy-six percent of Americans on his side—competing anti-war or anti-invasion discourses had obviously failed. The public had listened and stood behind their president.

John Dryzek demonstrated the actual weight and importance of rhetoric, especially as it relates to sustainability and environmentalism, in *The Politics of the Earth: Environmental Discourses*, published first in 1997 but currently, as of 2013, on its 3<sup>rd</sup> edition. Dryzek begins his analysis of differing actors' rhetorical response to the need for sustainability with a reflection on the power of words, of discourse. He reminds his audience that "contests over meaning are ubiquitous" (Dryzek 6) and matters as important as the environment, and cities I would add, "are subject to continuing dispute between people who think in sharply different ways" (Dryzek 6). Discourse is *powerful*. It carries material and profound psychological implications. In homage to the theories developed by Michel Foucault, Dryzek notes that "discourses can themselves embody power in the way they condition the perceptions and values of those subject to them, such that some interests are advanced, others suppressed, some people made more compliant and governable" (Dryzek 10).

Dryzek further clarifies the epistemological and material intricacies of rhetoric and discourse:

A discourse is a shared way of apprehending the world. Embedded in language, it enables those who subscribe to it to interpret bits of information and put them together into coherent stories or accounts. Discourses construct meanings and relationships, helping define common sense and legitimate knowledge. Each discourse rests on assumptions,

judgments, and contentions that provide the basic terms for analysis, debates, agreements, and disagreements. ( Dryzek 9-10)

Thus, if the centrality of rhetoric lays the foundation of my theory (# 1 in my depiction), the *various kinds of rhetoric*, and what they reveal about actors' differing "assumptions, judgments, and contentions," constitutes the pillars, beams, stairways, and support systems of my theoretical understanding of smart cities (#2 in my depiction). The sudden emergence of talk on smart cities is not just one talk, but many. Multiple actors have their own "coherent stories" about what the smart city is and its future implications. But beneath those stories, and the occasional rhetorical panache, lie assumptions that we should uncover and reveal.

Multiple rhetorics compete for the dominant meaning of "smart cities." In my analysis of a few central actors—corporations, their pilot projects, and academics—I have identified a few dominant strains. While the smart city may seem "new," actors' modes of discourse and the assumptions or goals that undergird them have a long history. I do not delineate here exactly what these rhetorical strains are, and instead will explicate these discursive themes and their intellectual histories in the discussion sections of my thesis.

However, what I do wish to emphasize now and in greater theoretical detail is the nature of discursive conflict. I wish to call attention to how chatter, about any popular movement such as the smart city, consists of multiple discourses that compete against each other vigorously—whether openly or surreptitiously—for the mantle of that movement, or the powerful right to define what it is and will be. This is level #3 of my depiction above.

Within industries and cities, words compete. Cities bear the material outcomes of those rhetorical battles. Urban design, architecture, land use and zoning, demographic and economic spatial trends—all reflect bygone battles, debates, compromises, and defeats that occurred primarily through discourse. Several urban theorists help us to demarcate these battle lines and to understand how we approach it critically as scholars, including Eduardo Aibar and Weibe Bijker, Andy Merrifield, and Steven Moore.

In their 1997 essay, Aibar and Bijker turn to a historical case study of the urban extension of Barcelona beyond its walls in order to highlight how competing

technological frames from differing actors not only affected the eventual spatial outcome of the city, but also clashed amongst each other. These clashes revealed ideological fissures, through which we can spot rhetorical, philosophical, and socio-economic differences, confirming the authors' suspicion that technology is anything but apolitical. It is itself a political instrument. Aibar and Bijker note that scholars now appreciate the complexity of technology in social and urban systems. They mark an academic emphasis "on the role of politics and cultural norms and values in the shaping of urban technological systems" (Aibar and Bijker 5). Technologies themselves, then, reflect and echo the social forces that led to their creation, refinement, and deployment.

Steven A. Moore, in his 2007 monograph *Alternative Routes to the Sustainable City: Austin, Curitiba, and Frankfurt*, credits Aibar and Bijker above with initializing the field of Science and Technology Studies (STS). Moore's deference to Aibar and Bijker makes sense when he explicates the epistemological premise of STS: "As a branch of sociology and philosophy, STS investigates how and why particular technologies emerge in particular places at particular times in history" (Moore 3). Obviously, STS strips technology of any deterministic halos we might be tempted to confer upon it, as if technological progression is "natural." Moore, Aibar and Bijker reveal that technology is anything but "natural," and instead is *situated* within contexts—contexts that we should be aware of, given what they reveal about politics, assumptions, and motives.

Moore seeks to apply this heuristic to sustainability, which, like technology, is not as homogenous or black-and-white as one might first assume. Moore argues that "sustainability" is a "story line or plot," cultivated most strongly by cities with active citizenry (Moore 1). Behind each story line, one could say, lies an entire cadre of philosophical support staff—assumptions, political leanings, desires, allegiances, etc. While no person is held prisoner to a single story-line, these discourses nevertheless hold significant sway over individuals and communities, not only affecting how the world is seen (and what remains unseen), but also literally shaping the physical environment in which humans (and other animals) will continue to evolve as a species (Moore 8-9).

Moore identifies three primary themes of public talk in sustainable development: political, environmental, and technological (Moore 12). Political talk arises because the "choices about which criteria for sustainability are best are social choices about how we



want to live, not scientific choices about what is true or more efficient” (Moore 13). Technology warrants our attention, he says, because “social habits,” which we could possibly change, nevertheless “coevolve with the technological systems that enable them,” and two, our social choices are limited by existing technological systems (Moore 19). In regards to the spatial differentiation of technology, Moore emphasizes that there are multiple “competing stories that are employed by local interpretive communities,” and that these frames cannot move themselves to another place (Moore 20). Indeed, “interpretive frames are filters that are historically and spatially constructed by the public talk in particular places” (Moore 20).

Already, three central tenets of my theoretical foundation begin to emerge:

- 1) Technology develops contextually.
- 2) Reading that context reveals political allegiances, assumptions, and motives.
- 3) Technologies and the ideas that shape them compete.
  - a) Either different technologies compete; OR
  - b) Different actors compete to define the meaning, purpose, and ramifications—i.e., the *idea*—of a technology.

In regards to the first and second points, we must not take the rhetoric of smart cities at face-value, no matter the actor who is speaking or writing. We must look beyond the discourse to map the relational web of influences—targeted audiences, hidden motives, historical precedents, forgotten assumptions, and supposed mission statements. Discourse itself is a story, but beneath it lies another, unspoken story. Thus, uncovering context allows us to analyze academics’, cities’, and corporations’ approaches to smart cities in their entirety.

In regards to the third point, we can theoretically understand now that technologies compete since they do not unfurl in a vacuum. Rather, a context riddled with heterogeneous actors and their own assumptions, motives, and histories sets the stage for either *interpreting* a technology differently or *proposing* competitive, uncomplimentary technologies that instantiate the political differences of actors. In the first example, we might consider scientists’, politicians’, and the military’s contestation over the future of nuclear physics—peaceful energy or catastrophic weapon? With the latter, we can consider differing technologies to address CO2 emissions, where some actors propose

technologies that “capture” CO2 post-emission and other actors that propose eliminating most, if not all, human activities that produce harmful CO2 in the first place. Both instances reveal, again, that technology—and certainly smart cities—are anything but apolitical. The smart city is not one story, but a host of stories. At times, these stories might follow the same logic; but they might also contradict and even compete against one another.

But wait! Do we—as intelligent creatures gifted with speech, reason, and communitarian instincts—really want to argue that competition, contradiction, and confusion are central to the very fabric of our cities and the tools that make them work? To reference the “roof” of my theoretical depiction above (item #4), I openly share now my theoretical assumption that, yes, conflict and debate are central to the development of human space, *but* that in no way inhibits communities from [eventually] identifying mutual interests and goals. In these last few paragraphs of this section, then, I wish to address stages three and four of my diagram. I argue that technology and the city, and therefore the smart city, are contested and dialectical. However, I wish to also emphasize that such contest and debate and political tension mobilizes a movement towards a particular outcome. While no actor completely wins a discursive dialectical battle, the scales nevertheless tilt eventually in favor of one party, and that party has significant sway over how larger networks of actors come to define and understand a given idea or technology. Given the flux of discourse, the change of political winds, and the oscillations of power, no actor, of course, will command center stage permanently. The dialectic is always in flux. But one can nevertheless wield influence here and now, when arguably we need it most.

Andy Merrifield, in his *Dialectical Urbanism: Social Struggles in the Capitalist City*, presents a theory for cities that embraces conflict and tension, specifically the tension between *urbanism* and *urbanization*. The former speaks of humans, social bonds and interaction, cultural creations, the formation of individuals and families—the “finer things in life” that one can often find, see, and experience in cities. The latter speaks of industrialism and capitalism, of the exploitation of readily-available labor that tends to flood cities and that fixates surplus value into fixed assets such as real estate and “innovation districts.” These two dialectical forces cannot be separated from each other.

Indeed, “urbanism is [therefore] a political experience because it’s an experience bound, shaped, and defined by a profoundly dynamic and imperceptible process,” or urbanization (Merrifield 9). Against the force of capital, where cities, like oiled machines at the factory made to churn out commodities and produce surplus value, stands the possibility “that cities burn with an infernal flame and that disorder is indeed part of the metropolitan experience” (Merrifield 13). He reiterates throughout his case studies that “this dialectic cannot nor should not be resolved; it’s a contradiction that needs to be harnessed somehow, not collapsed; worked through, sometimes lived with, not wiped out” (Merrifield 14). Indeed, despite the fact that “the city fulfills a functional role within the capitalist system,” the city, *at the same time*, is also a “place where people live, establish communities, raise kids, and put down roots” (Merrifield 155, 156).

I emphasize the dialectical nature of cities—sites of capital accumulation, and yet also places where people live and communities emerge—because of what we will find in our rhetorical analysis of smart city actors. These largely competing, and sometimes complimentary, urban visions both underlie various smart city narratives. Few actors, especially outside of the academy, openly preface their smart city manifestos or analyses with a declaration of which side of the urban dialectical coin they fall on. Thus, by accepting the contested nature of urban space, we prepare ourselves to read between the lines, and map the political-economic allegiances and assumptions of smart city actors.

Merrifield by no means wishes to suggest in *Dialectical Urbanism* that the tension of countervailing forces in cities are to be embraced as an unavoidable reality that unfurl according to mysterious forces. Rather, residents, community leaders, and even socially conscious businesses and institutions can play an active role in reshaping that tension, or guiding it, to produce desirable results for the community or city. He proposes that “we need to think through what sort of urban disorder and experience should be lived with and inured—no matter how painful and shocking—and what should be eradicated. And, while we’re at it, what sort of politics and political institutions we can invent to make these choices” (Merrifield 16). That is, we—as inhabitants of a place or as socially-interested folks wishing to enter the fray—can project future goals and, with strategic thinking, coalition building, and crafty ingenuity, nudge the oscillating tension among urban forces towards that goal. In short, urban dialectics do not necessitate the abolition

of political goals. Rather, they encourage the formation of *good* ones that can possibly outmaneuver other ideological frames and urban visions in this “contradictory and ambiguous” dialectical dance (Merrifield 28).

I have adopted a political goal in my analysis of smart cities, one that a rhetorical analysis serves well. This political assumption speaks to the “apex” of my theory diagram (again, item #4 above the “house of theory” depiction), and it will conclude this theory section, tying it all together. I have looked to Ivan Illich to elucidate my political stance and include its explication in my theory section given my understanding that little, if anything, can be apolitically described. Much in the vein of Merrifield, Illich sees two possibilities for the use of science and technology: 1) industrial bureaucracy and capitalism further expanding through science and technology, with humans simply aiding that expansion; or 2) science and technology serving and augmenting the creative capacities of each person’s talents. Whereas “the first leads to specialization of functions, institutionalization of values and centralization of power,” the latter “enlarges the range of each person’s competence, control, and initiative” (Illich xii). The latter only comes about through political limits, and incites the emergence of a “convivial” society, “in which modern technologies serve politically interrelated individuals rather than managers” (Illich xii). This term, “convivial,” designates “a modern society of responsibly limited tools” (Illich xiii).

Despite persistent conceptual vagueness, we know what smart cities are materially: the physical application of tools, machines, software, and—most importantly—real-time algorithms to physical space. This technological apparatus may serve—in part or in whole—industrialism’s march, whereby variable capital succumbs to the cheaper “labor” of fixed capital, or machines, that then redirect profits to the privileged few. Alternatively, this incredible technology may serve the individual and the communities they comprise, imbuing them with life-giving assets to pursue freedom, “survival, justice, and self-defined work” (Illich 13). Are smart cities just a “mode of corporate production” that “establishes a radical monopoly not only over resources and tools but also over the imagination and motivational structure of people” (Illich 96)? Or will smart cities augment each person’s talents and encourage the cultivation of “competence, control, and initiative” (Illich xii)?

Only through two collective efforts will that question be resolved. First and foremost, we must understand the various discourses currently occupying the smart city space. We must not only map them, compare and contrast them, and critique them, but must also perform deeper analyses of their respective assumptions, motives, and political allegiances. Second, after such rhetorical analyses, we can then ask whether or not a particular conception of the smart city, or even a particular technology or material intervention in urban space, actually serves what I find to be a more palatable conception of the city—a place where *people* are to thrive and flourish, where social, economic, and environmental progress can be pursued vigorously, but still in multifarious ways (Moore).

With this introduction of the multiple rhetorics of smart cities, the identification of the actors I will be assessing, and the clarification of the theories that guide my analysis, I will now turn to language of corporate and academic actors, as spoken on their terms. Chapter two explores, reviews, and analyzes the rhetoric of corporations and their pilot projects. Chapter three will address academic actors in a similar fashion. I have adopted a neutral tone in the literature reviews, as I wish to have these actors speak on their own terms. The findings sections presents my rhetorical assessment in tabulated form, and in the discussions, I imbue my analysis with appeals to theory.

