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New York City's Environmental Policy Effectiveness- from the perspective of Technology

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Abstract

This case study seeks to examine the nature of technology in New York City on promotion of public participation and addressing sustainability problems of the future. The primary method of this research is literature review which combines government resources, online resources, and research journals to further understand the impact of technology on New York's Environmental policy making. New York has created a holistic plan to address the cities challenges and is leveraging technology in a number of ways to promote sustainability and inclusive policy making in the digital age. Although these technologies have contributed positively to New York reaching its goals there are also many concerns globally associated with their deployment. It is likely urban policy makers around the world will need to work together with technologists, businesses, and the public to understand the pros and cons of technologies and adjust to meet the needs of urban society in the digital age.

Key Words: Smart Cities, Smart Infrastructure, Disaster Resilient Society, Smart Government, Public Participation, Technology, Innovation, Policy Making

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Introduction

From a global perspective one of the biggest challenges in terms of sustainability is managing the environmental impact that cities have as evidenced by Sustainable Development Goal 11's focus on smart sustainable cities. The United Nations mentions that in 2015 around 4 billion people or 54 percent of the world's population lived in cities but this is expected to grow to 5 billion people by 2030. [1] It is well known that cities are often considered to have the biggest impact on the environment and that cities will need to develop smart and innovative policy plans to mitigate or combat this existential crisis. Many big cities have turned to a concept called Smart Cities which leverage technology to meet some of the urban challenges that cities face.

This case study examines the role technology plays in New York's environmental policy making process and its effect on promotion of Public Participation. First, the environmental challenges faced by New York City are presented. Then the city's environmental plan to tackle these challenges is reviewed as well as its elements of public participation. In addition, technology's impact on environmental policy and public participation as well as public concerns are examined from the perspective of New York. Lastly, this study comes to a conclusion on New York City's ability to leverage technology for Public Participation and Environmental Sustainability.

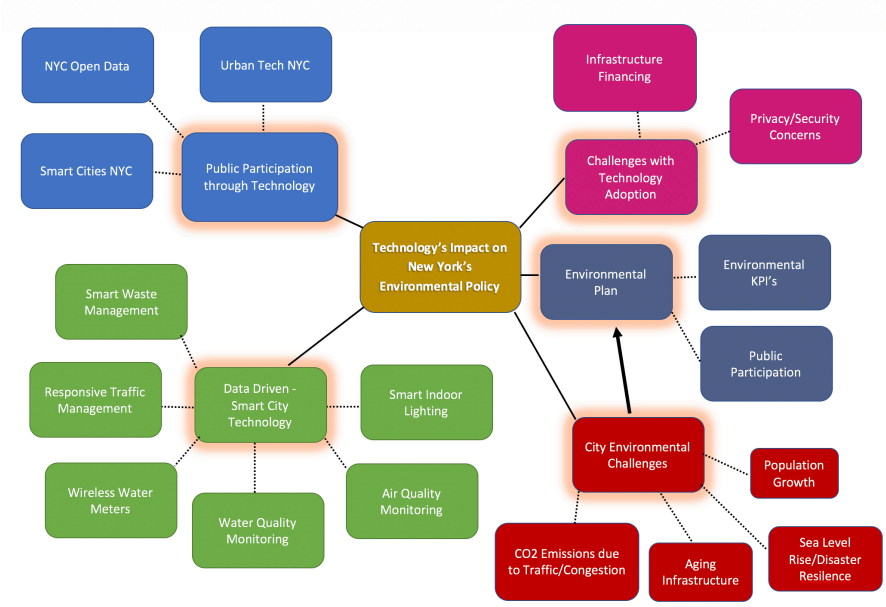

Figure 1: Mind map of Technology's Impact on New York's Environmental Policy

New York City's (NYC's) Environmental Challenges

Every city is unique, but New York has a plethora of its own challenges to solve related to the environment in which smart and public involved policy will be essential to overcoming.

New York's population is expected to grow from 8.4 million people to around 9 million by the year 2050. [2] This poses a challenge as with a growing population comes increased demands on basic infrastructure needs, resources, and increased CO2 emissions. New York as a city will need to be able to handle this growth and increased demand for services and resources in a smart manner to ensure the cities sustainability.

From the perspective of Disaster resilience, New York City is also surrounded by water at a low elevation and is at risk of future sea level rise due to climate change. New York already suffers from flooding during heavy rainfall as evidenced by Hurricane Sandy in 2012. According to the New York City Panel on Climate Change's Report in 2015, sea level around New York city has risen 12 inches since 1900 and New York City's future sea level rise projections exceed the global average. [3] This sea level rise due to global warming poses a threat to its population, infrastructure, and economy.

