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Technology's World

A study of modern technology and its effect on city life under different municipalities and political institutions, with a focus on The Social and Institutional Relations and Contentions of Modern Technology

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Introduction

Technology, understood as all of our material culture, has played a key role in our development since the origins of our species. At first, technology configured itself as a critical element to ensure our survival in the mists of time, through the control of fire and the development of simple tools such as flint axe. Today, technology both appears full of contradictions as the promise of a better, more equitable future and threatens the world as we know it. The threats materialize in issues of climate change or the dynamics of exploitation in late capitalism. These contradictions indicate that we must negotiate with technology, as it has placed our culture and institutions as well as our psychological, political, and philosophical defenses over the edge.

This work will first focus on modern technology's role in the municipal and political landscape in the US focusing on small municipalities and the burden to both adopt and regulate technology. Then it will explore how technology has been applied to solve problems globally that embed capitalism deeper into society. It will then explore how specific technologies, as a product of hyper capitalism seen most acutely in the US, write themselves into the fabric of the city, being the frontier of technological innovation. In the context of surveillance and data capitalism, US cities have been slower to embrace surveillance with open arms as city politicians, regulators, and managers are potential buffers to its forces, even though in people's private lives on their computers and smart phones they are being surveilled every second. However, Chinese cities like Shanghai and Beijing have fully partnered and even directed the use of capital to create a surveillance state, which this paper will address. This paper will contrast that phenomenon to how in the US capitalism pushes the limits of technology no matter the cost

while legislation is late and is attempting to introduce safety to the process of innovation. Overall, this paper will explore how technology has affected city life in the context of US gentrification and sharing economy disrupters (like Uber, Airbnb, and Bird scooters) and acknowledge the unique case of China as a context where there is cohesion of interests between capital and the state and its consequence as a surveillance state. This work aims to show how technology can and has improved societies as well as how it affects societies in different contexts through comparatively examining institutional and public interactions with technology.

To be concrete, below is a list of technological products and applications that can be employed by municipalities or used by users of the city. This list will show some of the simultaneously promising and controversial technologies that are aimed at improving quality of life

Security: Predictive policing, Real-time crime mapping, Gunshot detection, Smart surveillance, Emergency response optimization, Body-worn cameras, Disaster early-warning systems, Personal alert applications, Home security systems, Data-driven building inspections, Crowd management.

Healthcare: Telemedicine, Remote patient monitoring, Lifestyle wearables, First aid alerts, Real-time air quality information, Infectious disease surveillance, Data-based public health interventions: Maternal and child health, Data-based public health interventions: Sanitation and hygiene, Online care search and scheduling, Integrated patient flow management systems.

Mobility: Real-time public transit information, Digital public transit payment Autonomous vehicles, Predictive maintenance of transportation infrastructure, Intelligent traffic signals,

Congestion pricing, Demand-based microtransit, Smart parking apps (employing machine learning and/or crowd sourcing), E-hailing (private and pooled), Car sharing, Bike sharing, Integrated multimodal information, Real-time road navigation, Parcel load pooling, Smart parcel lockers

Energy: Building automation systems, Home energy automation systems, Home energy consumption tracking, Smart streetlights, Dynamic electricity pricing, Distribution automation systems.

Water: Water consumption tracking, Leakage detection and control, Smart irrigation (employs machine learning and predictive technology), Water quality monitoring.

Waste: Digital tracking and payment for waste disposal, Optimization of waste collection routes.

Economic and Housing Development: Digital business licensing and permitting, Digital business tax filing, Online retraining programs, Personalized education, Local e-career centers, Digital land-use and building permitting, Open cadastral database, Peer-to-peer accommodation platforms, Financial technology aimed at allowing individuals with little capital to participate in markets traditionally limited to mega-capital holders.