## **2.0 Smart City Pilot Projects and Corporate Actors**

These literature reviews bring together materials associated with actors I have identified in specific spheres—the corporate and the academic. The intent is to aggregate in representative sets of discourse what is common to these spheres of influence. While heterogeneous differences will be noticed by the reader among these sub actors, a persistent and prominent theme should become apparent as one reads through my rhetorical analysis of the applicable materials. Recall that the goal of such an exercise is to allow us to parse the smart city discourse into multiple narratives, according to actors’ assumptions, ideologies, ulterior motives, and political-economic dispositions. The literature reviews, however, seek to present the discourse of these actors on *their* terms, whereas my analysis of the “discourse behind the discourse,” so to speak, will be reserved for the discussion sections. Between each literature review and discussion will be a findings section, which will present tabulated discourse analyses with concise explanations.

### **2.1 Literature Review of Corporations and Pilot Projects**

In my literature of corporations and some of their pilot projects, I first turn to the big three smart city projects, all of which have received considerable fanfare and press. These include Masdar City, which lies outside of Abu Dhabi, U.A.E.; Sondo, which lies next to Icheon Airport, not too far from Seoul, South Korea; and Living PlanIT, which originally began as a utopian development in Portugal called PlanIT Valley, but appears to have since become primarily a business product. I then turn to Panasonic’s first and flagship pilot project, Fujisawa Sustainable Smart Town, located in Fujisawa, a distant suburb of Tokyo, Japan. Next, I explore two corporations involved in the smart city space—Panasonic and IBM, with an eye towards their corporate strategies for smart cities on the global stage.

#### **2.1.1 Pilot Projects**

Articles have recently begun to appear *en masse* that catalogue the social, economic, political, and spatial implications of “from-scratch” smart cities. Known as “greenfield developments,” or “cities” built literally from the ground up within the past 15 years, these developments include Masdar City in Abu Dhabi, United Arab Emirates, Songdo in Icheon, South Korea, and PlanIT Valley in Portugal. These three cities have received enormous press and fanfare (and a few critiques) across the digital medias. After all, in addition to being clean, new, and visually futuristic, they personify an enticing rhetoric that urban planners and citizens alike tragically remain susceptible to: an utopic future, where all societal issues are solved by careful spatial planning. For example, see how Masdar City describes itself:

The low-carbon development of Masdar City has an integral role in transforming Abu Dhabi’s economy from an oil foundation to one with a knowledge and innovation base. It serves as a centralised test bed for global renewable energy and technology companies. The city itself is designed to maximise convenience and reduce environmental impacts.  
 (“Sustainability”)

Such a description portends a future that is novel, revolutionary, and, importantly, ideal and comfortable to human habitation. It will be a place that is not only environmentally sound, but economically astute. And, to boot, it will be a convenient place to live, perhaps foregoing the unaffordability or traffic and other issues of previously successful cities.

Masdar City describes itself as “the world’s most sustainable eco-city,” and will pioneer a “‘greenprint’ for how cities can accommodate rapid urbanization and dramatically reduce energy, water and waste” (“About Masdar City”). But its core, as described through its marketing materials, is its innovative enterprises. Much as the block quote above hints, Masdar City clearly seems to interpret its undertakings as an economic initiative. Indeed, neighborhoods grow *around* the centripetal Masdar Institute of Science and Technology, which “extends a spirit of innovation and entrepreneurship throughout the city” (“About Masdar City”). This economic allegiance makes itself clear, too, with a prominent tab on the website advertising the city’s economic “free zone,” incentives pertaining to international capital flows that allow relocating corporations to forego

domestic interference from the U.A.E. Benefits include (“Benefits of Setting Up in Masdar Free Zone”):

1. The freedom to operate with 100 percent foreign ownership and no partner in the United Arab Emirates;
2. The ability to move capital and profits outside the UAE without restrictions;
3. No import tariffs, corporate taxes or individual taxes;
4. Zero currency restrictions;
5. And a strong framework of intellectual property protection.

Songdo and PlanIT Valley—two other greenfield developments—also grandiosely state their purposes. While PlanIT Valley was originally meant to be an actual physical city that, by attracting ICT campuses and investment, would become an economic cluster around smart city development, it seems to have become more of a single business venture focused on selling IoT (the Internet of Things) software. As they state on their website, “The PlanIT Urban Operating System™ is the smartest, most flexible way to converge infrastructure with a world of sensors, devices and people across developments of scale and entire cities. A single intelligent system to manage it all” (*Living PlanIT*).

And there is much to be analyzed. *Living PlanIT* claims that their integrated software system allows actors across all scales (residents, building managers, utilities, and governments) to achieve “massive savings” through shared intelligence, which allows for the more efficient operation of infrastructure. As explained on the “How It Works” webpage of their site, their advanced operating system can make “sentient” the physical space of one’s apartment or home. Sensors that measure “light, temperature, movement, and humidity” and wireless devices that control one’s appliances are all connected to a central platform. Anonymous data (they claim) from these individual apartments or homes can then leap to a higher tier data-analytics and control, at the building or block level. At this scale, “current conditions and historical data are used to provide efficient building systems management and predictive operation. The result? Reduced cost, less waste, and safer, smarter, more convenient spaces” (“How It Works”).



The goal of such analytics is nothing short of revolutionary changes in the fabric of human society. Or so it seems. Living PlanIT's elevator pitch reads as, "The Internet of Things is springing to life. And we're at the heart of it. Through our technology, expertise and partners, we're creating efficiencies, realizing revenue, increasing sustainability, and opening doors to new ways of building and living. We're not just envisioning the future, we're making it happen right now" (*Living PlanIT*). And the operating system that will carry forward this revolution is the "smartest." Everything—from cameras, voice recognition, security, healthcare, energy systems, traffic, the weather, pollution, water quality, lighting, water treatment—can now be brought together, "efficiently and intelligently." And for the first time ever ("What We Do").

Just as *Living PlanIT*'s motus operandi centers around a business venture, so, too, does Songdo, which markets itself as an Oceanic economic cluster zone, focused exclusively on the ICT industry. Indeed, just notice the development's tagline: "3.5 hour flight to 1/3 of the world's population" (*Songdo IBD*). Their efforts seem to be much more successful than Masdar and PlanIT Valley—as of late 2015, Songdo proper is home to 36,000 people in the core business district, with another 90,000 living in "greater Songdo" ("A South Korean City Designed for the Future Takes on a Life of Its Own"). Technically an "International Business District," its website proudly claims that this is "where the future of cities is taking shape . . . and residents, businesses, and visitors are contributing to the growing ecosystem" (*Songdo IBD*). Its corporate and international tenants include United Nations offices and agencies, including the Green Climate Fund and the Global Green Growth Institute, and smart city technology providers such as Cisco and IBM.

Songdo's three selling points include living, working, and visiting. I quote them exactly. For living, the advertising material online reads, "Connected homes in a vibrant, dynamic community: Life in Songdo offers the invaluable luxury of green spaces, high-quality education, a variety [*sic*] of dining and retail options and a pedestrian- and bike-friendly environment" (*Songdo IBD*). The quote is accompanied by a picture of a man golfing. In regards to working, the website visitor reads that, as "an established and ever growing international business ecosystem, Songdo is making a mark in industries like high-tech, bio-medical, IT, manufacturing, retail, and leisure" (*Songdo IBD*). And to top

it off, Songdo is a place to visit for outsiders, given “the hottest music acts, world-class athletes, [and] heads of state,” the website reads. It continues with a generous invitation—“we invite you to join visitors like these from around the world. Take in the architecture, the fine dining, and the energy of Songdo’s spectacular setting” (*Songdo IBD*).

These three “cities”—Songdo, Masdar, and PlanIT Valley—are well known now in the smart city literature given their aspirations, whether for overall size (Songdo is now a legitimate city of nearly 100,000 people) or their seemingly Kuhnian proposals to redefine urban life (PlanIT’s software programs). But, as the meaning of “smart city” continues to evolve and morph, hundreds of other interventions have begun to come into our purview. Indeed, Japan alone probably has around two hundred pilot projects underway, and the Ministry of Economy, Trade and Industry (METI) has itself sponsored, funded, and monitored four big-press projects in selected cities. These four projects alone targeted thousands of households, received several billion dollars in grants, and involved the participation of dozens of technology, utility & energy, transportation, and real estate companies (Pham).

A project that has interested me is Panasonic’s Fujisawa Sustainable Smart Town (FSST), a brownfield development nearly complete in the Tokyo suburb of Fujisawa, Japan. Officially opening in November of 2014 and to be completed by 2018, FSST will house six hundred smart homes and four hundred smart apartments (Pham). Unlike pilot projects covered above, Panasonic’s FSST is a brownfield development, as it sits atop the site of a decommissioned Panasonic television factory. Panasonic claims that this residential development will reduce CO2 emissions by seventy percent when compared to 1990 levels and attain thirty percent of its energy needs from renewable sources. It also intends to reduce residential water usage by thirty percent (compared to 2006 averages) and provide three days of energy in the case of an emergency. These features warrant its landing on the “smart” list (and perhaps even lists of “green cities” or “sustainable cities” given the breadth of its approach to residential living).

On its website, FSST claims that it not only demonstrates a “state-of-the-art smart town,” but also portends the “ultimate ideal” of what a town can be. Interestingly, FSST seems to differentiate itself from other smart city projects that have primarily emphasized

technologically enhanced infrastructure. FSST explains that its primary and first concern “was to create a concept for a smart community lifestyle based on residential comfort, regional characteristics, and future living patterns – taking into account such aspects as energy, security, mobility, and wellness” (“Project Overview”). Only after these variables were identified did the community’s planners then ask how technology and smart infrastructure might allow them to augment these primary goals.

FSST operationalizes five town services, which together demonstrate what this “ultimate ideal” for a town really is. They include energy, security, mobility, wellness, and community. With photovoltaic panels installed on each of the six hundred single family homes and community solar on public land, “the Fujisawa SST project will provide energy services designed to perfectly complement lifestyles through to the next generation, enabling residents to generate the energy that they use in their own homes, through optimal utilization of solar power generation and other tools” (Fujisawa SST Council 7). Power consumption will be automatically managed and optimized by a “Smart HEMS,” or Home Energy Management System (Fujisawa SST Council 8). This HEMS not only efficiently and effectively manages energy production and consumption (e.g., storing unused solar energy in household batteries, or imperceptibly raising the Air Conditioner temperature to lower peak demand), but it also visualizes the flows of energy. Advanced ICTs have also been mobilized to create an “invisible” gated community. Eschewing the “cloistered unease” of physical gates, FSST’s “virtual gate”—a collection of surveillance cameras and LED street lights with motion-detection sensors—maintains a “warm” and “unobtrusive” atmosphere among residents and [permitted] visitors (Fujisawa SST Council 11-12). ICT has also been tapped to disrupt the mobility patterns of residents, with FSST intending to offer “entirely new total mobility services,” including shared, electric cars, a bicycle network, a rental car delivery service, and battery stations. These solutions, FSST claims, will alleviate pressing social problems like “traffic gridlock,” all by creating “a flexible and comfortable relationship between residents and their cars” (Fujisawa SST Council 13).

Unlike the pilot projects covered before FSST, which emphasize their technological aspects almost to the exclusion of their more organic components, FSST’s last two stated town services include wellness and community. In regards to wellness,

Panasonic obviously sees an opportunity to leverage ICT for data purposes, but the stated mission of this service has a strong human element, too. The marketing literature speaks of the need for “elderly care facilities, assisted residences for the elderly, pharmacies, home care services, clinics, nursery centers, after-school day-care centers, cram schools, etc.” (Fujisawa SST Council 15). Indeed, an architectural rendering of these public facilities emphasizes how they are placed side-by-side to each other, so as to incite intergenerational socialization and communication—a culturally-sensitive issue right now in Japan, one of the most urban and rapidly aging countries in the world. And yet, we should remember, a rapidly aging society also warrants a shift in corporate strategy. One wonders if these gratuitous spaces for building social bonds belong to the public, or are rather conduits for elder-tailored products and services that come with a price tag.

Lastly, in regards to community, FSST proposes an information exchange portal, where residents can access local services, communicate among each other, and also monitor—and compare—their household energy habits. FSST again emphasizes non-technological engagement as an indicator of community health, pointing to predetermined community activities, such as neighborhood meetings, and/or community spaces in which residents can organize their own events.

### **2.1.2 Corporations**

Recall that FSST is a creation, or product, of Panasonic, a corporation with a market capitalization of \$22.9 Billion, ranked as the 245<sup>th</sup> most valuable company in the world (“#245 Panasonic”). Its mostly electronic products include most items involved in the construction and furnishing of technologically advanced homes in highly developed countries—vacuum cleaners, washers and driers, refrigerators, air conditioners, LED lighting, solar photovoltaic panels, air purifiers, digital cameras and sensors, personal computers, mobile phones, surveillance systems, lithium-ion batteries, bicycles, etc. (“#245 Panasonic”). In other words, Panasonic can basically provide most of the items that residents will find in their FSST homes.

Panasonic makes no secret of the corporation’s intentions. The company has a website and corporate division dedicated entirely to “smart city solutions.” Short,

assertive, and confident words mark the webpages of their clean and slick marketing materials: predictive, adaptive, responsive, smart, connected, sustainable, secure, safer, greener, better. Panasonic claims that these qualities are available now through its CityNOW platform, whereby “modern society [is] dramatically transformed by intelligent devices, real-time data and responsive infrastructure. People [are] empowered by the instantaneous delivery of information and services that allow them to live happier, more sustainable, and more fulfilling lives. That’s the power of Panasonic Smart City Solutions. That is the power of NOW” (*Panasonic City Now*).

Panasonic, in what has become a very competitive and possibly lucrative industry, obviously seeks to dominate the smart city market. The company advertises solutions for family residences and small offices, energy providers and utilities, the health and wellness industry, transportation services, and building management systems. Furthermore, all of these marketing materials are provided in English—a curious fact for a company headquartered in one of the most racially homogenous countries in the world—Japan. But the use of English perhaps makes sense when one scrolls to the bottom of the homepage of Panasonic’s Smart City Solutions website, where one will see pictures and links to its two pilot projects: Fujisawa Sustainable Smart Town, which is now fully operational and which I covered above, and Panasonic’s next project, currently in the planning phase. Where might this latter project be? In North America, just outside of the City of Denver, Colorado. There, “Panasonic is helping the city of Denver [to] create a brighter future” (“Panasonic is Helping the City of Denver Create a Brighter Future”).

