

Creating “Smarter” Cities through Human Involvement

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Worldwide, 50% of people live in urban areas. This number is projected to jump to 70% by 2050. Overcrowded cities are rapidly being physically expanded in an “unsustainable sprawl”, that continues to put added “pressure on land and natural resources” (*World Bank Overview*, n.d.). In addition to physical resources, larger populations make it increasingly difficult to properly address the needs of a city’s constituents. City leaders, unsure of how to address this phenomenon, look to technology for more efficient resource handling and citizen management. Often, these leaders become allured by the idea of smart cities, an alleged opportunity to partner with tech giants to “leap into the future”. While smart cities present an intriguing solution to a looming issue of resource management, corporate driven smart cities developed without public input overstep the role of technology in a community. Human driven smart initiatives provide constituents the opportunity to have their voice heard, but cannot be solely driven by the educated and interested proportion of citizens. Smart cities can only truly exist when human driven smart initiatives are implemented alongside creative community outreach and true participatory urbanism. Through analyzing smart city initiatives in Boston, Massachusetts and Nice, France, a case study approach is used to determine how varied constituent involvement impacts smart city outcomes.

Smart City Connotation

Skepticism about the effectiveness of smart cities has become common since the term emerged in the 1990s. Originally, it was used to refer to cities who utilized information and communications technology (ICTS), but the phrase “smart city” has remained somewhat vague (Soderstrom et al., 2014). Hollands (2008) states the phrase has “a rather self-congratulatory tendency”, the term “smart” providing the implication that its technical implementations are

inherently efficient and good. This is a dangerous implication, as it provides unjustified support for a field of technology with few limits and high data sensitivity. By viewing these technologies as smart, we can quickly be distracted away from the lack of results and high levels of daily intrusion that may result from them.

“Smart” has proved to be a misnomer in numerous examples of these cities. While smart cities often pledge to making progress towards “economic growth” or “societal growth”, broad claims can be difficult to quantify and analyze. For example, Singapore and San Diego, both early adopters of smart technology, suffered from increasing wage gaps during the peak of their technological growth (Hollands, 2008). While this is only one metric of improvement for the cities, it signals that these smart cities may not be equally addressing the needs of its constituents. Rising poverty rates in these cities further show an uneven distribution of “smart” benefits that seem to exclude those who could benefit from it most. Hollands states that these red flags for inequity are not solely shown in economic metrics, and can be seen in other aspects of smart city life. In Edmonton, an aspect of their smart city approach is to create “an exceptional arts and entertainment scene”. These arts initiatives inevitably cater to the “knowledge-based employees” these cities aim to attract for their smart city, leading to social exclusion for those outside the target audience. Examining flawed initiatives and approaches provides the groundwork for better understanding how these smart cities failed to properly serve their communities and how we can transition to “smarter” cities.

Introducing Differences Between Boston and Nice

To evaluate smart city failures, it’s necessary to consider what actors are driving technological growth. This development is typically driven by the producers of smart technology, as competing corporations look to propose solutions for problems that may not even

be relevant to the community (Eurocities, 2012). Kummitha (2018) described this as the techno-driven method (TDM), where the smart technology is pushed into smart cities through lobbying pressure by the corporations producing the technology. This method leads to rapid growth with outside corporate partners, but lacking constituent involvement leads to misaligned solutions. In contrast to the TDM, the human driven method (HDM) provides citizens the ability to incorporate technology as the needs of their society demand. This involves providing the opportunity for citizens to have a voice in the process and be the drivers of smart initiative projects. Individual cities would have the opportunity to personalize their smart immersion to the level that properly fits their community. Despite the seeming advantages of the HDM for true societal improvements, the TDM remains in favor for the tech corporations, such as IBM, who in 2013 relied on smart technology for 25% of their revenue and 3 billion dollars in revenue (Hollands, 2013). This number will continue to grow as “smart” technology has begun to involve itself in every face of our lives. There’s inevitable balance to be determined with the necessary investment needed from tech companies in smart city implementations and the emphasis for proper constituent input with any project.

