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Wisdom of Crowds and Participatory Planning

Abstract

Wisdom of Crowds is a theory that purports large groups of people are collectively smarter than the elite few, regardless of qualifications, at decision-making, problem-solving, innovating, and predicting. The idea is that individual viewpoints can be inherently biased, whereas taking the average knowledge of the crowd cancels out the bias or noise and generates a more clear and coherent result. The theory is often applied to financial markets but has applications in psychology, biology, behavioral economics, and other fields. This paper examines the theory as applied to the field of planning, and specifically its applications in participatory planning. Participatory planning is an approach which seeks to involve a multiplicity of voices in urban development projects. It was conceived to make the planning process more democratic and cities more just. Today technology has provided an opportunity to quickly aggregate data via the internet making participation and in turn application of the Wisdom of Crowds theory more attainable than ever before. Can important decisions be made based primarily on the independent views of the populace rather than typical consensus-driven governance? Should organizations spend more time observing what people actually do rather than trying to persuade the crowds down another path? This paper will investigate the pros and cons of this new type of participatory planning through examples like online civic platforms, public participation geographic information systems (PPGIS), face-to-face groups, and techniques being implemented to make 'smart cities'.

The Theory

The wisdom of crowds is not a new concept. The idea can be traced as far back as Aristotle's theory of collective judgement presented in *Politics*, he used the idea of a potluck dinner as an example of how a group of individuals coming together create a better feast for the group as a whole than one

person might provide (Halton, 2022). A more recent example is a story about Walt Disney in the early days of Disneyland. After seeing workers put up fencing to direct people around a patch of grass, Disney ordered the path moved instead. "If that is where people are walking, they are smarter about what they are doing than we are. Design it for them" (Marohn, 2015). It is legend that Michigan State University's sidewalks and paths were "planned" using this same approach. Rumor has it that when a new building was completed, they would wait to put in the sidewalks until they could see where the paths developed on the grass. Looking at the wildly irregular paths today it certainly makes sense.
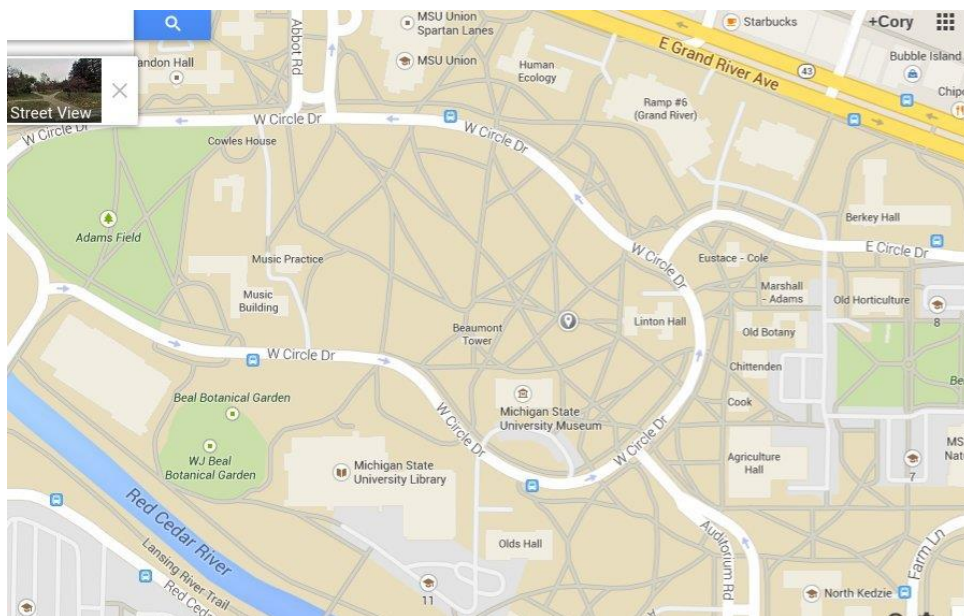
MSU campus paths, source: Marohn, 2015

The current wisdom of crowds theory was popularized by James Surowiecki in his 2004 book 'The wisdom of crowds: Why the many are smarter than the few and how collective wisdom shapes business, economies, societies, and nations'. He traces his inspiration to an experiment by scientist Francis Galton in 1906 at a livestock show. Galton believed in the power of breeding, not just for animals. His studies on individuals left him with little faith in the average person, "the stupidity and wrong-headedness of many men and women being so great as to be scarcely credible. Only if power and control stayed in the hands of the select, well-bred few, could a society remain healthy and strong" Galton believed (Surowiecki, 2004). At the livestock show a weight judging competition was underway.