Panasonic expressly states that its goal for Denver is “to bring a number of similar solutions [from FSST] to the 400 acres Transit Oriented Development project near Pena Station, as well as to Denver International Airport” (“Panasonic is Helping the City of Denver Create a Brighter Future”). Pena Station will be a mixed-use development just one light-rail stop away from the Denver airport. The 400 acre site will be anchored by the new Panasonic Enterprise Solutions headquarters. The CEO of the Denver International Airport, Kim Day, states that this “transit-oriented development as Pena Boulevard Station validates the mayor’s vision of an aerotropolis: the airport serving as a catalyst for regional economic development” (“Panasonic is Helping the City of Denver

Create a Brighter Future”). The crux of Day’s reference, of course, draws upon John Kasarda’s research into globalized cities made competitive and defined by their ease of international travel and trade. He coined the term “aerotropolis” and defines it as “a new urban form where cities are built around airports speedily connecting time-sensitive suppliers, manufacturers, distributors, and business people to distant customers, clients, and marketplaces” (*Aerotropolis*).

Another prominent player in the smart city space, of course, is technology stalwart International Business Machines Corp. (IBM). Founded in 1911 and with a current market capitalization of \$142.7 Billion (“#41 IBM”), IBM and its CEO have explicitly identified the smart city as the 21<sup>st</sup> century opportunity for corporate growth. Its homepage for smart cities introduces the concept as “new cognitive approaches to long-standing challenges.” Links to further essays and videos include phrases such as “new initiatives for entrenched challenges,” “cognitive government,” “next generation of buildings,” “the future of cities,” and “efficiency on campus” (“Smarter Cities: New Cognitive Approaches to Long-Standing Challenges”). The company’s product offerings—what it terms “solutions”—are numerous, and include general categories common to municipal operations, such as public safety solutions, smarter buildings, urban planning, government and agency administration, water and energy, transportation, social programs, healthcare, and education. Each of these general categories includes a half dozen or so specific interventions enabled through ICT and data analytics.

Much like Panasonic, IBM’s rhetoric employs carefully chosen words that point forward and that solicit affirmation. The homepage confidently states, “The world is moving to cities, fast and for the long term. In a cognitive era, cities themselves are moving: evolving, ever-changing, not fixed on a marked destination. We are at an important point in that evolution, as new forces emerge and combine to create new ways for cities to work” (“Smarter Cities: New Cognitive Approaches to Long-Standing Challenges”). These new forces will instigate improvements in “security,” “service delivery,” “efficiency,” “citizen engagement,” “business environment,” and “personalized experiences” (“Smarter Cities: New Cognitive Approaches to Long-Standing Challenges”).

A Marketing Portfolio Manager for IBM's smart city Government Solutions states that "For the past several decades, major success stories from within the social services sector have been somewhat scarce. The complexities of intergenerational poverty, aging populations, addiction, abuse, unemployment, homelessness, rising health care costs and tightened budgets have exceeded the capacity of existing programs" (MacIsaac). But big data and software analytics, he claims, can allow us to breakthrough these challenges. Data analytics will open up new perspectives and create new frameworks to "better understand connections and identify gaps" in knowledge (MacIsaac). Consider the case study this IBM employee shares, whereby software tools analyze "1,000 factors that combine to impact youth unemployment" so that social workers can better identify at-risk youth who may drop out of school and become a drag on the social safety net:

In the UK, the Medway Youth Trust is using predictive analytic models to reverse the downward spiral of youth unemployment by working to identify youth who are most at risk for dropping out of school or losing their jobs. With 6.2 percent of young people between the ages of 16 and 19 in the Medway area neither in school, training or employed, and realizing the staggering societal costs over the course of a life for a youth who slips through the cracks, the Medway Youth Trust set out to identify and then intervene on behalf of youth most at risk.

Central to the initiative is a propensity model that's based on more than 1,000 factors that combine to impact youth unemployment. Any youth that's identified with a greater than 60 percent chance for ending up neither employed or in education or training is targeted for intervention based on documented analysis of root causes. One year into the program, positive outcomes were reported for 51 percent of the 723 individuals initially identified as at risk.

Early findings revealed a 250 percent improvement in the accuracy for identifying at-risk youth versus the previous and time-consuming method of manually reviewing records. While the Trust is continuing to refine and

sharpen its focus on the types of interventions that are most effective, the model has produced evidence that interventions work and that the earlier in a person's life the interventions occur, the more effective they are.

(MacIsaac)

IBM also prominently advertises another smart city vertical—The Next Generation of Buildings—on its homepage. Written by an executive and licensed architect with the smart city cadre of solutions, the article notes that human habitable structures have *always* been on the upward trajectory of smartness. Like evolutionary theory with a teleological end, human structures have been steadily improving down through the ages. Now is different, though. He notes that:

Unlike previous forward advances on the trajectory of building management, the angle of the current path has veered sharply upwards—away from incremental improvements and towards thoroughly transformative possibilities. Advanced analytics is lowering maintenance costs, cutting energy consumption, reducing the carbon footprint, enabling a more efficient use of space, and improving quality of life. (Phillips)

Interestingly, in this particular article and nearly all others on IBM's website, the particular mechanics of how the immense collections of data from sensors can first be sifted through and then productively used to inform the management of various systems (building, urban, etc.) goes unspoken. Rather, it seems to be a phenomenon that just happens; verbs describing these actions already possess the present and present perfect tenses. “Advanced cognitive and analytics capabilities *are enabling* the aggregation of data and revealing a depth of understanding” and “descriptive analytics creates [*sic*] the foundation for another level of predictive capabilities that leverage ongoing and historical data” (Phillips). Notice, too, that the passive voice of this statement seems to remove us humans from involvement with this technology, thereby granting smart city tech a “life of its own,” it seems. And who are the winners of this shift to ICT enabled management and planning systems? “Buildings, building owners, investors, tenants, cities, and the entire planet.” And the purpose of this revolution? Not “because it's the right thing to do or because it's good to know. We do so *to realize a transformative outcome*, and that's the



point of advanced cognitive and analytic building management.” What values (if any) and ulterior motives lie behind such language?

## **2.2 Rhetorical Findings—Assumptions, Expressions, & Basic Entities Recognized**

In this section, the rhetoric of corporations analyzed in the above literature review has been tabulated. In the primary table, the rhetoric of each corporate actor / pilot project has been assessed according to four key questions:

1. What are the basic entities recognized in this actor’s discourse?
2. What assumptions are made about the composition of or the processes that constitute cities? What is assumed to be “natural” about urban space?
3. Who are the agents in this actor’s rhetoric, and what power (or lack thereof) are they imbued with? What are their goals, or, alternatively, what might a powerless agent receive?
4. What are the key rhetorical devices, words, themes, and concepts employed by this actor when describing the smart city?

While this section, “Rhetorical Findings,” presents the data in tabulated form, the next section, “Discussion,” explores these findings in a more conversational and detailed form.

The last table seeks to uncover the most commonly employed words as these actors market their smart city visions. I have taken all the language from the webpages I specifically cited above, and run all those words through a simple word-counter software. For words that were mentioned the same number of times, I have grouped them under the appropriate rank.

Table 2.1: Rhetorical Analysis of Key Smart City Corporate Actors

Rhetorical Analysis of Key Smart City Corporate Actors				
Actor	Basic Entities Recognized	Assumptions About the City	Agents & Their Motives	Key Rhetorical Devices & Their Purpose
Songdo	international players, whether corporations, their workers, or their emissaries	the city embodies a seamless movement across home, work, and play	corporations that seek access to global markets	<i>future</i> to connote progress and optimism; <i>newness</i> to suggest fresh beginnings and a perfectly engineered physical and social environment
Masdar City	sovereign state; innovative, largely foreign enterprises	the city is convenient; can be optimally designed; drives economic development; invites foreign capital	entrepreneurs who reorient economy's direction; sovereign state who ensure resilient economy	<i>movement</i> to accentuate mobility of capital; <i>pioneer</i> to suggest urban novelty; <i>test bed</i> to invite scientific, corporate, and media involvement
Living PlanIT / PlanIT Valley	governments; corporations; the "fabric" of human society; the future	the city is controllable; a system of variables that can be captured, monitored, assessed, and tweaked; perfect and seamless layering of urban variables and processes is possible through sound, technological management	public entities stressed financially; autonomous software systems that can address that financial stress; corporations that develop those software systems	<i>intelligent</i> to correlate technology with organic neural capacity (i.e., humans); <i>sentience</i> to correlate technology with organic physiology; <i>life</i> to convey a sense of naturalness to technology (i.e., IoT)
FSST	residents who have basic, specified needs; a centralized planning organization—the corporation at first—that can create a platform for meeting those needs	in the city, specifying needs of residents precedes dispensing of technological apparatuses	residents who pursue ideal conceptions of personal and communal life; corporations who can assist residents and communities in meeting those goals	<i>state-of-the-art</i> language to elevate importance of FSST; <i>idealism</i> to reconnect to more pastoral conceptions of townships;
Panasonic	corporations that innovate; society, writ large, that welcomes such innovation (e.g., Denver welcomes ...);	the city is a basket of commodities that can be made more effective and efficient through corporate innovation; modern society is currently undergoing radical transformation	technology initiates active change; societies passively receive such change	<i>solutions</i> to connote that no problem can go unresolved, and <i>now</i> to emphasize that such problem-solving can occur immediately with the right technology
IBM	cities that have problems; corporations that have solutions; the world, which is a collection of cities with problems	cities' heretofore unresolved problems can be relieved through technological innovation provided by corporations; this breakthrough comes solely from big data analytics and advanced software systems	evolution, which will "naturally" push cities and their components to progress towards seamless, effective, and efficient operation, via the assistance of advanced technologies	<i>cognitive</i> to correlate technological innovation with organ neural capacity (i.e., humans); <i>generation</i> and <i>evolution</i> to suggest natural progression towards "higher" forms of intelligence and progress; <i>future</i> to connote idealized outcomes; <i>solution</i> to connote that no problem can go unresolved; <i>revolution</i> , to convey importance and urgency

Songdo, Masdar City, Living PlanIT, Panasonic, and IBM seem to have much in common. All reduce the complexity of cities and their inhabitants to “society” or “city.” Very few call attention to the actual, heterogeneous needs of *residents*. If residents are mentioned, they are usually presented as a homogenous, idealized hominoid tapped in to technological futurism. Another prominent entity recognized, of course, are the corporations themselves, which can provide solutions to persistent urban dilemmas. Common rhetorical ploys include themes, words, and concepts that *point forward* to the *future*, where *ideal* and *state-of-the-art* cities can be imagined. Indeed, this future is said to be *natural*, *evolutionary*, and *inevitable*. Progress will happen.

Note, too, how corporations and entrepreneurs were often imbued with action, whereas cities and their residents were passive recipients of that action. The only possible exception to these rhetorical tendencies is Fujisawa Sustainable Smart Town. FSST explicitly began its narrative with the *needs* of residents. While technological hope, one could say, can be found in FSST’s discourse, note that it comes *after* specifying the unique needs of these residents in suburban Tokyo, Japan.

Table 2.2: Most Used Marketing Words by Pilot Projects and Corporations

Smart City Pilot Projects & Companies and Their Most Used Marketing Words*			
Pilot Project	1st Ranked Word(s)	2nd Ranked Word(s)	3rd Ranked Word(s)
Songdo	international	airport public central walk people global education	solutions residents
Masdar City	reduce(ing)	energy water technology	residents solar innovation
Living PlanIT	new reduce	governments devices people future energy management	devices
FSST	residents	energy	services
Panasonic	solutions energy	sustainable	transit
IBM	data	building	cognitive buildings analytics solutions

\*cited webpages were rhetorically analyzed for most often used words; words that directly reference the company were removed, as were common words like articles and "smart" and "city"

The purpose of this table is to highlight common words employed by corporate actors and pilot projects as they seek to write their own smart city narratives. While some lexicon is predictable—residents, people, service—the predominance of certain words for each actor opens our eyes to their rhetorical angles into smart cities. For example, is it any accident that IBM’s most prevalent word is “data” when we recall that it is the largest data analytics firm in the world? Likewise, does it not make sense that Songdo’s most used word is “international” when we recall that the development’s primary purpose is to be a “business district” that provides access to one third of the world’s population

through a major airport? Like subtle clues, these core words point to underlying missions and goals that belie actors' true motives in the smart city.

### 2.3 Discussion

In this section, I pair my rhetorical findings with the theories I discussed and explored in my theory section. Having uncovered the basic rhetorical intent of these corporate actors and pilot projects, I now wish to expand these findings into fuller form, employing theory to connect dots about the motives, ideologies, and assumptions lying behind the marketing campaigns of these international corporations and their projects.

The theories I explored above in my theory section allow us to peer behind the smooth advertisements and marketing materials of these corporations and cities to make sense of what, exactly, is going on. One would not be mistaken to group together Songdo, Masdar City, and Living PlanIT, which was initially often referred to as a place—PlanIT Valley—but seems to have shed such spatial roots given the complexity, obviously, of building a city from scratch. I find them to be “quasi-places,” in that, unlike a spatial experience I might have in Yellowstone National Park or even on the streets of New York City, the space *itself* in Songdo, Masdar, or PlanIT Valley (if it ever comes to exist) is an economic product.

Recall Andy Merrifield's notion of the city as dialectical—urban space embodies the contradictory confluence of two primary, oftentimes competing forces, that of capital accumulation and that of human bonding and cultural creation. Respectively referred to as forces of *urbanization* (capital) and *urbanism* (“beauty and an abundance of life,” Merrifield says in homage to Jane Jacobs), the city is and has been the fulcrum between these dialectical, contradictory forces (Merrifield 114, 14). The spatial reality, however, of these corporately developed “cities” seems to completely ignore the “softer” side of cities—Merrifield's notion of urbanism—and instead seem to exclusively accentuate and privilege the forces of urbanization.