The conflict between the technology producers and technology users is clear, and leads to smart cities that are not properly designed for its people. By doing a case study on a city like Boston, which has had success with participatory urbanism and solving “real problems for real people”, as well as Nice, France, who encourages “innovation to monitor and manage all elements of the city” (*Boston Smart City Playbook — from the Mayor’s Office of New Urban Mechanics*, n.d.) (*Nice & Smart City*, n.d.). By contrasting specific aspects of the smart city initiatives in the human driven approach of Boston and the techno-driven approach of Nice, it’ll reveal the consequences of a techno-driven smart city and how these issues can be remedied in

the approaches. Additionally, in the analysis of Boston, it will be important to explore how the smart city caters to not just technologically literate constituents, but also the silent majority of citizens who take a backseat in development but are most affected by these projects.

Analyzing the Cities' Backgrounds

Prior to analyzing the two cities and their smart initiatives, it's important to provide geographical and demographical background on each city, in order to better understand each city and its decisions in context. This background can help provide information into why these cities differ in their methods and project results.

Home to over 30 colleges, universities and community colleges, Boston is a highly educated and young city. 51% of residents over age 25 have at least a bachelors degree, and 34% of the population is between the ages of 20 and 34, providing Boston the highest concentration of millennials among the largest U.S Cities (*City-of-Millennials-2017.Pdf*, n.d.)It's important to consider that the young, educated demographic provides Boston with a largely technologically literate citizen pool, one that seems as though it could easily be tapped into through smart city projects.

On the other hand, Nice, France has a very different demographic and geographical setting. The metropolis of Nice Côte d'Azur (NCA) is a group of 49 municipalities that stretches from the coastal city of Nice towards the mountains to the North (*Métropole Nice Côte d'Azur - Une Croissance Démographique à Retrouver - Insee Analyses Provence-Alpes-Côte d'Azur - 7*, n.d.). This metropolis is split into three parts. The southern portion, which contains the city of Nice, contains 84% (450,000 residents) of the population and is very densely populated along the coast. The central portion Moyen-Pays has 72,000 occupants, most of which are family units, and then the northern portion Haut-Pays, which makes up 75% of the land area of the NCA only

houses 12,000 people (very mountainous and landlocked). When contrasted to comparable territories in France, the NCA has an overall aging population as well as less educated youth, which tends to signal a less technologically literate constituent group. In the early 2010s, the NCA has lost population to neighboring territories due to a plethora of issues such as housing costs, aging, and undereducation of youth. As mentioned in the introduction, struggling areas are often the places that are most likely to turn to corporate-led smart city implementation, and in the next section, the different approaches for both Nice and Boston will be explored.

Smart City Approach and Handling of Stakeholders

Based on these two cities' backgrounds, it's clear their needs in a smart city may differ and that one size doesn't fit all for smart technologies. Boston, with its heavily educated and growing young population, will likely have much more interest and varied voices in their smart city initiatives. Additionally, there is not a strong pressure on Boston city leaders to produce immediate or overwhelming results as the city thrives. Boston's smart initiatives are driven by the "Boston Smart City Playbook", a document that aims to dissuade frivolous data collection projects and profit seeking behavior in their smart infrastructure (*Boston Smart City Playbook — from the Mayor's Office of New Urban Mechanics*, n.d.). The 6 "plays", which include "stop sending sales people" and "solve real problems for real people" serve as commandments for smart initiatives in Boston, and help to provide a simple guide for understanding the goals of the goals of their smart city implementation.

In contrast, with an aging, decreasing population, the situation for city leaders in NCA was more worrisome and largescale. While it doesn't follow the typical problem of city overcrowding, resource management and citizen quality life are still important aspects in this situation. Seeing digital innovation as a clear solution to the issue, NCA leaders advocated for

small scale smart projects and after making contact with a local IBM office, they entered the IBM's Smarter Cities Challenge in 2011 (Veltz et al., 2018). This led to a three-year R&D partnership with IBM to better manage the city's data in order to promote "interoperability and accessibility of data". However, this accessibility is not for individuals, but for public works and city departments to access in order to improve overall efficiency. This non-human centered approach continues in the territory descriptions on the NCA site, stating that their goal first and foremost is to support entrepreneurial success and creation of jobs in the NCA (*Nice & Smart City*, n.d.). While quality of life is mentioned in later paragraphs, it seems as though its expected as a byproduct or trickle-down result of the economic and behind-the-scenes work of corporate partners and city leaders, rather than a true focus. However, as has been discussed in previous literature (Hollands), this technological push often leaves citizens with much to be desired as the corporations profit motivated behavior takes over.