Source: Mckinsey Global Institute: Smart City: Digital Solutions For A More Livable Future, June 2018

1) Technology and the Municipality

Are the fears of the public sector holding back progress and opportunities for improved quality of life created by smart cities? After more than a decade of exploration, discussion, and progress, the term ‘smart city’ has come to have slightly different definitions depending on the source. However, though the term is fairly new, the underlying concept is as old as cities themselves. Whether it was the aqueducts built by the ancient Romans to bring water into cities or their use of large stones to pave streets, to the more modern use of pavement or the installation of traffic and street lights or the many other solutions within cities that we take for granted that each of these solutions would be considered “smart city solutions” in their time. The term ‘Smart City’ therefore, can be defined simply to mean the evolution of a city’s technology or systems to be more sustainable, resilient, and equitable. In the 21st century that next phase of city evolution is heavily, though not exclusively, driven by electronic or digital technology. Smart cities leverage the advancement of smart technologies; sensing, data collection, and AI to improve quality of life and city functionality for constituents of the city.

Modern technology has forced institutions to adopt, reject, and make decisions regarding the new technological world. In particular, American municipalities are being forced to respond to problems caused by technology, and at the same time adopt technology to solve 21st century problems. Right now, states and governments are not the main innovators of technology in the US. The private sector has led the way in 21st century technology innovation which means states are asked to adopt and partner with private institutions to modernize. A relationship like this is often complicated and controversial in American democracy due to work culture differences and different end goals. Because of this, the US market for high tech solutions for city problems operates inefficiently. The supply for smart solutions is plentiful but the municipal buyers are

scarce and unequipped for a few reasons. Generally speaking, large cities with large budgets that can allocate a small portion of their budget to engaging in the public procurement process for pilot projects with new technologies. Although this isn't a complete rejection of technological progress and experimentation, it is not the level of commitment effective enough to see lasting results. However, the market has produced plenty of small-scale solution providers that are looking for pilot projects or long-term partnerships but are crowded out by other larger firms working with larger cities.

So why should smart cities have to be for the high budget ones? When it comes to small and medium sized municipal buyers of city solution products and services, the perceived risk to reward that could come from implementing smart technology is too great given budget constraints, perceived possibility of failure, and current knowledge and resources prepared to take on such a project. While lacking capacity to implement high tech solutions is a real problem for smaller cities, there exists higher opportunity and cost savings in regions with less development because of the ability for these places to start from scratch. Finding ways to reduce the burden of technology to smaller municipalities and include them in the age of technology remains the challenge in the efforts to expand the smart city industry in an inclusive way. However, this means finding real ways to reduce the risk that comes with adopting technologies.

In the summer of 2019, the small city of New Bedford, Massachusetts participated in a startup challenge called AcceliCITY where they offered to work with the small companies that won the "smart challenges" as facilitated by Leading Cities, a non-profit dedicated to bridging the gap between city functionality in small cities and technological innovation. In the early 1800's, New Bedford was a thriving port town whose primary industry was whaling and the export of oil. However, in the mid to late 1800's, oil fracking surpassed whaling as a cheaper and

more plentiful way to extract oil. This boom made New Bedford's whaling industry irrelevant, crippling its local economy. Since then the small city has struggled to find ways to experience the same economic activity, whilst cherishing its past as a whaling town. Coming back to the present, by participating in the AcceliCITY program the municipality of New Bedford was looking to be proactive in evolving into a 21'st century city that effectively serves the needs of their citizens, attracts industry, and provide jobs for its residents.

However, just a few weeks prior to their participation, the city of New Bedford was hit with the Ryuk ransomware. Ransomware is a type of cyber-attack that can lock all network connected systems until the attacker decides to unlock them, usually demanding bitcoin in exchange for an encryption key that will unlock the data or functions that were blocked. It doesn't just happen randomly, however. Ransomware tactics include advertising security software to be downloaded that executes code when the user opens it so that the hacker can encrypt (lock) data from the host; other's might include aggressive advertising opening a loud and scary popup window and a fake security alert asking for the user to call a fake IT support so that the user will be tricked into giving remote desktop control to the hacker; and others may simply include sending blast emails designed get the user to downloading the ransomware. All computer viruses usually attempt to socially control the user to download the ransomware. Once this happens, the attacker is in. And in the case of the Ryuk attack on New Bedford, the software was designed to spread from node to node on a connected network and encrypt files on its way. The city of New Bedford had to shut off their entire network and bring in third party experts to help. Overall, the ransomware hackers' often prey on older individuals who don't have common sense with computers and can't tell what feels legitimate and what is predatory. This makes city government and municipalities ripe for this kind of attack. A City Hall has access to loads of