Recall, too, Merrifield's definition of “lean urbanization,” which is the transformation of governance and daily life into a corporate system. It is “a city measured typically by its ability to balance its budget, to operate efficiently, and to maximize its

service provision—to maximize at minimal cost” (Merrifield 93). As we have seen, it is not just these three cities that make such claims, but other corporate parties active in this thoroughly *economic* space. Note, for example, IBM’s application of words, phrases, and concepts common in corporate discourse to its conception of the city, its problems, and the solutions to those problems. Things move “fast.” We are at an “important point” that demands a hardline response. We must make the processes of cities “efficient.” Persistent social problems must be solved using new frameworks and strategies. We must delegate tricky tasks that humans have failed to implement, or that humans implement ineffectively, to better-performing (and cheaper) productivity tools, such as software systems or robots.

These promises from the corporate actors reviewed in this thesis obviously reflect Lewis Mumford’s insights from his critical essay “Utopia, the City and the Machine.” Much like Plato’s rigid idealization of the city as a machine that can be optimally tinkered with—as if the right dash of this and that ingredient or the perfect setting of this or that instrument—Songdo, Masdar, PlanIT, IBM, and, at times, Panasonic portray the city as a utopic machine that can be *fully known*. No variable will remain unknown, these actors suggest, and with such omniscience and omnipresence, omnipotence logically ensues. Mumford referred to this assumption as “machine thinking,” an idea that he finds especially prevalent today, post-industrial revolution. Machine thinking assumes that the world can be “completely under scientific and technological control” (Mumford 279). As many academic critics of the smart city will point out, such naivety was brought into high relief through modernist urban planning, which failed miserably. Is it not ironic that the same logic of a dismissed urban philosophy and practice has been resurrected today, but because of its shinier clothes and glistening guise, the smart city fanfare has drowned out such historical inconveniences?

Mumford presciently predicted how this machine thinking would come to frame and direct social practices in highly developed urban spaces today. Whereas machine thinking in Plato’s time meant the enslavement or specialization of humans and their crafts (Mumford 285), machine thinking today is the way we conceive of our worlds and adopt “thousands of useful mechanical and electronic inventions” to monitor, regiment, and control our individual and collective lives (Mumford 288). In conclusion to his dark,

prophetic essay, Mumford worries that the Machine itself has become the very *goal* of humanity's collective imagining of what the city should be. The danger, of course, is that this Machine may become a "totalitarian system" that trumps all other narrative conceptions of what the city could be (Mumford 290).

Some may find Mumford's prophetic warnings too dismal or pessimistic. And perhaps they are. But if we latch on to what Mumford means by this Machine trumping all other competing visions of the city, so much so that it can never be "challenged, still less modified" (Mumford 290), we come to notice a persistent absence of discourse across much of these marketing materials from corporate actors—ordinary people. Again, the "other side" of Merrifield's dialectic suspiciously lacks voice in my analysis of Masdar's, Songdo's, PlanIT's, and IBM's digital materials. The assumption is that the social, political, and cultural technics of people—which, needless to remind ourselves, are *not* all the same across space and time—will naturally fall into place once a corporation designs a city the "right" way.

Steven Moore, too, reminds us in his work that we should worry when only one narrative dominates the meaning of concept or practice, whether that be "sustainability" or the "smart city." When the corporations above speak of "challenges" faced by cities and the technologically-enhanced "solutions" that they can offer, they each seem to universalize these situations. There is *one* problem faced by cities, and there is *one* solution (their products). This gesture towards singularity is a rhetorical ploy by corporations to grant scientific legitimacy to their claims. To quote Moore again from my theory section, urban planners must always remember that the "choices about which criteria for sustainability are best are *social* choices about how *we* want to live, not scientific choices about what is true or more efficient" (Moore 13, emphasis added). To grant objectivity to urban complexity and possible solutions is to efface the myriad social, cultural, environmental, and political economic uniqueness of a given place and time.

This absence of alternative, non-corporate actors (and it could have been as simple as *interviews* of city residents living along with, or under, these smart city regimes) carries political implications. As Eduardo Aibar and Wiebe Bijker demonstrated in their article on technological interventions in nineteenth-century Barcelona, spatial forms and processes reflect and instantiate competing actors' power and ideologies. Aibar

and Bijker claim that “different rival technological frames strive for dominance” (Aibar and Bijker 15), and I believe that the rhetoric and discourse being employed by these corporate smart city actors is meant to substantiate *their* view of the city, one that is not just a Machine as Mumford warned, but, as a logical conclusion to that, one that is to be built, serviced, and operated by corporate, for-profit inventions.

The hyperbole of needing to quickly solve “wicked” social problems could be construed as a coordinated drumbeat among corporate actors to generate interest in this hot new topic of smart cities. They appear to have been successful thus far, as even a cursory glance at what cities, from large ones like New York City to small utilities in rural America, reveals thousands of mayors and municipal departments proudly donning the nomenclature of “smart \_\_\_\_\_” behind their cities’ name. Such hyperbolic calls for urban [re]development have been seen before. In an astute research essay on westward expansion, William Cronon wrote of “Booster Dreams.” In this essay, Cronon catalogues the real estate mania that drove urban speculation, and some urban development, in the western frontier during the nineteenth and early twentieth centuries. A philosophical determinism, explicated in part by Frederick Jackson Turner, drove this mania. Just as humans had evolved towards rationality, so too would our world evolve, from wild land and then pastoral landscapes, to eventually the “manufacturing organization with city and factory system” (qtd. in Cronon 31). Urban speculators would buy up land all throughout the West, and boisterously proclaim that the confluence of this creek and that river would be the next New York City of the hinterlands.

It may be fair to say that a similar mania has overtaken the corporate narrative, at the very least, on how technology will transform urban space. While some actors’ narratives (such as some academics or some civil society groups) might be more reserved in their proclamations and predictions on smart city interventions, many of the corporations and pilot projects I have analyzed in this thesis seem to be over-stating what they can feasibly accomplish. Just as Cronon recorded that “the search for the great western cities of the future drove nearly all nineteenth-century townsite speculation, and the accompanying rhetoric always inclined toward enthusiastic exaggeration and self-interested promotion (Cronon 34), so, too, could the *idea* of a utopic, Machine-driven, perfect urban space be driving the increasingly enthusiastic and exaggerated rhetoric of



some smart city narratives. Recall the narrative shared by the IBM employee about the next generation of buildings. Like the western notion of a “Great Chain of Being,” his underlying assumption is that buildings have “naturally evolved” towards greater and greater complexity, and the *most* complex buildings—and therefore the best—are here today. Lucky us.

What might be the risk of this one-sided narration of smart cities? So what if corporate actors seem to be demarcating what the smart city will be and how it will unfold? To return to Ivan Illich, who I looked to theoretically to uncover the *purpose* of cities (which, at its most basic level, is ‘human habitat’), one could argue that the rhetoric largely seen above from the likes of Songdo, Masdar, PlanIT, IBM, and a bit of Panasonic eschews the “convivial society” that Illich defended so vigorously in *Tools for Conviviality*. Recall that a convivial society is one that “enlarges the range of each person’s competence, control, and initiative” (Illich xii), where “modern technologies serve politically interrelated individuals rather than managers” (Illich xii). As seen in the marketing and descriptive materials of the interventions proposed by these corporate actors and some of their pilot projects, the entities *behind* these technological interventions remain anonymous. One can only assume that, of course, they are elite managers, either from for-profit or governmental institutions. Take IBM’s case studies, for example. Reading through its descriptions of how advanced analytics will prevent at-risk youth from dropping out of schools or will optimize the mechanics of a building, one cannot help but imagine a privileged individual sitting behind a computer screen.

Even if the data of these advanced analytics were to be made publicly available, left unsaid in the corporate narratives explored above is *how* those analytical structures are formulated. What variables are identified and, alternatively, what variables are ignored? To return to Aibar and Bijker, the obtuseness of a rhetoric can be a carefully chosen tactic to silence competing actors or to solicit acquiescence from unsuspecting actors. The scientific community has in the past employed this nefarious discursive practice to circumvent public accountability. Aibar and Bijker refer to such a practice as technologically-induced semiotic creations, which are languages that not only describe technologies, but allow for the manipulation and control of those technologies. The engineers’ rhetorical emphasis on hygiene and their corresponding technological

interventions entailed social policies meant to elevate their knowledge and expertise in nineteenth-century Barcelona, and therefore circumvent addressing deep-seated socio-economic stratification. So, too, might the silence around the *construction* of advanced data analytics—“it is very complicated,” corporations might say, “so leave these matters to our experts”—be meant to circumvent public debate and conversation about socio-economic issues.

My reader may have noticed that I have somewhat resisted lumping Fujisawa Sustainable Smart Town and Panasonic with Songdo, Masdar, PlanIT, and IBM. I have indeed done so because I detect a shift in rhetoric with FSST. While certain elements may indeed be similar (recall, for example, the egregious bragging of creating an “invisible gate” using ICT to “protect” the community), FSST nevertheless takes care to emphasize throughout its digital materials that people and their quality of life matter, and that any technology deployed in the pilot project should serve that concern. As I stated in my assessment of FSST, the planners of Panasonic’s first smart city pilot started with the goal of creating “a concept for a smart community lifestyle based on residential comfort, regional characteristics, and future living patterns – taking into account such aspects as energy, security, mobility, and wellness” (“Project Overview”). Thus, only after they had conducted this scenario-planning exercise did they then ask how advanced technologies might support such development goals.

Note, too, that FSST took into account “regional characteristics.” Indeed, the homes and garden alleyways among them are intentionally positioned to maximize natural wind flow, thereby minimizing the usage of air conditioners. This attention to “passive design” implies FSST’s recognition that primitive interventions are just as valuable as technologically advanced ones. FSST states that passive design enables “comfortable living with minimal burden on energy resources,” and that it respects “traditional knowledge about homebuilding” (“Town Services—Energy”). Such practical wisdom might not be monetized by Panasonic, but the corporation nevertheless finds it valuable to its pilot development.

The corporate actors and pilot projects above largely present a reductive worldview in their smart city narratives. I am concerned about the power dynamics of the agents in cities—corporations innovate and solve problems that cities and citizens have

simply been unable to solve because of their lack of technology. Furthermore, while I can foresee commonplace solutions for *some* aspects of cities across the globe (such as energy or mobility), the large corporations I analyze above fail to recognize the *difference* and *heterogeneity* of cultures and socio-economic circles. Furthermore, the pilot projects I analyze, with the possible exception of Fujisawa Sustainable Smart Town, fail to recognize the contested heterogeneity that invariably arises *within* individual cities themselves, no matter the illusion of top-down, perfectly engineered control.

Other actors exist, though, in this smart city space, and I will now turn my attention to academic actors. Might these actors follow the same rhetorical path of corporate actors? Or are there differences? If so, are those differences subtle or more pronounced? As I have done above, I will first recount these academic actors on their terms, attempting to allow them to speak as they do in their respective publications. I then tabulate my assessment of their rhetoric in the findings section, and next analyze those findings according to some helpful theories for making sense of their rhetorical angles.

### 3.0 Smart City Academic Actors

In this literature of academic actors engaged in the narration of smart cities, I look primarily to the most referenced and complete collections of smart city analysis. This includes two monographs (one published via a popular press and the other published via academic presses), one pamphlet (published as a free eBook), and two peer-reviewed special issues for prominent journals in the broad field of urban planning. I begin with Anthony Townsend's *Smart Cities*, and then turn to a book bearing the same title, by Antoine Picon. The last book I assess is Adam Greenfield's pamphlet *Against the Smart City*. I then turn to peer-reviewed articles, focusing exclusively on two prominent special issues. The first one, the *Journal of Urban Technology*, published a special issue in 2011. The second special issue was published in 2015 and comes from the *Journal of Regions, Economy and Society*. Following these literature reviews, I will present rhetorical findings in tabulated form, and then turn to a more nuanced discussion of my findings.

#### 3.1 Monographs

The “king” of smart cities and governance is without a doubt Anthony Townsend, whose *Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia* (2014) served as a megaphone for the empowering possibilities of information and communication technology when in the hands of ordinary citizens of an urban space. Nate Berg does a Q&A interview with Anthony Townsend in a recent *MIT Technology Review*, where Townsend's overriding argument is that the direction of smart cities—whether they will turn our lives into technocratic regiments or expand the creative and social capacity of urban life—depends upon to what extent the public embraces information and communication technology. He thinks the public will embrace the smart city because of smartphones, which he considers to be the most important urban tech. Townsend envisions the urbanites of cities each having a smart phone, “networked supercomputers” that can aggregate many helpful services (Berg 63). Tools like smartphones will decentralize power, create redundant infrastructure, increase social interaction, increase sustainable behavior, and incite creative energy (Berg 63). As an

example, he points to the sudden and disruptive impact of smart phones upon transportation. The network of smart phones is now “the best transportation sensing network in the history of mankind,” and we discovered it “completely by accident” (Berg 64).

Townsend more clearly spells out this on-the-ground vision of smart cities in his monograph, which catalogues the infiltration of big data and technology into the fabric of our cities, noting its benefits, its faults, and its potentialities. The digitalization of our cities, and their transformation into “smart cities,” appears to be inevitable, with some “50 billion networked objects” connected to the Internet by 2020 (Townsend 3). Townsend does not shy away from this inevitability, though. He sees it as a challenge to which we must decide how we will respond. Citing Patrick Geddes throughout the book, he calls for a few things to guide smart cities’ development around the globe: 1) good governance that serves the people and that avoids blind infatuation with the glistening toys of smart cities; 2) an open-source approach to smart cities that solicits the creative intelligence of the people who actually live there, instead of the wholesale standardization of smart cities through the global sales teams of a few corporations; and 3) a balancing of smart city tech with an interdisciplinary, “soft” urban planning intelligence that is more of an art than a science.

Why do we need this softer touch? Townsend likes to draw parallels to the standardization of urban areas in the early 20th century, especially in regards to the personal automobile. That standardization, and the vast infrastructure eventually built to accommodate the car, seemed logical, reasonable, and rational at the time, but it is a huge problem that we now wrestle with. As he says, “If the history of city building in the last century tells us anything, it is that the unintended consequences of new technologies often dwarf their intended design” (Townsend 14). This is why Townsend references Patrick Geddes and Jane Jacobs so often—he legitimately fears that tech will literally program spontaneity and on-the-ground, individual-driven networks of exploration out of existence.