Investigating Smart Projects

To get a better understanding of how these approaches impact the implementation of smart projects, we'll look at the Boston Smart Streets Project, a project that aimed "to learn more about how people navigate and interact on and with the City's Streets", with Nice's Urban Environmental Monitoring (UEM) Project, which collects environmental data (air quality, pollen, weather etc.) in order to provide information for numerous services that are being tested for local residents, companies, and the local government (*Fiche-Urban-Environmental-Monitoring.Pdf*, n.d.) (*Smart Streets*, 2016). While the projects differ in their base project statements, they both have the goal of utilizing environmental data analysis to improve the city overall.

Boston Smart Streets

The Boston Smart Streets Project is part of a larger plan called *Imagine Boston 2030*. *Imagine Boston 2030* details a “framework to preserve and enhance Boston”, discussing how different aspects of the city should adjust to help reach goals such as “affordable housing, accessible transportation, and a growing economy” (*Imagine20boston202030_pages2.Pdf*, n.d.). Additionally, the all-encompassing *Imagine Boston 2030* plan boasts the input of over 15,000 Boston residents over the two years the plan was created, showing clear human driven input into the future of the city. Within this plan, the Boston Smart Streets Projects leverages sensors to help limit the prevalence of serious or fatal automobile crashes in the city, as part of the international Vision Zero program, which aims to completely eliminate these types of crashes. The methodology and project design are transparently outlined on the “Smart Streets” project page online, explaining how they will accomplish the project and what insights it could reveal, such as “changing how we enforce traffic rules” or creating “better streets, sidewalks, or signage”. Additionally, it specifically mentions the city departments that are interacting on the project, providing resources to learn more about the departments and getting involved.

Despite the human-centered approach, Boston was not without a corporate partner in the initiative, as they teamed up with Verizon who would deploy the cameras and sensors at the intersections of interest. While this could be worrying as camera data is sensitive, Boston goes above and beyond not only in data privacy, but also in its transparency and easy to find information on the data collected. From the main “Smart Streets” webpage, there is explanation on the anonymity of the data as well as a disclaimer that Verizon will not use the data for commercial purposes unrelated to the specific project (*Smart Streets*, 2016). This partnership

allows the city to utilize resources it would not typically have, while ensuring the safety of a citizen's personal data and privacy.

While the project continues to work on eliminating fatal and serious crashes in Boston, improvements quickly began after the start of the project. According to Verizon, some of the improvements have included synchronizing crossing and signaling times at intersections, widening sidewalks, improving bike lanes, and raising medians(*Boston's Vision Zero*, 2017).

Nice Urban Environmental Monitoring

The Urban Environmental Monitoring project is a shared project by the NCA region authority as well as a group of private partners such as Veolia, Orange, M20 City, and IBM. The project involved the deployment of 3,000 sensors across the city in order to track different environmental metrics and to “explore new areas of intervention” (Veltz et al., 2018) From this data, the direct objectives were to save money on operating costs and resources, to reduce noise and pollution in public spaces, and to research and create jobs in their field. The main focus is economic with this action, as it's looking to become more efficient rather than looking for opportunities to accommodate the needs of the citizens. The Boston Smart City Playbook warned of “focusing on efficiency”, as it “assumes that we've already figured out what service to deliver to residents, and now just have to make it cheaper”(*Boston Smart City Playbook — from the Mayor's Office of New Urban Mechanics*, n.d.). It's important to not just look to improve current services, but also look to other services and methods that could be installed based on the data collected.

With Nice, the emphasis is on rapid and widespread technological progress, and this provides the opportunity for the corporate role to increase greatly while the public benefit decreases. For example, after their creation of an IBM data platform for Nice, various issues led

to it “not be taken up by the city departments it was intended to help” and that it “did not meet their immediate needs” (Veltz et al., 2018). This was at the conclusion of a three-year partnership with IBM, and showed that they failed to address the needs of the city. Despite these disappointing results, they still continued to partner with IBM for the Urban Environmental Monitoring Project, as Veltz claims interviewees stated the partnership had been useful in creating a futuristic image of the city. This improvement of the city’s image may attract new businesses and educated individuals, but it does little to help the current constituents. This trend continues with the UEM project, as it provides a testing ground for IBM and other tech companies while the region will experience increased job creation and the opportunity for start-ups relying on these data streams. While job creation and increased start-up opportunities seem like clear improvements for constituents, in a location with a mostly aging population, as well as an uneducated youth, these jobs are more likely to attract outsiders than to assist the current population. It’s clear that NCA leaders views it as easier and more efficient to bring new more educated business and individuals into the area than to provide the resources for their current population to become educated.