For six pence, one could buy a ticket where one guessed the butchered and dressed weight of an ox, the best guesses would receive prizes. 800 people of diverse backgrounds entered, some with butchering and agricultural knowledge and many without. Galton expected the "average voter" to do poorly but he was wrong. The actual dressed weight was 1,198 lbs and the average guess was 1,197 lbs, , better than any single guess, even by the experts. "The result seems more creditable to the trustworthiness of a democratic judgment than might have been expected" Galton wrote.

Surowiecki seized on the truth Galton stumbled upon, that under the right circumstances, groups are remarkably intelligent, and are often smarter than the smartest people in them. "Groups do not need to be dominated by exceptionally intelligent people in order to be smart. Even if most of the people within the group are not especially well-informed or rational, it can still reach a collectively wise decision." Collective wisdom is at work in the Google search engine, sports betting, open-source software, stock markets, even in game shows like *Who Wants To Be a Millionaire* where 'ask the audience' is 95% correct, vastly better than any other category. It's easy to miss and can be hard to accept. Most people believe that valuable knowledge is concentrated in few hands and the key to solving problems is finding that one right person who will have the answer. He says we need to stop "chasing the expert" and ask the crowd.

There's a catch though, in order to benefit from the wisdom of crowds, conditions are required. Each member of the crowd must have their own independent source of information and there must be a diversity of opinions. They must make their own decisions and not be swayed by the decisions of those around them. Finally, there must be a mechanism in place that can aggregate these diverse opinions into a collective decision. Aggregation of data has traditionally been a barrier to harnessing the wisdom of crowds but now with the advent of the internet, broad access to it via smartphones and computers, and "big data" acquisition and processing techniques, perhaps the time has arrived where we can truly take advantage of it. The following sections describe some planning specific areas where collective

intelligence is being leveraged. The planning profession and the communities they serve are poised to benefit greatly; increased public participation, decentralization of power, new opportunities for innovation and complex problem solving make application of this theory enticing but, as with many fashionable planning solutions, caution is advised.

Online Civic Platforms

Good participation is the foundation of sound communities. When people are involved, they begin to feel responsible for what goes on around them, they become invested and take on ownership, building and strengthening trust among all parties. True citizen participation is difficult. In 1969 Sherry Arnstein published A Ladder of Citizen Participation. She equates citizenship participation to citizen power, a "redistribution of power that enables the have-not citizens, presently excluded from the political and economic processes, to be deliberately included in the future." (Arstein, 1969). Participation without the redistribution of power is an empty ritual allowing powerholders to claim they considered all sides but in reality, continue along as they would regardless. There are many obstacles to authentic citizen participation. Time constraints, lack of transportation, fear of speaking out all prevent people from participating. Umemoto enumerates many challenges that hinder good participation under culturally diverse settings like confronting otherness, understanding multiple meanings of language, respecting and navigating cultural protocols and social relationships (2001). Attending public meetings can be plain intimidating, like walking into a neighborhood bar where everyone looks at you, wondering 'who are you and why are you here?'

Today online civic platforms such as coUrbanize, MindMixer, and, Civinomics advertise "meaningful and equitable community engagement" (coUrbanize.com) and "Local Government in your hands" (civinomics.com). These platforms utilize collective intelligence to solve policy and planning issues by engaging the masses through technology to solve problems. Citizens are motivated to engage

because they can do it during their free time, it's easy and unintimidating, and they want to share

information as a matter of civic duty.

coUrbanize.com home page, source: coUrbanize.com

The platforms tend to fall into four main categories according to Desouza and Smith in the

December 14th issue of Planning Magazine. Citizen-centric/citizen-sourced data platforms are created by

community members themselves who make the rules and moderate the content. They engage citizens

with group discussions, thematic issues, setup competitions to crowdsource ideas, and request votes on

ideas. The goal is to help solve local governance issues. The local government has no formal role and can

only receive information and solutions once they have been chosen and vetted by the citizen user.