But again, this big data, upon which smart cities are built, is here to stay and it will transform urban planning and city halls. Quoting John Tolva (Chicago’s Chief Technology Officer, an increasingly common position across cities), Townsend argues

that governing and policy making will now be based on what “vital signs” are telling us in real time, and not just anecdote (Townsend 211). Whereas problems in neighborhoods could not have been uncovered unless a public forum was provided, urban issues can now be discovered, assessed, analyzed, discussed, and even *responded to* instantaneously (assuming municipal staff remain employed to actually resolve them).

Ultimately, though, even Townsend must acknowledge the necessity for *some* top-down delivery of municipal services, especially in regards to energy. When covering the appropriate realms of large-scale government and corporate smart city initiatives, Townsend turns to the smart grid. He reminds us that “electricity, even more than the digital data it conveys, will be the lifeblood of smart cities” (Townsend 35). Representing \$1 trillion of public/private investment, the USA power grid has never really been updated (Townsend 35). While three quarters of American electric meters will be smart meters by 2016 (Townsend 38), the grid itself still needs a major overhaul. What makes our current grid inefficient is the split between base load plants and peak plants; a smart grid, through load shifting and load shedding, might allow us to focus entirely on developing clean base-load plants (Townsend 39). Together, loading shifting and shedding could reduce electricity needs by 10% (Townsend 40). Simply put, the creation of a smart grid will *never* be citizen-led. A smart grid for any sizeable city necessitates large expenditures of capital, centralized-planning, and a managerial class (corporate and government) who intimately understand electricity.

This recognition that both styles of governance are needed in the smart cities of the future—both “base-superstructure” and “superstructure-base” interventions—is the compelling insight of Antoine Picon’s *Smart Cities: A Spatialised Intelligence*. Picon argues that cities need both top-down and bottom-up approaches to effectively implement smart city solutions, and the sooner actors move past this false dilemma, the better. Indeed, Picon states that tech directives issued from municipal managers and grassroots activism are actually mutually supportive of each other.

Picon encourages his readers to realize that “there are some fields, albeit limited in number, where a neocybernetic type of management seems preferable to citizen engagement” (Picon 90). Take, for example, the energy grid, whereby ICT can automatically adjust a household’s thermostat to decrease peak demand, or smart urban

mobility systems, whereby a tenth of existing cars could meet the needs of 99% of an urban populace through automated ride-sharing. It is through such centrally-controlled systems as these that “the desires and experiences of spontaneity and collaboration” can then flourish (Picon 84). These centralized services, that will be admittedly controlled by a select few, create platforms for individual and community freedom. Ultimately, Picon proposes smart city advocates adopt “a form of city intelligence” that is “both widespread and focused,” diffuse among all urban inhabitants and their tools of collaboration and participation, and yet also concentrated in control rooms and command posts that keep a city functioning materially (Picon 100).

Despite his pragmatic defense of smart cities, Picon does spend considerable time tracing its historical antecedents. He finds similarities with the discourse of cybernetics from the 1950s and 1960s (Picon 67). This rhetoric and practice expressed a “desire to anticipate and master everything” (Picon 67). And this desire *must* rest upon “a resolutely reductionist view of humankind and the world,” one that “made sense” to militarized, hegemonic discourse that pitted the “evil empire” of the east against “shining armor of freedom” of the west during the Cold War (Picon 69, 69-78).

However, to Picon, the connection to militarized and reductionist cybernetics *is only a temptation*, not a necessity. While that temptation is certainly real, dangerous, and, according to historical precedent, a constant plausibility, it need not define the future path of smart cities. Indeed, while neo-cybernetics and the current instantiation of the smart city might “rely on the same type of digital infrastructure based on sensors, chips, wireless transmission, information processing units and databases” (Picon 68), the smart city *also* (and perhaps more so) leans towards “the notion of a city that sets out to reinvest its citizens with the capacity spontaneously to invent community living” (Picon 67). Ultimately, as we saw above, Picon proposes that the neo-cybernetics of “controlling” or “commanding” a city is not mutually exclusive from the spontaneity and individuality made possible through smart city technology (Picon 100).

What we begin to see with Picon then is a more expansive understanding of technology. Eschewing “the twin pitfalls of unbridled enthusiasm for technology and blanket criticism—two attitudes which are unfortunately all too common in relation to digital matters” (Picon 20), Picon adopts a strong pragmatic framework for evaluating

both the dangers and possibilities of technologically-advanced urban planning. Indeed, despite even *his own* reservations with the smart city, he still calls the smart city movement a “turning point,” one that, despite its foreseeable disadvantages, will nevertheless usher in a host of advantages, which he amply catalogues in his book (Picon 20). The smart city *will* bring us a “different future” . . . but perhaps with the vigilance and activism of the academic community, it can be a future “rich in promise” (Picon 156).

The most critical monograph of smart cities is Adam Greenfield’s *Against the Smart City*. A pamphlet published for free on the internet, *Against the Smart City* critiques not the use of technology in urban planning, but rather the vision of a city mobilized by the corporations that stand to gain from selling this “smart” technology. Indeed, Greenfield, who purportedly spent several years reading through corporate advertisements, marketing materials, pamphlets, interviews, and trade reports, finds their urban utopic visions to be naïve and deeply flawed. The predominant error Greenfield finds in corporate visions of smart cities revolves around a persistent and systemic misperception on the corporations’ part—they each fail to recognize the *complexity* of cities, and they remain blinded by the naïve simplicity of now-debunked modernist urban planning.

While Greenfield’s pamphlet obviously caters to a nonacademic audience given its conversational style and its medium of publication (digital and free), one can infer the appropriate theories that lie behind this notion of cities as sticky, protean, rhizomatic, messy, and—in a sense—somewhat unknowable, uncontrollable, and unplannable. Cities, much like the entities who build and reside within them, morph and change in organic ways. Unfortunately for the smart city and its potential benefits, Greenfield argues that the conversation is being dominated by just “one particular story,” the corporate story (Greenfield Loc 56). And that limits people’s rights to plan their own and collective urban futures.

What is so wrong with these “canonical smart cities” that Greenfield walks us through rhetorically? What fault does he find with IBM’s Rio de Janeiro Operations Center or Songdo or Masdar City or PlanIT Valley (Greenfield Loc 109, Loc 133, Loc 145)? The flaws are numerous. First, these quintessential poster cities, constructed from



“scratch,” circumvent the complexities of socio-economic and political spaces. Referencing Deleuze, Greenfield ties these greenfield developments theoretically to “any-space-whatever” (Greenfield Loc 254). No wonder, he says, that these corporations and managers can speak so glibly of efficiency, optimization, and seamlessness when they can ideologically bracket the inconveniences and difficulties of real cities (Greenfield Loc 266). Similarly, the time horizons of smart cities unfairly lay claim to an “any-time-in-the-future,” whereby the utopic promises made today are *just* around the corner, but constantly fail to arise. Such constant delay curiously does little to dampen the hype and promises of smart cities, Greenfield remarks. Indeed, he jesters that “the smart city is something that can and will always be redefined as its enthusiasts deem necessary, and so remain forever just beyond our reach” (Greenfield Loc 380-393), always enticing, forever utopic, but surely “just around the corner!”

This tendency towards oversimplifying the challenges our cities face and overpromising the ease of solutions continues on several other fronts, Greenfield argues. He critiques these corporations’ claims that their platforms will be “open” to the public, when they are by no means open-source software, or free for all to download and edit as they see fit (Greenfield Loc 566-611). Furthermore, the technology that is available “has to be staged in any-space-whatever” given how simple the assumptions *behind* the technology are (Greenfield Loc 420). “Only by proposing to install generic technologies on generic landscapes in a generic future can advocates avoid running afoul of the knotty complexities that crop up immediately any time actual technologies are deployed in existing places” (Greenfield Loc 420), Greenfield says.

Greenfield especially eschews the “unreconstructed logical positivism” (Greenfield Loc 432) that he deems rampant throughout corporate smart city rhetoric, whereby the world is assumed to be “perfectly knowable, its contents enumerable and their relations capable of being meaningfully encoded in the state of a technical system, without bias or distortion” (Greenfield Loc 443). Greenfield finds this logic to be incompatible with “the messy reality of all known information-processing systems, the human individuals and institutions that make use of them and, more broadly, with the world as we experience it” (Greenfield Loc 480). Indeed, he employs a curious metaphor of cities as *tragic* (Greenfield Loc 492) given how *multiple* people and *multiple*

communities hold differing and sometimes contradictory conceptions of the good—messiness that gives a flare to cities that we all intimately know, but corporate schmooze conveniently forgets.

Greenfield's most weighty invective against the current and dominant narrative of smart cities—one, again, controlled largely by for-profit, large corporations—is that it serves the neoliberal political economy. Greenfield blankly states that “virtually without exception, the canonical smart cities are predicated on the logic of neoliberalism” (Greenfield Loc 875). If by neoliberalism one means that citizen services should be privatized, that public oversight of private activities should be minimized, that the best utilitarian outcome of economic activity rests upon “frictionless global trade,” and that taxes should be reduced as low as possible to support primarily a juridical apparatus and military that protects private property rights, then the smart city is a close rhetorical match, Greenfield argues (Greenfield Loc 875). He locates each of these criteria in the practices and discourse of Songdo, Masdar City, and Living PlanIT's marketing materials. With its “organic capacity for data-driven process optimization, its seamless interweaving of public and private action and its organization for the convenience of administration,” the smart city and its accouterments can be interpreted as “the most recent additions to the armature of enticements and amenities a city must offer in order to be considered a credible contender as a destination” for globalized capital (Greenfield Loc 935).

But even someone as critical as Greenfield can see potential benefits of smart city interventions, just so long as they unfold through *alternative* narratives than the one for-profit corporations have written. And voicing those alternatives is incredibly important he says, given the weight of discourse on our future actions (Greenfield Loc 1329-1365). “I hope we can agree,” he implores, “that ‘the smart city’ is a specific rhetorical move within a much larger space of potential” (Greenfield Loc 1377). He asks his readers to explore, develop, and advocate for “far more interesting potentials locked up in networked technologies” (Greenfield Loc 1377), and if one cannot yet think of potentials, at the very least ask critical questions that invite all actors to converse about equity, power, and access (Greenfield Loc 1389).

## 3.2 Peer-Reviewed Articles

In addition to the three primary monographs in the smart city academic literature, there have been two primary special issues from respected journals that relate to urban planning and management. These two journals have been divided by their general dispositions toward smart cities—optimistic and cautious interpretations.

### 3.2.1 Optimistic Interpretations

There have been two special journal issues in the fields of urban studies and regional planning that address smart cities. The first one, published in 2011, was the *Journal of Urban Technology*'s "Creating Smart-er Cities," edited by Mark Deakin. While individual articles may have been published sparsely before then, recall that no monograph or special issue had yet appeared.

From the diverse foci of these collected research articles and the few authors involved (two scholars co-authored four of the six research articles), one can infer that in 2011 the scholarly community had just begun to initiate a conversation specifically on smart cities. The first article, "Creating Smart-er Cities: An Overview" by Sam Allwinkle and Peter Cruickshank, tries to define what a "smart city" actually is in light of the recent 2009 "Conference on Creating Smart(er) Cities" (Allwinkle and Cruickshank 1). Their initial list of cities that have chosen to call themselves "smart" leaves one wondering what exactly the word means—San Diego, Ottawa, Kyoto, Bangalore, Edinburgh. Because even the most experienced, globally-minded urban planner would fail to spot the "smart connection" among these cities, Allwinkle and Cruickshank initially posit that the term is simply a "self-congratulatory tone" cities adopt to make themselves stand apart globally (Allwinkle and Cruickshank 1). But the authors do note that something *different* can be found in urban planning and cities around the globe, pointing to "ICT infrastructures, underpinned by a new generation of mobile technologies, connected devices, network platforms, and associated software" (Allwinkle and Cruickshank 2).

As an introductory primer on both the emerging smart city conversation in general and the five research articles that follow, Allwinkle and Cruickshank's article clearly understands that the pragmatic applications of those ICT infrastructures remain

unresolved. On the one hand, they can imagine a “worst-case nightmare scenario of a city dominated by the entrepreneurial values of the elite few,” and on the other hand, they can foresee a more “progressive alternative” that uses information technology, not to shore-up the entrepreneurial values of the city, but rather to “undergird” a community’s social, communal, and environmental qualities” (Allwinkle and Cruickshank 4). This tension in the *purpose* of the smart city will continue in academic scholarship. Ultimately, Allwinkle and Cruickshank argue that the smart city, in contrast to previous versions of technologically-enhanced urban systems (the intelligent city, the wired city, etc.) is about people. It establishes a platform for civic and communal engagement and becomes an “exercise in liberal democratic governance, or *civitas*” (Allwinkle and Cruickshank 9).

Renewed *civitas*—engaging individuals through new channels of governance and participation—seems to have been a predominant focus of early scholarship on smart cities, as evidenced by some of the remaining research articles in this special issue. Indeed, the following article, “The IntelCities Community of Practice” by Mark Deakin, Patrizia Lombardi, and Ian Cooper, analyzes a joint government-academic-industry initiative in enhancing government services using ICTs. The authors wonder if the information transfer enabled by informal networks of social capital can be amplified through digital technologies (Deakin et al. 18). They argue to the affirmative, pointing to what they deem a successful case study of “virtual organization whose customization is co-designed to manage the learning needs and knowledge-generating requirements of a technological platform” (Deakin et al. 35). Consisting of an e-learning module, a knowledge-management system, and a digital library, the IntelCities Community of Practice case study demonstrated how the intricacies of bureaucratic governance might become more easily understandable, accessible, and subject to democratic monitoring through online portals. While this subject matter could simply be reduced to a matter of digital design, Deakin et al. give voice to how the “big data” of sensed cities might be accessibly presented to the general public, rather than elite managers who keep the data unto themselves.

George Kuk and Marijn Janssen extend this analysis of improving government services through digital applications in their essay “The Business Models and Information Architectures of Smart Cities.” They believe that smart cities will necessitate

a shift in how governments extend services to their citizenry, foregoing what we may call person-to-person meetings in exchange for the ease of remote access and integrated online portals. The goal, they argue, is to meet the 21<sup>st</sup> century demands of a connected citizenry: “the integration of various products into a single service, the reuse and real-time availability of information, easy interaction, and discussion with government bodies” (Kuk and Janssen 39). Looking to case studies in the Netherlands, where some government actors have explored web-based business models for extending services, the authors believe that mapping possible pathways for migrating public data, information, and services to digital platforms (away from filing cabinets and the harder-to-access individuals in government who hold that knowledge) is the most important issue facing governments today (Kuk and Janssen 40).