Citizen Involvement

Data Portals

An important aspect of the two smart cities to compare is the open data portals that they provide for citizens to access the collected data. Open datasets provide the foundation for citizens to become involved in the smart community and understand what these smart cities entail.

Nice’s Open Data Portal was established in 2014 to provide the data collected to the public. The portal claims to provide “useful” data to its population, but besides presenting the

datasets, the site provides very little other information (*Open Data NCA Nice Cote d'Azur*, n.d.). An outdated news section, redundant buttons and links on the site, and a non-user-friendly developers section make this data portal seem like a bare minimum rather than an opportunity for true citizen engagement. This may be partially by design with the current NCA demographic, which isn't consisted of groups who are especially technologically literate (Arduin et al., 2016). Arduin claims that the lacking education of its youth and aging population serve as a handicap for the city to attempt to involve them in the smart city development. While this hinders the process for Nice, disregarding and not encouraging constituent input creates cities that are unfit for its people and is not a reasonable alternative to a human centered design. By improving the data portal and providing training resources, Nice would give themselves an opportunity to begin solving issues of the community rather than solving issues of efficiency and serving corporate motivations.

Boston's open data portal and encouragement of citizen input serves as the core of its smart city development, providing datasets across all departments and topics (*Welcome - Analyze Boston*, n.d.). Additionally, there's showcasing of individual user projects and a section providing resources for how to access and work with the data provided. Compared to Nice, the site provides a much more modern feel and organizational structure that shows it's meant to be more than just virtue signaling. More than simply the data, Boston provides a direct line of communication to residents through the BOS:311 system, which allows citizens to self-report non-emergency issues such as potholes, graffiti, and other small issues to the city . By giving the typical person the power to easily participate in this "smart city", Boston provides the individual a sense of righteousness and paves the way for increased participatory urbanism.

Boston's Appeal to the Uninvested Citizen

It can be tempting to state that Boston only has this type of smart city success because of its educated and young demographic. While that clearly helps the city better accommodate their citizens, as they are more likely to participate in the development process, Boston has also focused on appealing to those who are not likely to involve themselves, specifically with their New Urban Mechanics department. For example, CommunityPlanIt was a pilot program to test how community involvement would work in a game-like environment where users earned participation points that they could then “spend” on a certain priority for Boston Public Schools (*Community PlanIt*, 2017). While this took place in 2011, the work by the department has continued with multiple projects highlighted in their 2020 review, including Robot Block Party, an event aimed at families to introduce them to AI and robotics, as part of their Beta Blocks Project. This project aims to better engage the public in smart cities, and focuses on maintaining Boston as a home, not a laboratory. This language directly objects the goals and mission of Nice, who prides itself on being an “open-air innovation laboratory”. The work by Boston shows that creating a true smart city is not impossible with proper citizen input and outreach to its constituents. However, in the case of Nice, a city that was struggling prior to incorporating smart technology, it can be easy to lose sight of the city's role in serving as a home for its citizens, rather than serving as a corporate testing site.

Conclusion

After comparing the two cities, it's clear that there is an easier path to “smart” in Boston, with the educated youth and overall young population. However, Boston continues past this interested population in hopes of engaging and educating those outside of this demographic group about technology and creating smarter cities. By providing and encouraging the avenues

for direct constituent involvement and putting humans at the center of the development process, Boston is well on its way to accomplishing a smarter city.

In Nice's case, their smart city seems to be attempt to attract a new, younger and more educated population, as well as the businesses and the economy boom that comes with that. However, there's a distinct lack of human involvement or any attempt to reach out to the current population base, leading to a smart city designed better for the city leaders than for the actual citizens. By not addressing their root problems and instead attempting to gain a cutting-edge reputation, they've failed to address the needs of the population. This is a concerning aspect of the plan, even for the economic future of Nice. With an influx of business and educated people hopefully resulting from this plan for the city, it brings the question of whether this demographic design will become more human-centered or if the corporate powers have already implanted themselves as the leaders of the smart city development.

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