Citizen-centric/government open data is much like the previous described category but here interaction

occurs between citizens and the open data. Over 300,000 datasets are available on everything from

motor vehicle collisions, health care provider charges, monthly housing price indexes to air traffic

passenger statistics are available on sites like data.gov, the home of the U.S. Government's open data.

With the government-centric/citizen-sourced category public agencies take the lead and control the

narrative. City agencies identify problems, make those problems available for citizens to read, and ask

them to respond. They can also vote on proposed solutions. For example, the city of Wichita used

MindMixer during a drought to ask citizens what they would be willing to do to conserve water (Desouza & Smith, 2014). The last category is the government-centric/citizen-developed model. Here public agencies seek and encourage citizens to become citizen software developers, using open data and mentorship to create a solution. "This model offers a true partnership because it is government centric but with a high level of citizen power" (Desouza & Smith, 2014). Agencies often offer monetary prizes to encourage participation. In response to mass flooding, the United Kingdom's Environmental Agency called on developers to create solutions. In just 2 days of planning #FloodHack was organized and "over the course of the weekend we had hundreds of people volunteer their time to produce genuinely innovative apps that are testament to the creativity, imagination and generosity of our local tech community and demonstrates the power of government opening up data" (The Guardian, 2014).

Encouraging people to use their talents and skills to help improve their city and themselves is the promise of online civic platforms. Planners need to understand the different capabilities of each platform and determine which one is right for them, build connections with those that run the platforms, figure out which problems can be outsourced to them and realize that when seeking intelligence on community issues there can be unwanted or undesirable outcomes. The planner will not be able to control the narrative and citizen ideas may not align with city constraints or priorities.

PPGIS

Public Participation Geographic Information Systems (PPGIS) was coined in in 1996, during the National Center for Geographic Information and Analysis meetings to introduce a new role of GIS as an instrument to broaden public involvement in spatial planning decisions. Back then PPGIS relied on paper maps, pens, and stickers. (Bąkowska-Waldmann & Kaczmarek, 2021). Nowadays, PPGIS is a collection of digital tools that allow planners to solicit online, map-based data (maptionnaire.com). Residents are no longer the object of planning processes, but also creators. "PPGIS can be viewed as an instrument that changes power relations in the processes of territorial governance. This idea guides the development of

one of the most important goals of PPGIS, which is the involvement of citizens in planning processes,

leading to their participation in decision making on the issues that will directly affect their lives."

(Bąkowska-Waldmann & Kaczmarek, 2021). Brown says "PPGIS provides the means to operationalise

and translate the wisdom of crowds and public judgement into spatially explicit information for land use

decisions" (2014). He lists methods to achieve the conditions required for wise crowds when using

PPGIS, like including a random sample of population for diversity of opinions, ensuring geographic

diversity as well as participant diversity, having the mapping done individually to avoid influence by

others. Information is obtained by requesting the participants to spatially locate attributes such as

positive or negative experiences, place values, or location of special places. PPGIS platforms strive to

capture not only objective knowledge about places but also residents' subjective attachments and social

concerns. "The democratization of digital mapping tools has enabled more people to model their own

worlds: to hold governments accountable … fill gaps when infrastructural and municipal services are

fragmented … [and] make visible social and political processes and events that might be otherwise

hidden or overlooked" (Mattern, 2020, Siddharth et al, 2020).

Ushahidi (Swahili for witness) is an open-source mapping tool that allows for anyone to gather

information to find solutions in a model that has been coined "activist mapping". Combining social

activism, citizen journalism, and geographic information, it has played an important role in addressing

social, political, and public health challenges and fostering meaningful change. It was founded in Kenya

following the 2007 presidential election and the crisis that erupted afterward to collect eyewitness

reports of violence and place them on a map. It has since been used for relief efforts following the

earthquakes in Haiti and Nepal, supporting COVID-19 response and recovery, helping women address

sexual violence in Egypt to name a few (Ushahidi.com, nd). Heat Seek NYC is a civic hacking project that

taps the internet of things to empower tenants, landlords, community organizations, and the justice

system to tackle the heating crisis. Using temperature sensors installed in apartments, the app

integrates this data with public 311 heating complaint information. It provides unbiased evidence to

verify heating code abuse in housing court, helps landlords heat their buildings more efficiently, and