The last three articles of the *Journal of Urban Technology* special issue on smart cities concern themselves with interwoven and complimentary relationships among universities (intellectual capital), industry (wealth creation), and governments (civil society). This notion of a “triple-helix” framework of smart cities implies early scholarship’s focus not so much on the defining feature of smart cities today—nascent ICTs that mobilize data in real-time to change urban processes and functions—but rather the *effects* of that ICT upon actors intricately involved in urban spaces.

Loet Leydesdorff and Mark Deakin first propose this model in their essay “The Triple-Helix Model of Smart Cities: A Neo-Evolutionary Perspective,” with the two final articles in the special issue building upon their key metaphor. Leydesdorff and Deakin maintain the earlier authors’ theme of focusing upon the softer aspects of smart cities, asking only thereafter how the hard aspects, namely ICT, can accentuate networks of social, entrepreneurial, and governmental capital. Much in the vein of scholarship of Richard Florida, they argue that “cities can be considered as densities in networks among at least these three relevant dynamics: that is, in the intellectual capital of universities, the industry of wealth creation, and their participation in the democratic government which forms the rule of law in civil society” (Leydesdorff and Deakin 61). If ICT can do anything to help these cities become “smarter,” it would do so by “intensifying” existing modes of potential interaction (Leydesdorff and Deakin 56). Ultimately, however, Leydesdorff and Deakin reiterate repeatedly that the “cultural development” necessary

for creating permanently “smarter” cities “is not a spontaneous product of market economies, but a product of the policies, academic leadership, and corporate strategies that need to be carefully constructed as part of an urban regeneration program” (Leydesdorff and Deakin 59).

The final two articles of the special issue from the *Journal of Urban Technology* speak about smart cities from the viewpoints of urban economists. Peter Cruickshank, in “SCRAN: The Network,” explains how integral ICT now is to “the development of cities” and to leveraging “social and environmental capital as measures of the competitiveness of cities” (Cruickshank 83). His analysis of the Smart Cities Regional Academic Network (SCRAN) as a community of practice seeks to demonstrate how the “triple-helix model of smart cities” might fuel economic development and competitiveness in the future.

Similarly, Andrea Caragliu et al. in their essay “Smart Cities in Europe” argue that, according to their statistical analysis of variables contributing to sustained economic development, ICT—and the triple-helix interactions it can facilitate and amplify—is “positively correlated with urban wealth” (Caragliu et al. 65). Acknowledging that, in 2011, “the label ‘smart city’ is still, in our opinion, quite a fuzzy concept” (Caragliu et al. 67), they proffer what they see as a more definitive one: “We believe a city to be smart when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance” (Caragliu et al. 70). Signaling possible tension *within* the academic and journalist actor network, Caragliu et al. explicitly cast doubt on neoliberal concerns with smart cities. They note that, “although caveats on the potential risks associated with putting an excessive weight on economic values as the sole driver of urban development may be worth noting, the data actually shows that business-oriented cities are indeed among those with a satisfactory socio-economic performance” (Caragliu et al. 68).

### **3.2.2 Cautious Interpretations**

If the 2011 special issue on smart cities from the *Journal of Urban Technology*

seemed to have enthusiastically embraced the smart city as a lens for understanding how cities develop inconclusive social and economic capital (and perhaps environmental capital), then the other special issue on smart cities, published in 2015, offers a cautious, more reserved exploration of its possibilities and a frank discussion of its dangers. Susan Christopherson and Amy Glasmeier, the editors of the smart city special issue for the *Journal of Regions, Economy and Society*, set the stage with their “Thinking About Smart Cities.” A telling quote from Glasmeier and Christopherson portends what we will see in the following eight articles and, in general, the broad skepticism—whether cautious or outspoken—from a few peer-reviewed academics:

Although the authors in this issue approach the subject of smart cities from very different angles, they generally agree that smart city technologies are ill-suited to solving the problems that lie at the heart of improving the quality of urban life. Poverty is not on the agenda of smart city planners. They may solve traffic problems, but it is not clear how they will regenerate failing schools or find ways to include neighbourhoods facing disinvestment. The contradiction between the promise of smart cities and its limited policy scope is aptly demonstrated in one of the most celebrated smart cities, Rio de Janeiro. The city, with its control centre filled with wall size computer monitors, can perhaps use forecasts of threatening weather to send out warnings of storm intensity thus leading to speedier evacuation. What it does not address is the question of why people build housing in such high-risk environments and what it would take to change this behaviour. In this instance, at least, smart city technologies deal with symptoms rather than the disease. (Glasmeier and Christopherson 6)

That skepticism finds full voice in the first full essay of the collection, “The ‘Actually Existing Smart City’” by Taylor Shelton, Matthew Zook, and Alan Wiig. The authors largely wish to situate the emergence of smart cities in a theoretical history. Against the claim that the smart city might be rationalist, neutral, scientific development, they remind us that “smart cities are not, by practically any stretch of the imagination, new,” referencing a long tradition of rational, urban science sweeping in to save the day (Shelton et al. 14). Indeed, in homage to a persistent argument among astute academics,

Shelton et al. note that “planners and engineers have sought to make the study and management of cities more scientific for over a century” (Shelton et al. 14).

Theoretically, they see smart cities operating in a world of neoliberalism, where cities must adopt strategies for “economic growth in an era of austerity” (Shelton et al. 16). Thus, the smart city is a “means of territorial competitiveness, a way of attracting both capital and labour to cities” (Shelton et al. 16). Thus, as with any neoliberal policy, there will be “winners” and “losers.” “Whatever it means for a city to be ‘smart’,” they say, “it is also readily apparent that not all spaces of the city will be equally smart, meaning that smart cities will privilege some places, people and activities over others” (Shelton et al. 15). Finally, they fault the central tenet of the smart city—the collection of data—since “data are socially constructed, and different forms of data allow for competing representations of place” (Shelton et al. 18). While the authors do acknowledge the “alternative possibilities opened up by these new forms of data-driven governance” (Shelton et al. 22), their article leans more heavily towards the proclamation that much of the smart city discourse—from corporations and cities—is quite shallow.

They are not the only authors to say so. Rob Kitchin, in “Making Sense of Smart Cities: Addressing Present Shortcomings,” pegs smart cities’ theoretical genealogy to managerial neoliberalism. He states that “the smart city is understood to be the technological version of a sequence of neoliberal-infused new urban visions, including competitive cities, creative cities, sustainable cities, resilient cities and green cities” (Kitchin 133). In addition to interjecting certain discourses into the public conversation (entrepreneurialism, global competition, efficiency, etc.), neoliberalism also obscures certain discourses, with Kitchin noting that the current smart city discourse, as promulgated by companies and cities, leaves unquestioned and untouched issues such as panoptic surveillance, technocratic and corporate forms of governance, technological lock-ins, profiling and social sorting, anticipatory governance, control creep, the hollowing out of state provided services, widening inequalities and dispossession of land and livelihoods (especially on green field sites)” (Kitchin 132).

And another article in the Glasmeier and Christopherson collection largely concurs: “Critical Interventions into the Corporate Smart City” by Robert G. Hollands. As with Shelton et al.’s neoliberal critique, Hollands spots an ideology, left unspoken,



beneath the corporate-driven smart city movement—the privatization of public space that becomes the playground for corporate management and advertising (Hollands 68). Furthermore, Hollands sees a smart city rhetoric that suggests its urban solutions can only be delivered “through a corporate vision of smartness, in conjunction with an entrepreneurial form of urban governance (Harvey, 1989) and a largely compliant and accommodating citizenry (Gabrys, 2014)” (Hollands 62). Hollands attributes corporations’ smart city fix to the projection that it’s an industry worth \$20-40 billion, annually (Hollands 66). Thus, he fears the emergence of what Michelle Provoost calls a “neo-liberal urban utopia” (Hollands 67). Hollands is also critical of public-private partnerships, asking “who gains and who loses through such arrangements” (Hollands 69). Finally, he notices a glaring omission of “serious urban problems like poverty, inequality and discrimination” (Hollands 69) in the current discourse of smart cities.

Much as Kicos Komninos spoke in 2014 of smart city ICT as the addition of another “layer” to the urban ecosystem, so too do Chirag Rabari and Michael Storper treat these new, advanced ICTs as the addition of a “digital skin” upon the physical urban fabric (Rabari and Storper 27). According to them, “the digital skin of cities consists of the widespread implantation of sensors into urban and household environments, together with ubiquitous mobile broadband communication technologies that can transmit both deliberate communications and automated user data” (Rabari and Storper 28).

Rabari and Storper catalogue what they see as severe deficiencies of smart city discourse thus far: the hyperbolic—and discredited—technological rationalism peddled by smart city corporations (Rabari and Storper 34); the failure of cybernetic rhetoric to recognize the spontaneous “messiness” described so poetically by Jane Jacobs (Rabari and Storper 35); the technologically enabled threats against liberal democracies (Rabari and Storper 35); the “weak ties” of digital interaction (Rabari and Storper 37); and the opacity of selective algorithms that determine what is “useful” data and what is not (Rabari and Storper 39). While they acknowledge the *potential* benefits of an urban digital skin, Rabari and Storper worry that smart city ICT inescapably operates within, and exacerbates, a world of uneven development (Rabari and Storper 40).

While Rabari and Storper and Shelton et al. are frugal with optimistic objections, Hollands ended his article on a light, cautiously hopeful note. The remaining authors of

this special collection are more liberal their optimism. The two *theoretically* optimistic authors are Robert Goodspeed in his “Smart Cities: Moving Beyond Urban Cybernetics to Tackle Wicked Problems” and Luís Carvalho in “Smart Cities from Scratch? A Socio-Technical Perspective.” Each of these authors takes to heart Gasmeier and Christopherson’s recognition that “we can’t just lend critique to the situation. We have to be willing and able to get in, roll up our sleeves and discover how new applications and technologies can be used to genuinely improve the quality of urban life.” After dismissing the corporate-driven smart city, Hollands argues for *alternative*, citizen-empowered smart city initiatives.

Goodspeed concurs with this cautious optimism, demonstrating how smart cities can tackle “wicked problems” by eschewing the urban cybernetics of corporate-driven smart city solutions, and instead turning to local innovation and stakeholder participation. Indeed, these authors see *people* as fundamental to smart cities, since they subscribe to what Goodspeed identifies as a “*sociotechnical theory of action*,” which proposes an “*ensemble* view of technology.” “According to this perspective,” he says, “a smart city is not defined by IT alone, but also by the use of IT artefacts (such as databases, sensors and networks) embedded within broader organizational and social contexts” (Goodspeed 81). Those contexts invite scholars, planners, and communities to explore how ICT *fits* their local needs and cultural practices. Instead of global corporations peddling the same technology to cities and inhabitants across six continents, Goodspeed foresees a “place-based creative milieu to spark development of *effective* use of IT to address [context-specific] urban problems” (Goodspeed 87, emphasis added).

Lastly, these admittedly wicked and sticky aspects of urban politics and social processes are given full attention in Luís Carvalho’s article, in which he also employs a socio-technical lens to map both the drawbacks and potential promises of smart cities. He is particularly concerned about all of the technical, social and political processes that contribute to a radical shift in urban living. He fears that the greenfield developments of Songdo, Masdar City, and PlanIT Valley bypass the social and political milieu, which makes their actual physical construction quicker but stymies their spatial adoption in social and political circles. Indeed, his closer look at PlanIT Valley and Songdo reveal an eventual collapse in social and political support, precisely because the smart technologies

were contrived in a top-down manner. What is perhaps more appropriate are “technological transitions,” which “unfold through non-linear co-evolutionary processes between technological, social, political, and economic domains, taking place over long periods of time” (Carvalho 46). These changes stew in small “niches” (Carvalho 46), where innovations are cared to by *people on the ground*, including citizens and entrepreneurs. Key to the incubation of these innovative technologies are 1) technological learning, or the fine-tuning and implementation of new practices; and 2) societal embedding, or the adoption of new technology (Carvalho 47). Only then can new ICT solutions challenge, disrupt, and eventually replace outmoded urban regimes (Carvalho 57).

The remaining two articles of this special issue from *Regions, Economy and Society* forego questioning the validity of the smart city and instead jump right into the analysis of case studies, offering an urban planner’s perspective on the implications of smart city ICT (whereas the authors of the special issue from the *Journal of Urban Technology* were more interested in ICT’s implications for municipal managerialism). Dietmar Offenhuber, in “Infrastructure Legibility—A Comparative Analysis of Open311-Based Citizen Feedback Systems,” investigates how mobile apps might impact citizens’ engagement with municipal governance. Subscribing to Kevin Lynch’s notion of legibility, Offenhuber claims that no matter how interactive or well-designed a governance-focused app may be, citizens will *not* be able to participate unless they possess a reciprocal familiarity with the urban environment in which they live and to which that app ought to respond (Offenhuber 96). This condition forms the theoretical bedrock of the case study analysis. And it rings true in the findings—“most [app enabled] reports are submitted in the reporter’s own neighborhood” (Offenhuber 107), leading to the plausible conclusion that ICT enables more citizen engagement with the environments they know best.

P. Christopher Zegras et al. draw a similar conclusion in “Tracing a Path to Knowledge? Indicative User Impacts of Introducing a Public Transport Map in Dhaka, Bangladesh.” Here the authors explore how ICT enabled apps on smartphones do not so much distract users, as cantankerous interpretations of technology might lead us to believe, but instead *compliment* residents of Dhaka, Bangladesh’s ability to explore their

home city. With a “loosely organized and weakly regulated system of approximately 7000 buses and minibuses” in one of the largest megacities in the world, these subaltern scholars wondered how the smartphone—“a portable, high-powered personal computing, communication and sensing device with data and Internet connectivity”—might be deployed to “empower people in their urban environment” (Zegras et al. 114). Zegras and team geolocated the movements and routes of these 7000 buses and developed an app-based schematic bus map, “incorporating the design suggestions derived from on-the-street interviews” (120). Ultimately, the authors see this as an example of and express their hope towards the smart city being a movement that employs data to generate knowledge for the public good (Zegras et al. 125).