Vehicle traffic and road congestion due to many vehicles on the road is also a common problem in New York city that has some detrimental impacts on the environment. A study by Harvard School of Public Health found that road congestion has huge impacts on public health due to PM 2.5 levels which are impacted by emissions of vehicles. [4] New York City is quite congested from a road's perspective which poses further challenges for city wide air quality management and public health.

Lastly, Aging infrastructure and buildings is another challenge facing New York City often cited as a problem as many of these older constructions take up a great deal of energy use. According to Harvard Business Review, in the United States buildings consume 41 % of the total energy use but this figure jumps to 70 % in the case of urban centers like Chicago and New York. [5] It is important to create more efficient buildings and reduce emissions for further environmental savings.

The above challenges cannot be easily ignored as they have the potential for huge impact on the City of New York as well as the world. Further sections in this study will examine New York's Environmental Policy and how technology is being used to assist with their impact mitigation.

NYC's Environmental Plan

According to the Environmental Protection Agency (EPA), Public Participation is a process throughout the full lifespan of projects to inform the public and get input from them. [7] This section will review elements of New York City's environmental plan as well as how well public participation is incorporated throughout the process.

OneNYC is a holistic plan with 5 pillars including Growth, Equity, Sustainability, Resiliency, and Diversity & Inclusivity published in 2015 to solve all of the city's problems and challenges. [2] The mission statement states that the plan aims to make the city the most resilient, equitable and sustainable city in the world. [2] The plan from its creation to implementation seems to heavily incorporate public participation to drive better outcomes which will be covered below.

The plan was made through the consultation of various stakeholders including 7,500 new Yorkers through online survey, 800 New Yorkers through telephone survey, 1300 + residents and 40 community meetings, 177 civic organizations and 50 + elected official offices, 15 leaders from neighboring cities and counties, as well as 175 representatives from over 70 city agencies, and businesses. [2] This feedback from a wide variety of stakeholders was used to understand the problems facing people in the city and to outline areas of focus within the plan.

The Environmentally focused part of the plan is titled Sustainability which has 6 goals related to reduced greenhouse gas emissions, zero waste, air quality improvement, brownfields reduction, water management, and parks & natural resources. [2] Within each of these goals are specific targets that need to be met to achieve these goals. The city of New York also publishes yearly progress reports or indicators detailing how much progress has been made from all of their goals since the previous year. [2] According to the Innovation Policy Platform at the World Bank, measurement and evaluation help policy makers understand the impact of policies, evaluate effectiveness, enhance public accountability, and promote continuous improvement in policy administration and governance. [6] These Environmental Key Performance Indicators (KPI's) as I would define it help the city understand how far they are from their goals and can provide a feedback loop on how effective their policy implementations are as well as possible ways to improve. These reports also provide a degree of transparency to citizens as they can see how the city is performing in terms of its policy targets.

The consultation of citizens during the creation of the plan and its implementation as well as the transparency illustrated by their yearly progress reports shows the emphasis that New York

seems to place on Public Participation within their policy making process. In addition, according to the Environmental Protection Agency, Public Participation can often lead to better outcomes and better governance within the policy making process. [7] It is likely this incorporation of public participation in New York City's Environmental Policy as well as viewing their cities policy from a holistic perspective will help the city meet its targets in a more effective manner with less road blocks.

NYC's Utilization of Technology to meet Environmental Targets

In addition to utilization of Public Participation in the policy making process New York is also leveraging technology and innovation to meet its environmental targets stated above. New York has published a report through the Mayor's Office of Technology and Innovation titled Building a Smart + Equitable city which presents a multitude of case studies on New York's recent Smart City Technology developments. [8] New York was also awarded the Best Smart City Award in 2016 at the Smart City Expo World Congress in Spain. [9] New York seems to be aggressively leveraging technology to achieve these ambitious environmental policy goals/targets as evidenced by their global recognition and this report on their achievements.

In regards to urban development from a technological perspective, Smart Cities seems to be a term that has been receiving a lot of attention in the last few years. The term Smart Cities has many different definitions depending on who is asked but according to IBM a smart city is "one that makes optimal use of all the interconnected information available today to better understand and control its operations and optimize the use of limited resources". [10] Smart Cities can be defined simply as the convergence of technology and infrastructure to optimize urban services. Smart Cities are a holistic concept but can also be extended to specifically sustainability use cases when coupled with environmental sensors and data.

Some smart technologies examples published in New York's report include Smart Indoor Lighting, Wireless Water Meters, Responsive Traffic Management, Smart Waste Management, Water Quality Monitoring, and Air Quality Monitoring. [8] These data driven approaches allow residents to track their own consumption habits as well as their current environmental conditions to promote sustainable more comfortable lifestyles. The above use cases show clearly that New York is aggressively leveraging technology in the best way it can to improve life of its citizens while progressing towards its public policy goals and targets. These applications also promote

public participation as they let people take conservation efforts into their own hands and inform each individual on their own consumption habits.