money and its function is crucial, making them likely to comply with demands. On top of that, they consist of individuals who don't have the knowhow themselves to prevent or deal with the problem quickly. Many elected officials and their teams are not versed in cybersecurity and often times cannot identify a virus/scam that, if clicked on, can make all connected systems vulnerable. Municipalities like New Bedford are a sitting ducks for this kind of attack.

As a member of the AcceliCITY team, it was noticeable how difficult it was for the city manager of New Bedford to participate while their networks were completely shut down. Participation in our program was the least of their concerns as the. However, they maintained participation because it became all the more apparent that it is a far greater risk to *not* modernize than it is to evolve and adapt with the needs of 21st century city management and citizens. The AcceliCITY program aims to build knowledge and networks between small governments and small smart-city private companies, broadening the market for small municipalities that get left behind and for small companies that get outbid and by large conglomerates for implementation.

If the goal is to “catch up” with the private sector in using technology to solve problems for the city instead of just raise a profit, it is important to find ways to institutionally support smart city ecosystem building on a small scale and in scalable ways and to find ways to prioritize building these ecosystems with cybersecurity solutions and startups. For example, in the Baltimore ransomware attack in May of 2019 hackers demanded 13 bitcoin (roughly \$76,000) in exchange for keys to restore access. The note stated that if the demands were not met within four days, the price would increase and within ten days the city would permanently lose all of the data. The attack had a negative impact on the real estate market as property transfers could not be completed until the system was restored on May 20th. However, the restoration of all systems

was, as of May 20, 2019, estimated to take weeks more. Baltimore was susceptible to such an attack due to its IT practices, which included decentralized control of its technology budget and a failure to allocate money its information security manager wanted to fund cyberattack insurance. It's instances like these that communicate to municipalities that cyber security is an immediate need given how easy and profitable it is to attack ill-equipped cities. Matching cyber security solutions at an appropriate scale and cost for all cities, no matter their sizes, is what may help cities build out safe and reliable smart city ecosystems with reduced risk (Durkin, 2019).

In the global private sector, there exists a growing amount of innovation on smart city solution development but a lack of serious commitment from municipalities to implement these solutions for a variety of real and perceived reasons. All too often the hesitation on the part of the public sector stems from the perceived risks of innovating and a lack of knowledge on the part of the municipal operators in the political bureaucratic organization. Risk assessments must be done to ensure the proper use of public funds and the mitigation of unintended consequences, but risks are also worth taking. This conjures the sentiments of the adage "if it isn't broke, don't fix it." While it's true that governments have a responsibility to provide basic needs to its citizens, not to push the boundary of innovation, it stands in opposition of meeting the needs of 21st century communities. Cities that take a conservative approach to technological adoption may inadvertently perpetuate inequity in their communities and may end up providing inadequate services, infrastructure, protections, etc. for their communities at a great social and economic cost in the long run.

However, one of the most pressing reasons why smaller cities especially are hesitant to adopt information technology solutions is because of the chance they might either get hacked with a type of malware or ransomware or because they might get any sort of sensitive data

collected stolen. There are concrete reasons for keeping a government institution low tech. For example, some sensitive military data, like nuclear codes, are still stored on floppy disks because it is impossible to hack digitally and the risk of having such sensitive pieces of information hacked is too high to transfer to digital storage. However, this shouldn't be the reason why no technological experimentation happens. Cities still need to provide 21st century needs to 21st century citizens and should have the capacity to serve and protect its citizens in that context. Because of this, cyber security may be the backbone for the future of municipalities. Ultimately, the municipalities that simultaneously grapple with and embrace the fears of innovation, work diligently to separate perceived risks from actual risks, and take necessary measures to protect their community from those real risks, will be the communities that thrive long into the 21st century. However, recognizing that, for example, each new data collecting node or sensor installed in a city creates another point of potential vulnerability for a municipal system to be hacked, is not reason or excuse for keeping a municipality from delivering improved services, equity and/or sustainability for its people. Instead, this provides another opportunity for cities to develop more sophisticated systems of protection and reduce the real threats that may exist.