### **3.3 Rhetorical Findings—Assumptions, Expressions, & Basic Entities Recognized**

Like the “Rhetorical Findings” section for corporations, here I have tabulated my rhetorical findings of academic actors. In the primary table, the rhetoric of each academic actor has been assessed according to four key questions:

1. What are the basic entities recognized in this actor’s discourse?
2. What assumptions are made about the composition of or the processes that constitute cities? What is assumed to be “natural” about urban space?
3. Who are the agents in this actor’s rhetoric, and what power (or lack thereof) are they imbued with? What are their goals, or, alternatively, what might a powerless agent receive?
4. What are the key rhetorical devices, words, themes, and concepts employed by this actor when describing the smart city?

Note in the first table that I have assessed the entire special issue of each journal instead of each author(s) in those journals, given their common and overlapping themes.

In the second table, I have assessed each academic actor according to whether or not he/she/they take a neoliberal approach to smart cities or a citizen empowerment approach. I make the case that these are the two primary foci throughout the academic literature on smart cities. Note, too, that some actors are identified as subscribing to *both*.

It is these actors who I believe display the most balanced and nuanced perspectives on smart cities, their drawbacks, and their possibilities.

Lastly, the third table specifies whether an actor has a negative, positive, or cautious outlook on smart cities, and correlates that outlook with the pilot projects analyzed in his/her/their respective article. For those actors who seem to move across a spectrum of interpretation of the smart city, I have coded their outlook with two selections. For example, an actor who begins his/her/their article expressing concern and skepticism about the rhetoric of corporate actors, but ends the article exploring alternative possibilities for citizens, might be said to take a “cautious / positive” stance.

Table 3.1: Rhetorical Analysis of Key Smart City Academic Actors

Rhetorical Analysis of Key Smart City Academic Actors				
Actor	Basic Entities Recognized	Assumptions About the City	Agents & Their Motives	Key Rhetorical Devices
Townsend	corporations; individual citizens	the city is a contested space, with a pendulum of power swinging between corporations and everyday citizens	corporations pursue profit; citizens seek to better their lives	largely <i>either/or</i> portrait of smart city development, with corporate-led smart city marked by <i>standardization</i> , and citizen-led smart city marked by <i>empowerment</i> and <i>spontaneity</i>
Picon	corporations; individual citizens; planners who occasionally wield centralized power	the city is a site of compromise and pragmatism, where some core standardized services—e.g., mobility and energy—might be technocratically controlled, but citizens largely direct their own paths using smart technology	planners seek centralized control of core services; corporations and sovereign states have history of idealizing cybernetic control of society;	employs <i>false-dilemma</i> logic to move beyond <i>either/or fallacy</i> ; <i>intelligence</i> to suggest that dispersed sensors will add a layer of responsive infrastructure to cities; <i>historical analysis</i> of theoretical antecedents
Greenfield	corporations; individual citizens; their communities	cities are inherently complex and comprise multiple, competing actors; cities are tragic, in that controversy is inevitable	corporations pursue profit; citizens seek to better their lives	attention to how <i>rhetoric</i> equates with <i>power</i> and <i>perception</i> of future possibilities; <i>neoliberal</i> concerns
<i>Urban Technology</i>	citizens; corporations; democratic communities; academics	cities are democratically managed; that democratic control can be enhanced via technology; economic development serves the interests and needs of all parties	citizens and their representatives solve problems; the marketplace provides tools put to good use by those citizens and their representatives	<i>civitas</i> , which conveys how ICT can enable more active citizen participation in the governance of their shared spaces; <i>excitement</i> about the <i>empowering</i> possibilities of ICT
<i>Regions, Economy and Society</i>	citizens; corporations; democratic communities; academics	the urban space of cities is coveted by for-profit corporations; the collective space of cities must be protected by citizens and their representatives; urban problems warrant socio-economic solutions, not technological interventions	corporations pursue profit; citizens seek to better their lives; citizens <i>*may*</i> be able to wield technology to self-direct their projects, ideals, and collective goals	<i>caution</i> towards the promises of ICT solutions for urban problems; <i>skepticism</i> towards corporate marketing promises; <i>neoliberal</i> concerns

Many academic actors move beyond the myopia of corporations to include *individual citizens* and *communities* in entities recognized. Recall that most corporations spoke reductively of society, and when residents were mentioned, it was often in the context of consumption for their smart homes. I argue that these academic actors' conception of the city are more nuanced, with most actors recognizing that urban space is contested. Corporations are often portrayed as seeking profits, but some academic actors recognize that corporations can indeed provide useful tools that democratically charged citizens decide to deploy on their terms (not vice versa). Lastly, many of these academic actors themselves bring an awareness of rhetoric and discourse to their scholarship. When emphasizing specific themes, one notices a focus both on neoliberalism and citizen empowerment.

Table 3.2: Authors and Their Predominant Interpretations of Smart Cities

Authors and Their Predominant Interpretations of Smart Cities		
Author	Neoliberalism	Citizen Empowerment
Anthony Townsend	Y	Y
Antoine Picon	Y	Y
Adam Greenfield	Y	N
Allwinkle & Cruickshank	N	Y
Deakin, Lombardi, Cooper	N	Y
Kuk & Janssen	N	Y
Leydesdorff & Deakin	N	Y
Caragliu, Del Bo, & Nijkamp	N	Y
Cruickshank	N	Y
Glasmeier & Christopherson	Y	Y
Shelton, Zook, Wiig	Y	N
Rabani & Storper	Y	N
Carvalho	N	Y
Hollands	Y	Y
Goodspeed	N	Y
Offenhuber	N	Y
Zegras et al.	N	Y
Kitchin	Y	N
Y = "Yes" N = "No"		

The two predominant foci of academic actors seems to be neoliberalism and citizen empowerment. Some scholars construe the smart city as simply the next move of neoliberal socio-economics, whereby public space is privatized or, worse, that privatized space becomes reserved for the economic and social elite. Other academic actors, however, tend to interpret the smart city as a suite of technologically-enabled grass root tools that might empower democratic activism. They thus speak of the smart city as a means to empower ordinary citizens. A few scholars' writings cross the spectrum of interpretations, recognizing the neoliberal proclivities of current smart city discourse and practice, but holding on to a hope that the power of its tools might ultimately reside with the citizenry.



Table 3.3: The Outlook and Breadth of Smart City Research

The Outlook and Breadth of Smart City Research						
Scholarship	Interpretation	Smart City Case Studies Mentioned in Publication				
Author(s)	Negative; Positive; Cautious	Songdo	Masdar	Rio de Janeiro	PlanIT Valley / Living PlanIT	Other
Anthony Townsend	Positive	Y	N	Y	N	Y
Antoine Picon	Cautious; Positive	Y	Y	Y	Y	Y
Adam Greenfield	Negative	Y	Y	Y	Y	N
Allwinkle & Cruickshank	Positive	N	N	N	N	Y
Deakin, Lombardi, Cooper	Positive	N	N	N	N	Y
Kuk & Janssen	Positive	N	N	N	N	Y
Leydesdorff & Deakin	Positive	N	N	N	N	Y
Caragliu, Del Bo, & Nijkamp	Positive	N	N	N	N	Y
Cruickshank	Positive	N	N	N	N	Y
Glasmeier & Christopherson	Cautious; Positive	Y	Y	Y	N	Y
Shelton, Zook, Wiig	Negative	Y	Y	N	Y	Y*
Rabani & Storper	Negative	Y	Y	Y	Y	N
Carvalho	Cautious; Positive	Y	N	N	Y	N
Hollands	Negative; Cautious	Y	Y	N	Y	Y
Goodspeed	Cautious; Positive	Y	Y	Y	Y	Y
Offenhuber	Positive	N	N	N	N	Y
Zegras et al.	Positive	N	N	N	N	Y
Kitchin	Negative	Y	Y	Y	Y	Y*

\*While Shelton, Zook, & Wiig and Kitchin have been marked as mentioning "Other" smart city projects, one should note that Shelton, Zook, & Wiig's "Other" **only** addresses IBM's smart city challenge, and Kitchin only name drops small European smart city projects at the end of his essay to remark that, moving beyond the neoliberal, negative critique, scholars and corporations should work closely together to monitor the effects of more equitable smart city pilot projects.

Ultimately, an actor’s stance on a smart city can be read as negative, positive, or cautious. Of course, some actors sway between two dispositions, often beginning on a cautious tone, but carefully migrating towards tepid optimism of smart cities’ possibilities for everyday citizens.

I have correlated academic actors’ overarching dispositions with a catalogue of the smart city pilot projects addressed in their respective essays. I have tabulated the four most common pilot projects mentioned in this academic literature, which also happens to be the quintessential smart city pilots one might hear or read about in more casual conversations on smart cities. Another category is “Other,” which might include one of the hundreds, if not thousands, self-declared smart city projects around the world that has unfortunately received little press compared to the four more successfully marketed ones.

A revelatory finding is that all but one of the actors who adopt positive interpretations of smart cities draw upon Other pilot projects in their essays. Conversely, those actors who adopt hardline, negative views of smart cities tend to focus exclusively on the four most popular (and most derided) smart city pilot projects. When those actors with negative dispositions toward smart cities do address Other pilot projects, this material, in my estimation, tends to be shallow and often focuses on projects implemented by large corporations like IBM, as opposed to government- or citizen-led projects.

### **3.4 Discussion**

In this section, I seek to expand my rhetorical findings with the underlying theory I sense in these academic actors—neoliberalism. With the help of it and a few other theories explained in my “Theory” section, I seek to connect dots about the motives, ideologies, and assumptions lying behind the analyses of these academic actors.

If I had to identify a common theme throughout much of the academic discourse above, it would be *caution* and *concern*. That is, many of the authors above, especially in regards to the monograph authors and the writers in the *Regions, Economy and Society*, express concern about the discourse and intent behind “canonical” smart cities, and try to preempt that rhetoric with cautious explorations of better narratizations of what the smart city could be.

This caution arises from many authors’ understanding of and appeal to the theory of neoliberalism. As seen in the table in the rhetorical findings section above, a majority of the articles I summarized in the literature review steep at least part of their analysis in neoliberalism. Given the money to be made and the accrued value of the infrastructure that could potentially be replaced with ICT and sensors, these smart city observers and researchers have legitimately found similarities between the discourse of smart cities and the discourse of neoliberalism.

Most of these critics pay homage to David Harvey and Neil Brenner, if not explicitly by name, then certainly in the concepts they employ or the references they make in their bibliographies. Harvey, in his definitive guide to neoliberalism (2005), explains that “neoliberalism is in the first instance a theory of political economic

practices that proposes that human well-being can best be advanced by liberating individual entrepreneurial freedoms and skills within an institutional framework characterized by strong property rights, free markets, and free trade. *The role of the state is to create and preserve an institutional framework appropriate to such practices*” (Harvey, *A Brief History* 2, emphasis added). Neoliberalism, Harvey recounts, festered and grew in a few geographic locales; but through free trade and global finance, especially debt-issuance and its attendant debt-restructuring, neoliberalism became the privileged strategy of the global economy. Harvey declares its true status when he says that “neoliberalism has, in short, become hegemonic as a mode of discourse” (Harvey, *A Brief History* 3). And as I have made clear I hope in the theory section of my thesis, discourse *matters*, literally.

Harvey’s theory of neoliberalism, then, could actually explain the smart city movement on two levels. First, because neoliberalism is now a global discourse, states, and increasingly rather cities, must compete against each other in the publicly-financed recruitment of global capital. What better way to recruit multinational corporations than to claim that your city is “smart,” lubricated by the wheels of digitalization and information and community technology? Given the ever-uphill battle against falling rates of return, relocating to cities built upon an infrastructure that boosts worker productivity—that is, where everyone is an entrepreneur, mobilizing every second as a means to produce and innovate—makes all the more sense. But just as entrepreneurs must compete against each other in the marketplace, so, too, must cities now compete against each other on the global stage of recruiting corporate headquarters and regional offices, which wander the world like itinerant pan-handlers, constantly in search of the best deal.

Second, neoliberalism might suggest that the smart city movement is simply another iteration of the “financialization of everything” (Harvey, *A Brief History* 33). And so, when Anthony Townsend recounts that the smart city and internet of things (IoT) markets could total \$650 billion annually by 2020, and when McKinsey and Company reminds us a smart grid in the United States could potentially generate an annual value of \$130 billion by 2019 (Booth et al. 4), and when another McKinsey and Company study speculates that big data applications in Europe alone could become a \$250 billion per

annum industry (Li et al. 11), it is no surprise to discover why the likes of IBM, Siemens, Cisco, Hitachi, Panasonic, and others have their mouths watering at replacing urban infrastructure. Their being at the table confirms a [possibly] dangerous trend in cities under the aegis of neoliberalism: there is no such thing, or no need for, public goods; everything must be privatized, everything should generate monetary value.

Neil Brenner echoes and extends Harvey's concerns about neoliberalism and urban redevelopment in his research. In the co-authored essay of his edited collection *Spaces of Neoliberalism: Urban Restructuring in North America and Western Europe* (2002), Brenner and Nik Theodore explore the basic premises of "actually existing neoliberalism." The third premise of their argument relates to the first concern that I attached to Harvey's understanding of urbanism, neoliberalism, and smart cities—the premise of uneven geographical development. I quote Brenner and Theodore at length:

Each round of capitalist development is associated with a distinctive, historically specific geographical landscape in which some places, territories, and scales are systematically privileged over and against others as sites for capital accumulation. The resultant patterns of core-periphery polarization and sociospatial inequality exist at all spatial scales; their contours are never inscribed permanently upon the geographical landscape but are continually reworked through capital's dynamic of uneven spatial development (Harvey 1982; Massey 1985). Uneven development is endemic to capitalism as an historical-geographical system: it is a key expression of capital's relentless drive to mobilize particular territories and places as forces of production; it is a basic geographical medium through which intercapitalist competition and class struggle are fought out; and it is an evolving spatial-institutional scaffolding within which processes of devalorization and revalorization unfold (Smith 1984).