NYC's Examples of Public Participation Through Technology

The city of New York is not only using Technology to meet its environmental targets but is also using it to promote more public participation within its city. In this new digital internet connected society we live in; public participation takes other more non-traditional forms and New York is implementing many initiatives to adapt to these changes. According to UNDP, recently governments are developing innovative tools to interact with citizens online and digital participation has the potential to greatly improve civil participation in segments which were historically unrepresented. [11] New York is promoting new forms of public participation in its policy making process through technology in a number of initiatives including New York Open Data, Smart Cities NYC, and Urban Tech NYC.

Many governments and organizations now collect data and open data is an initiative that allows the public access to this data which many places around the world have begun to adopt. New York has made all of their data public accessible from their New York Open Data portal online. [12] According to the Open Data Handbook, there are many benefits to the implementation of Open data including citizen participation, self-empowerment, and improved effectiveness in government services among others. [13] In the case of New York, the three main benefits to the city are a more informed public, data that empowers the public to create, and increased transparency and oversight. New York Open Data allows citizens to be more informed as it gives normal citizens the opportunity to look up statistics and data related to their community and direct environment. It also empowers citizens like entrepreneurs and data professionals with economic incentives to build innovative tools for the city to improve life for all. Lastly, it contributes to increased transparency as anyone can access all of the cities data including Environmental Datasets (Air Pollution, Water Quality, Traffic Flow Data Etc.) as well as current targets and progress.

New York's second initiative to promote public participation is called Smart Cities NYC. Smart Cities NYC is a yearly event where academia, businesses, and cities around the world gather to discuss cities of the future with a focus on public participation and inclusion. [14] This event serves to discuss best practices around the world while listening to the voices of all people to promote sustainability and technological driven smart living around the world.

An interesting initiative New York has been promoting recently is called Urban Tech NYC which seeks to promote innovation in New York City. Urban Tech NYC is sponsored by the NYC Mayor's Office of Tech + Innovation and according to their Mission is an "Entrepreneurship Ecosystem that facilitates innovation by supporting entrepreneurs who make the city more sustainable, resilient, and livable." [15] This project functions similar to an innovation lab which many companies in the private sector have been implementing as of recently to promote new technology development. All of these initiatives in some way contribute to the basic environmental plan and leverage technology use to promote public participation and a more sustainable city.

Smart Technologies Challenges/Concerns

Although these technologies have been bringing about a number benefits to the city as evidenced by their effectiveness in environmental savings there are a number of challenges related to their use globally.

One challenge is the initial cost associated with the development of smart city infrastructure. Smart Cities require sensors for data collection and other IT infrastructure to function. According to a Deloitte report titled the challenge of paying for smart cities, two factors cited that make financing of smart cities difficult include technology risk and difficulty in quantifying return on investment of projects. [16] As Smart Cities technologies and projects tend to be new it is unknown sometimes what their benefit is which can make financing them quite risky from a private and public perspective. Although the benefit may outweigh the cost in the long term, creating this funding may be challenging without all stakeholders on board in government and private sector involvement.

The second big concern is privacy and security as a smart city in principle now collects higher volumes of data about nearly anything which can be used to track daily citizens. There are huge concerns regarding data leakage as well as improper data usage. These concerns are echoed by the waves of legislation that have been passed around the world recently. Perhaps the most iconic is the EU's recently passed comprehensive data law data law called the GDPR which protects and empowers all citizens in regard to data privacy and collection. [17] If citizens are to feel at ease, the city will likely need institute data protection practices and also inform the public on how their data is being collected and used.

Although there are some concerns related to implementation of these technologies it is important for policy makers to weigh the pros and cons while taking into account the various stakeholders in our society. Although it is unknown what their impact will be, smart city technology has the potential to help us reach ambitious sustainability goals in the future. It is likely policy makers will need to work together with technologists and the public to ensure their smooth transition into daily life.

Conclusion

New York's Environmental Policy is quite progressive in the United States and it will be interesting to monitor whether their policy's implementation in conjunction with technology help them achieve their goals. Their method of defining of goals (Environmental KPI's) and yearly publication helps promote transparency and public participation in many stages from ordinary citizen to entrepreneur. New York's Innovative approaches for public participation in the digital age ensure they are not only a smart and sustainable city in the future but also a city that is desirable to live in for potential intellectual capital who could contribute even further to development of the city. Although technology's role in cities has been growing and does concern some citizens it is important to weigh the pros and cons or cost and benefits of these technologies as to not impede a possibly helpful technology for global sustainable development. Perhaps future cities require a holistic plan like New York City covering not only the environment to address sustainability challenges of the future as solving problems effectively often involves the cross section of many fields, expertise, and stakeholders.

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