The resistance and general fear of adoption may come from a lack of understanding and knowledge about technology. Conservatives and liberals alike demonstrated their lack of understanding and ideological persistence in the face of new information. As this paper elaborates on later, Shoshanna Zuboff's research and analysis of Surveillance Capitalism cuts through the century old logic being applied to concepts of how technology affects our lives and how it should be managed by regulators in the US. But even though there is a lack of education on the part of public sector officials, increasing number of urban areas are embracing smart technologies to solve city problems. For example, municipalities as large as San Diego,

California and as small as Richmond Hill, Ontario are installing new lighting systems that are equipped to carry out 24-hour surveillance. Such governments employ this technology because it has the potential to improve management efficiency, save money, provide crime watch and protection, and control and monitor the homeless population to better understand the illusive and off-the-grid demographic.

The technology companies that operate in the urban development space stand to profit from the sale and maintenance of this equipment. However, they also profit from the data they gather and sell to advertisers and other third parties. They often provide assurances that personal identifiers will be stripped before such transactions take place, but that is not always effective, and it does not stop the company itself from retaining, using, and selling such data. Even still, companies don't always keep their promise especially when the apparatus meant to regulate and legislate their actions proves to be incompetent.

With little protection afforded in legal systems in the US, urbanites have to rely on the commitments of governments and companies conducting the surveillance. In modern democratic societies, the onus is on government authorities to regulate, limit, and set parameters on the technology created by private companies, but the enthusiasm for the surveillance ability afforded by these technologies shown by governments like the Russian Federation and, as will be explored later in this paper, the Chinese Communist Party, highlight a different relationship between government authority and technological innovation. Under late stage capitalism. However, tech companies have just as much, if not more bargaining power than the governments that are supposed to help shape the use of these technologies due to strong intellectual property laws, but mainly an expertise, knowledge, and cultural gap between these sectors.

Because municipalities are under intense pressure to improve efficiency by adopting these technologies, regulate them because of the unique problems they create, and companies expect to generate revenue from data to offset their massive investment in building out software infrastructure, public fears about surveillance and the loss of personal privacy are completely warranted. Yet, there exists no plan for cooperation and education on all sides between the public, government authority, and private institutions. What exists now is only contentious politics of blame as seen in Mark Zuckerberg's congressional testimony's in 2018 and 2019.

To prevent smart cities from becoming surveillance cities, it is essential to build privacy into their design. This includes by first having knowledgeable legislators. Second, this includes having public allies, stakeholder representatives, and regulatory compliance personnel whose interest align with the stakeholders in the design and deployment process. However, without establishing that all interests can be "on the same page" with each other and respect each other's interests, a culture of cooperation will not flourish. Two principles should guide this effort.

Concerned citizens have made it known that they have a fundamental right to personal privacy. That means any smart city data-gathering system must de-identify data at the source of collection and must take full responsibility to ensure that data traceable back to the provider does not go to advertisers or other interested entities. It is just as essential to demand that data gathered from smart city projects must belong to the people from whom it is collected. Citizens have the right to retain, remove, or place in a citizen-controlled public trust, all data collected on their activities in smart cities.

They can also agree to have private and public institutions make use of their data, but only when all parties are fully informed and when there is a guarantee that if people choose not to share data at any time in the process, there will be no repercussions and it will be easy to do

so. All in all, Smart cities do not have to become surveillance cities. It is clear that smart democratic cities require a strong public commitment to privacy rights through increased participation in the design of technology to be used in the public realm. Without a strong and uncontentious relationship, as well as a knowledgeable body of legislators, any kind of attempt at regulation from elected authority will be futile at the expense of public safety (Mosco, 2019).