generates data to educate the community and inform housing policy (Heat Seek NYC, nd).
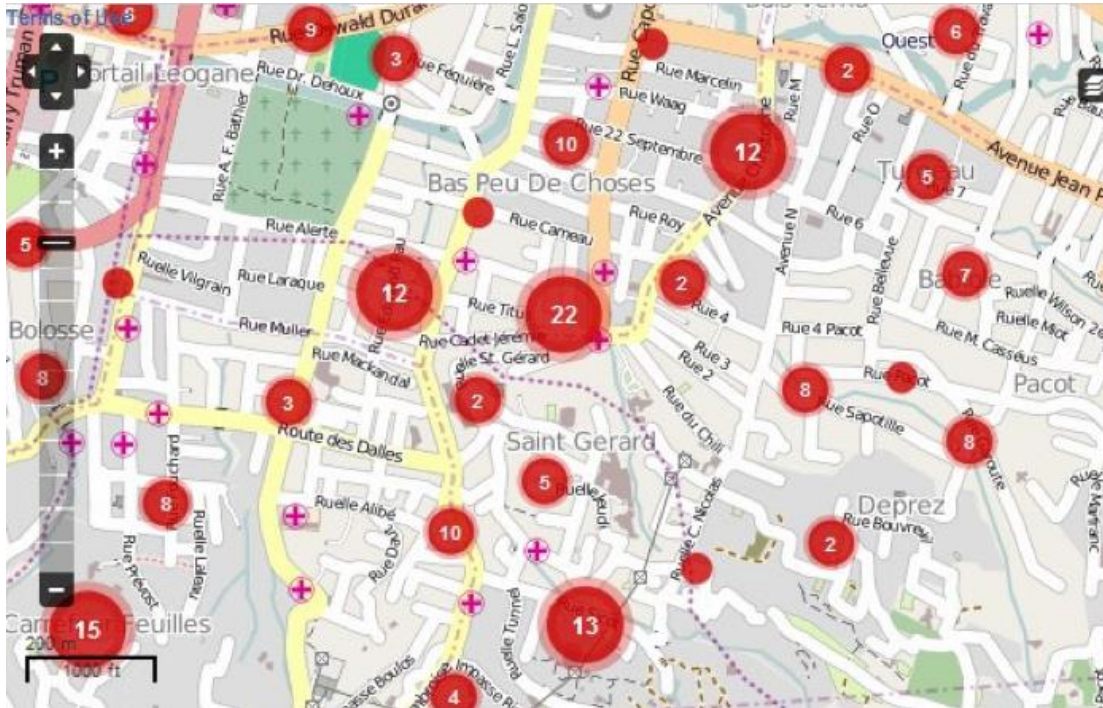
Ushahidi-Haiti Project, source: Ushahidi.com, 2010
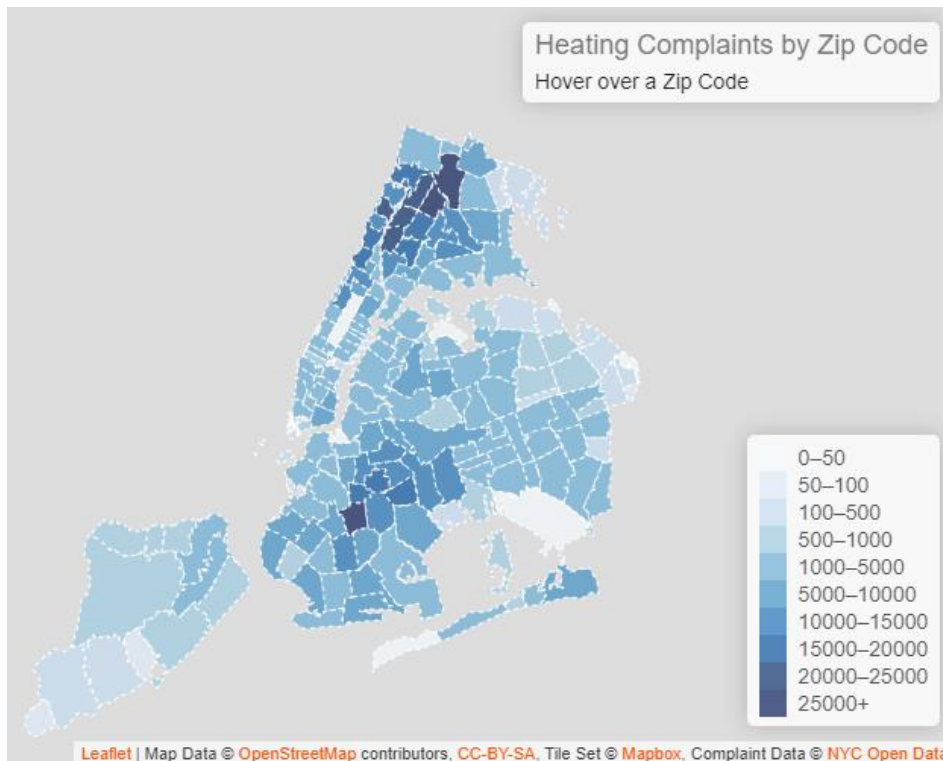
The Cold Map, source: Heat Seek NYC, 2014