(Brenner and Theodore 8)

The smart city, then, is a site of privilege. ICT, sensors, and the efficient and effective infrastructure that they allow simply augment the capability of for-profit corporations to extract even more surplus value not only from people, but also from the systems that

support people, especially after neoliberal policies privatize those urban infrastructure systems.

The concern about uneven geographic development has been raised before in architecture and design, even without reference to the difficult task of clearly articulating the neoliberalization of cities. Mike Hodson and Simon Marvin (2013), in their essay “Transcendent Eco-cities or Urban Ecological Security?” cast a skeptical eye upon eco-cities, wondering if eco-city design simply will not be subsumed into the current political-economic system. That is, eco-cities might allow dominant financial urban cores to continue growing economically and politically, all the while shielding the city from the adverse effects of global climatic and environmental change and social unrest. Eco-city design, then, becomes more akin to the superficial “bio-dome” design, isolating the city from the rest of the biosphere and global weirding (Marris 2011).

Hodson and Marvin use the phrase “ecologically secure gated communities” to describe this phenomenon, thereby suggesting that eco-city design currently has rhetorical and teleological similarities to the policy of “ecological security,” which governments speak of when seeking to “safeguard flows of ecological resources, infrastructure, and services at the national scale” (Hodson and Marvin 212). *Urban* ecological security, likewise, seeks to “reconfigure cities and their infrastructure in ways that help to secure their ecological and material reproduction—that is, their capacity to secure the resources (such as water and energy, but also waste disposal and protection from flooding) required to assure their continued economic and social development” (Hodson and Marvin 213). Thus, smart cities could be construed as the reconfiguration of urban infrastructure for the purposes of securing some cities’ positions as epicenters of global capital movement and investment.

To return to Brenner and Theodore’s essay, then, we begin to see why the scholars I reviewed above have construed the smart city as an apparatus of neoliberal experimentation. Calling attention to the “creative destruction” of neoliberalism, a dialectical tool for better understanding its spatial implications (Brenner and Theodore 15-28), Brenner and Theodore note as an example “the privatization of infrastructural facilities” (Brenner and Theodore 27). With one swipe, this action reduces to ashes the public monopoly “for the provision of standardized municipal services” (Brenner and

Theodore 23); but from those ashes arise a moment of creation—“creation of privatized, customized, and networked urban infrastructures intended to (re)position cities within supranational capital flows” (Brenner and Theodore 23). So, yes, while the smart city is new, creative, innovative, and cutting-edge, behind that “smoke screen” lies an ideology that does not hold the public good close to heart; rather, its an ideology that privileges the corporate accumulation of capital.

As we see in the tables in the findings section, though, I do not think we can dwell solely on the pessimistic rhetoric informed by the awareness of neoliberalism from the smart city academic actors I reviewed in this paper. Obviously, many authors see an explicit benefit in smart city interventions that serve the public good. Alternatively, some authors first acknowledge the neoliberal dangers of the smart city narrative occupying public discourse today, but then cautiously express optimism that other narratives could overtake the dominant corporate narrative. This alternative narrative, according to my literature review above, focuses upon how ICT might empower citizens.

Whereas many of the corporate actors and pilot projects I analyzed (with the slight exception of FSST, I wish to maintain) spoke of smart city solutions managerially, whereby cities can be seen, monitored, and tweaked so long as “all” of the variables are known and connected to an ICT mainframe, these scholars who proposed countervailing narratives see ICT as “convivial tools” for ordinary citizens of urban spaces (Illich). If corporate actors see ICT as a means to accumulate capital in urban space (Merrifield’s process of urbanization), then these opposing interpreters of smart cities envision ICT, advanced analytics, and big data as a means to augment people’s social, economic, and cultural capital (Merrifield’s process of urbanism).

These networks of interaction, exchange, sharing, helping, learning, support, development, resisting, and adaptation already exist; ICT merely augments these existing networks’ capacity, resilience, and extent. In this light, the smart city narrative of citizen and democratic empowerment might very well be seen as a 21<sup>st</sup> century instantiation of what Ivan Illich meant by convivial society, “in which modern technologies serve politically interrelated individuals rather than managers” (Illich xii). The corporate smart city personifies Illich’s fear of overextended industrialism, which, draped across the fabric of urban space, “establishes a radical monopoly not only over resources and tools

but also over the imagination and motivational structure of people” (Illich 96). The citizen’s smart city, however, proposes the opposite, whereby democratically controlled tools of information and communication technology provide a platform for “autonomous and creative intercourse among persons, and the intercourse of persons with their environment” (Illich 11).

With Songdo or PlanIT Valley or IBM’s quintessential smart city, Illich foresees a nightmarish hell, where, “enveloped in a physical, social, and psychological milieu of his own making, [man] will be a prisoner in the shell of technology, unable to find again the ancient milieu to which he was adapted for hundreds of thousands of years” (Illich 54). Perhaps, though, the vision of a *people’s* smart city, as expressed by Townsend, Picon, Allwinkle and Cruickshank, Deakin et al., Kuk and Janseen, and many other authors above, will help urban residents to express their “right to the city,” their “right to participate in urbanity, the right to appropriate the city not merely as an *economic* unit, but as a *home* and as an expression of lived experience” (Merrfield 156, emphasis added).

## 4.0 Conclusion

The smart city, we have seen, is not necessarily *one* thing, force, movement, or idea. Rather, the smart city is a rhetorical space in which competing factions attempt to narrate their own conception of the smart city. These unique conceptions belie underlying assumptions, interests, and goals about cities and the entities / forces that comprise cities. By drawing attention to the importance of how rhetoric and discourse shape our perception of smart cities, and therefore our understanding of how information and communication technology might serve urban spaces, it is my hope that actors in this field might equip themselves with the knowledge to make informed decisions.

Why ought we be concerned with how cities develop? I find it helpful to recall a few pertinent statistics about cities:

- 1) Cities are responsible for 60-70% of GHG emissions; their main sources of GHG emissions stem from the use of fossil fuels, for electricity generation, transportation, “energy use in commercial and residential buildings for lighting, cooking, space heating, and cooling,” industry, and waste disposal (United Nations Habitat, “Cities and Climate Change” vii).
- 2) 90% of the world’s population growth will occur in developing countries (United Nations Habitat, “Cities and Climate Change” vii). 50% of the world’s population currently lives in urban areas, and 60% will by 2030 (UN Habitat, “Urbanization and Structural Transformation” 3).
- 3) The cities of these developing countries will *triple* the size of their urban space between 2000 and 2030—an amount of land equal to *all* of the built, urban environment that existed in 2000 (Suzuki 1).
- 4) In 2011, there were globally 447 cities with a population of 1,000,000 or more; by 2020, there will be 527 (United Nations Habitat, “Cities and Climate Change” 2).
- 5) In the built-out cities of developed nations, massive investments are nevertheless still needed in infrastructure. The American Society of Civil Engineers gives the US government a D+ rating on its current infrastructure, and argues that it needs to invest \$3.6 trillion by 2020 (ASCE).



- 6) US residents emit, on average, 20 metric tons of CO<sub>2</sub>, whereas currently the Chinese emit 5 tons and the Indians emit 1 ton (Gleaser). To reach global, climatic stability, where planetary temperatures cease to rise precipitously year over year, scientists recommend *per capita* CO<sub>2</sub> emissions of 4.5 tons.
- 7) Cities account for 70% of global GDP, and 80% of future economic growth will occur in cities (UN Habitat, “Urbanization and Structural Transformation” 1).
- 8) Finally, while demographers are unable to predict the world’s population in the future, it seems increasingly likely that the world’s population will stabilize some time between 2050 and 2100 (UN, “World Population 2015”), after which, we can assume, cities as they are will suffice for accommodating future humans.

To quote economist Paul Romer, we are literally building the cities that humanity will live in for centuries (Qtd. in Townsend 284). As I stated in the theory section of this thesis, rhetoric *matters*, in the most literal sense of that word. Rhetoric can be said to *build* cities. Rhetoric determines the contours, design, and functioning of any city. Given the importance of cities to our collective well-being and our species’ continued survival and development, urbanites should concern themselves with this ascendant rhetoric of “smartness” in order to steer it towards the most optimal and equitable outcome.

Just recently, for example, I attended the Housing + Health Summit in Austin, TX. During the lunch panel, the moderator Sherri Greenberg, who has conducted research into smart cities on behalf of IBM, stoked a conversation about smart cities. Between her and the three panelists—a Chair of a medical school, an advisor to a mayor, and a director at a local housing authority—I recorded *at least* five different conceptions of what constitutes a smart city, with the most reductive being “it is *not* a dumb city.” This hodgepodge of conflicting and sometimes nonsensical definitions is dangerous because, again, language matters. If our definitions of key concepts that increasingly hold sway in municipal governance are messy, will not our cities therefore develop haphazardly? Or worse, be co-opted by powerful entities who see this muddled rhetorical mess and capitalize upon it to serve their own interests?

To avoid such a pernicious outcome, I would like to conclude this thesis with a proposal for future research. I believe that urban researchers, enthusiasts, and hobbyists

need to build a shared database of all projects that purport to be smart cities. We need a common set of metrics that can be applied to each one. I have not done this, given that my research has focused exclusively thus far on reading the rhetoric of smart cities. But in order for the academy and the profession of urban planners to understand smart cities holistically—their pitfalls, their dangers, their promises, and their successes—we need to watch them all closely, measuring for certain important outcomes. Local researchers in the US, parts of Europe, Brazil, India, Korea, China, and Japan (places where I have seen most clearly the rhetoric and practice of smart cities) should all work to create profiles of every smart city project underway. Collected together, these profiles would provide a helpful, crowd-sourced site of information for businesses, public leaders, academics, and curious citizens and activists, all of whom are eager, I believe, to answer a key question: “what do smart cities actually do?”

Here I propose what these profiles should consist of. I cannot reiterate enough how much “rhetorical steam” the smart city currently has as a discourse. A search through an academic database for “smart city” will yield thousands of leads, whereas a search through Google’s search engine will yield millions. But that breadth of content does not necessarily translate into depth, of seriously wrestling with the implications and outcomes of existing smart city technology and pilot projects. Applying this same investigative rubric to instances of the smart city, I believe, would further the conversation.

Table 4.1: Opportunities for Future Research

Research Questions	Metrics	Significance
Do smart cities actually limit GHG emissions?	CO2, Methane emissions, and other GHG emissions per capita.	Determines whether or not smart cities are actually responding to core challenge: solving climate change, and creating carbon-neutral economies.
How do smart cities impact land development trends?	Commuting behaviors; impervious cover per capita; weighted density of smart city development.	Clarifies how the smart city might impact land development trends. Is it more protective and efficient of critical nonhuman habitat? Or is it just as consumptive of land as American style sprawl?
Does smart city technology improve the efficiency of city infrastructure?	Water usage per capita; energy usage per capita; commuting behaviors; cost/benefit analysis of smart interventions in infrastructure.	Identifies components of urban infrastructure that might actually be made more efficient through the use of advanced technology. The cost/benefit analysis of interventions is the most significant and important metric, I believe, for evaluating smart city technology.
Are smart city residents more aware of environmental issues and urban spaces?	Responses to a pre-set questionnaire gauging concern for the environment and awareness of urban networks.	Given the “biofeedback” and instantaneous data-formation of smart cities, are smart city residents actually “smarter” about their surroundings?
Does the smart city catalyze and maintain social involvement and cohesion? Is it equitable?	Household annual income; household annual expenses; education and demographic (race and age) statistics.	As mentioned already, a danger of smart cities is that they become ecologically secure, gated communities. It is vital that the equity of smart cities be evaluated. If the smart city is not for everyone, then it will merely follow the trajectory of all previous technoutopias: failure.

When a smart city intervention occurs in an existing city, or when a smart city pilot project or development is constructed, researchers should be there immediately with this “toolkit” of questions. In order to properly evaluate the rhetorical claims (or chaos, depending on your perspective) of the smart city, the comparison should always be statistics for the same urban space before the smart city intervention. For example, if a

city is going to launch a demonstration site on the use of smart water meters and sensors, then per capita water usage should be known *before* it is measured after the intervention. Those prior metrics must be compared to post-intervention metrics.

I eagerly await researchers—ideally cadres of graduate students at urban planning and urban design programs throughout the world—devoting their time and resources to asking these questions. As I share in the table above, the most important metric to be applied to these questions is the cost/benefit analysis. “What is the actual cost of these technological interventions, and what are the measurable benefits?” we should ask.

When possible, I propose that a monetary value be attached to these measurable benefits. For example, if a smart city intervention removes more individually-owned automobiles from the road since software-enabled ride-sharing allows commuters to maximize seat space in existing cars, then that improved efficiency should be monetized—how do road maintenance costs improve since fewer cars are being used to shuffle people around? How much can we reduce highway expansion costs since we are beginning to maximize the efficiency of existing road infrastructure? How much money can each household on average redirect to other sectors of the economy since they are no longer purchasing their own vehicles (a significant cost, in regards to both fixed and variable capital)? If the dominant rhetoric propelling decision-making in regards to urban functions and environmental concern revolves mostly around money, then we should place equivalent monetary values on the ramifications of smart city interventions.

Based on my visits to smart city pilot projects in Japan, and based on existing data that supports this notion that technology can both improve the quality of life (both human and more-than-human) while decreasing humans’ adverse impact upon the environment (GHG emissions, land consumption, etc.), I find it hard to hide my excitement about smart city technology. I do believe that it is better and preferable to urban and exurban development as it occurred in the 21<sup>st</sup> century in North America and in countries that replicated the “American way.” I also believe that, despite the warnings and concerns from the academy about smart city technology, the discourse of “cities being smart” or “getting smarter” and the suite of tools offered by corporations to accomplish that *will continue to grow*, until it becomes part of urban development’s hegemonic paradigm. Nevertheless, our job as researchers is to offer a neutral declaration on the effects,

impacts, and expected trajectories of smart city technology, and we cannot do that unless we *measure* interventions. While “theoretical analyses” have their place in our grappling with this new layer of infrastructure, they alone cannot evaluate this change in urban form and function entirely. Active monitoring and measuring tell the fuller story.

I am hopeful it will be a good story.

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