The mass-market smartphones and mobile devices equipped with many sensors and measuring capabilities have allowed for collection of large amounts of data over long-time spans. Success has been found using a gamification approach where game-like elements are incorporated like winning points and advancing levels, unlocking new features depending on contributions, bolstering competition to motive user engagement. OpenStreetMap (OSM) is a collaborative project to create a free editable geographic database of the world. The Kort app, replaced by StreetComplete, was one of the earliest examples to utilize gamification to collect OSM data. Noise Battle encouraged users to collect noise measurement with their smartphones so that other stakeholders could use their data for analysis and decision making. Players conquered the city, split into a series of cells, by taking measurements at certain locations and times of day. (Brovelli, 2016, Garcia-Marti, 2013). Needless to say, gamification is attracting to young people who typically are left out of more traditional methods of public participation (maptionnaire, nd).

A user solves the house number quest of StreetComplete, source: Tobias Zwick-
https://github.com/westnordost/StreetComplete, nd

Smart Cities

So far, we have discussed extracting the wisdom of crowds to benefit planning processes via

several user voluntary mechanisms but, like the MSU paths example, knowledge from the crowd can be

gathered without their even knowing they are participating. Smart Cities is a term for an urban area that

uses electronic methods and sensors to collect data in order to manage resources and services

efficiently and improve operations across the city. One city experimenting with this concept is Toronto,

in particular their redevelopment of a parcel of waterfront called Quayside. The goal is to transform

Quayside into a "globally-significant community that will showcase advanced technologies, building

materials, sustainable practices and innovative business models that demonstrate pragmatic solutions

toward climate positive urban development" (Waterfront Toronto, 2017). The company winning the

request for proposal was Sidewalk Labs, a subsidiary of Alphabet Inc., the parent company of Google.

Sidewalk Labs' proposal envisioned urban planning in five layers; physical layers of utility infrastructure, transportation infrastructure, public spaces and buildings, and a digital layer which enabled the physical layers to be more efficient and adaptable. The proposal included ideas like autonomous trash collection robots and a pay-as-you-throw metering system to incentivize reduced consumption, an outcome-based zoning system made up of embedded sensors providing real-time monitoring and automated regulation which would allow the zoning code in the mixed-use environment to be changed dynamically, according to criteria such as maximum noise level, and a robust system of asset monitoring to track patterns and change usage designation on demand such as temporarily changing bike lanes to pedestrian lanes. Deep integration of the digital layer demonstrates Sidewalk Labs' aspirations about making a city from the internet up (Sidewalk Lab, 2017). Alphabet has the resources to design, build, power, monitor, connect, and monetize a city, and that is Orwellian to some.

Furthermore, the public-private partnership has raised concerns about the reliance on proprietary technologies and lack of clarity about data governance. Sidewalk has tried to alleviate fear with ostentatious displays of transparency and a participation commitment of "planning for a future where community members can easily influence the decisions, spaces, and technologies that impact them, and where decision-making entities can be even more responsive to community input" (Mattern, 2020). Citizens invited to participate have reason to be skeptical when that invitation comes from a commercial developer with a profit motive. "I Participate, You Participate, He Participates, We Participate, You All Participate, They Profit" translated from the French student poster used in Arnstein's famous work comes to mind. Mattern asks "if cities can be made responsive to real-time data collected from environments and inhabitants without their explicit consent, how meaningful is our participation? Sidewalk Toronto should prompt reflection about the ethics of conscripting urban subjects as passive participants in smart-city design" (2020). On May 7, 2020, Sidewalk Lab cancelled the Toronto smart city project citing "unprecedented economic uncertainty" (Doctoroff, 2020).

WoC Unplugged

Small, face-to-face groups are ubiquitous to participatory planning and their decisions are consequential. Parts of the Wisdom of Crowds theory can still be used with them. According to Surowiecki, diversity of opinion is the single best guarantee that a group will see benefits from face-to-face discussions. By having even one devil's advocate, team members are more likely to better process information, consider all angles of the problem, and explore solutions they had not considered before (2004). DeWees and Minson say to get better judgements, team members should form independent opinions before coming together to decide as a group and that decision making groups should pre-commit to a strategy for combining their opinions. Though difficult to do, teams should prevent the person responsible for the final judgement from forming an opinion of their own before seeing the opinions of others. Importantly, individual team members should re-evaluate how they think about disagreement. Studies show many people interpret disagreement to mean that someone else is incorrect. For teams, disagreement should be thought of as valuable information (2018).

Limitations and Cautions

Crowds aren't always wise. Herding-following others and imitating group behaviors, groupthink-human tendency to conform, and certain types of information cascades-making a choice solely based on someone else's choice can result in things like stock bubbles and crashes, riots, and bad decisions (Surowiecki , 2004). Surowiecki reiterates again and again "collective decisions are most likely to be good ones when they're made by people with diverse opinions reaching independent conclusions, relying primarily on their private information." Brown lists multiple challenges using crowd sourcing for public participation including the 'digital divide' or unequal access to technology and the internet, resistance from the professional planning community themselves along with politicians, NGOs, and other segments of society "imbued with the belief that expert knowledge is superior to crowd wisdom" (2014). People believe experts are better because they assume intelligence can only exist in individuals. Humans believe that averaging multiple responses is dumbing down or compromising when averaging

actually produces better results. "Thus, resistance to crowd sourcing is deeply rooted in the beliefs and assumptions about the origin of intelligence and will be difficult to overcome" (Brown, 2014).

Data privacy and data ownership concerns aside, tools like community engagement apps and participatory mapping help keep urban data and oversight powers in public hands but those same tools can be co-opted by savvy tech developers who deploy "participation" as a public performance with the appearance of a democratic process without providing the real thing. Mattern calls this disingenuous use of maps, apps, and other tools of participatory planning 'mapwashing' and it threatens to undermine the technology's radical potential (2020). The rise of algorithmic public planning has been accompanied in the private realm by proptech or "property technology", tools providing developers and property owners solutions to increase the efficiency of everything from collecting rent payments to coordinating projects (TRD, 2021). But they have also been used for tenant screening, building security and circulation to identify targets for higher rents or eviction. Erin McElroy, founder of the Anti-Eviction Mapping Project says about the power of these tools "Community mapping really is just a tool that can help produce an array of futures, depending on who designs and uses it, [it] can be used to embolden technocapitalism … or to produce anti-capitalist futures. It really depends on who 'the community' is comprised of — users and developers alike" (Mattern, 2020). Open-government advocate Bianca Wylie warns that digital governance projects have been considered a stable financial revenue for the companies involved. By embedding a technical product in a government system, it becomes extremely difficult to pull out from the system, thus making the government market highly attractive (Center for Ethics, 2018). This is only a very abbreviated list of issues that can arise with this 'brave new world'.

Conclusion

The wisdom of crowds theory of 'no one of us knows more than all of us', with its diversity and richness of knowledge, has been proven to exist contrary to our intuition and beliefs. The ability to engage the masses to solve problems and realize opportunities is becoming possible with the internet

and widely available devices to connect to it. Digital apps that increase public participation in planning

and draw on collective intelligence abound with just a very few discussed here. But social problems are

messier than technical problems and not easily fixed. So, as we implement these tools, we must ask

important questions. Can decisions be made, based primarily on the independent views of the populace

rather than the more typical consensus-driven governing boards? Who benefits? And does this harm a

community or group of individuals? What problems can we anticipate tomorrow from the technological

solutions we develop today? The possibilities are enticing but we must also be cautious, least our

utopian futures turn dystopian.

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Note on the references. While I did not use very many references from the assigned reading, they were themselves referenced in many of the references I did use. Habermas, Flyvbjerg, Healey, Jacobs, Innes & Booher were the most frequently cited.