2) Technology and the “Smart City”

As the physical, social, demographic, and economic realities of 21stth century urban ecosystems become increasingly complex, it’s been noted that municipal leaders look to technological strategies to maximize the efficient use of limited resources. Around the globe, the call for Smart City solutions entices leaders to innovate with interconnected networks, cloud computing, digital information exchange between citizens and government—and to identify “the city” as the ideal proving ground for harnessing big data in the service of livable and secure shared environments.

This pull toward tech-driven optimization is most notable in the rise of blockchain, the decentralized, Distributed Ledger Technology (DLT) mechanism. Blockchain experts proclaim it as a revolution in the way cities and governments can operate, one that holds the promise of supplanting obsolete models with durable solutions that can be fairly and democratically tailored to meet the requirements of cities. While blockchain is proving its value in addressing the fundamental and formidable challenges of urban infrastructure reform, it is not to be mistaken for just another smart city solution. Smart cities, amongst their many benefits, create problems if not managed correctly. Data driven governance and economies, especially with data infrastructure that is not built for the 21st century (For example, the IRS is a major cost liability and inefficient system in the economy that’s sole purpose is to simply handle data) can lead to

security problems, technocracies, unproductivity and inefficiencies. In the urban context, this solution has huge potential to democratize citizenship without sacrificing (in fact promoting) personal security nor creating a technocracy by destroying existing ones. It is important to understand that the smart city application of blockchain is to precisely solve those problems. Other solutions derived from blockchain, like cryptocurrencies, can have other major impacts on funding and transactions.

Chief among the challenges facing modern cities is the growing imbalance between demand and supply. With half the global population now living in urban centers (a percentage expected to rise to two-thirds by 2050), municipal services are strained to deliver the most basic services like clean air and water. Currently, 5 million people in Brazil and 844 million worldwide lack access to safe water and 2.3 billion do not have means of clean sanitation. In the US, most electric transmission and distribution lines were constructed in the 1950s and 60s with a 50-year life expectancy, more than 640,000 miles of high-voltage transmission lines are at full capacity, the national transit system has a \$90 billion rehabilitation backlog, and the nation's highways are in urgent need of repair. In 2017, the US Infrastructure Report Card (as judged by the American Society for Civil Engineers) earned a rating of D+ (Buildcoin Foundation, 2018), its lowest mark ever and a signal, across all categories (from aviation to bridges, parks, schools, sanitation, and more), of foundational vulnerability, even crisis. The root of the problem globally, is not overpopulation as much as corruption, risk aversion, and lack of political motivation on the municipal level (Buildcoin Foundation, 2018). These impediments can be addressed by shifting the urban paradigm toward decentralization thus forcing the catalysts that are supposed to make a city fair and livable accountable.

Whether through migration (from rural farms to urban centers, or international migration between countries), reclassification of formerly non-urban districts, or natural growth within cities, urbanization is a mass phenomenon with unique impacts around the world. It particularly impacts global cities like Dubai, which is expanding its urban footprint at record rates—and its international cachet as a new tourist destination carved out of the desert—to accommodate an over 85 percent rise in urban population in less than a decade. In centuries-old São Paulo, Brazil (whose current population of 11,967,825 is expected to rise to 23 million by 2030), poverty, persistent drought, environmental degradation, failing infrastructure, and governing instability exist alongside a veneer of dazzling modernism. These two epicenters of urbanization provide a framework for examining the potential impact of Smart City development and how blockchain applications could mitigate the negative impacts of Smart City solutions.

For all their challenges, cities have become idea factories where a concentration of experimental mindsets have fostered innovative, sustainable, and humane approaches to intractable problems. Becoming “Smart” requires the deployment of “information technology to integrate and manage physical, social, and business infrastructures in order to provide better services to its dwellers while ensuring efficient and optimal utilization of available resources,” according to Griffith University lecturers Kamanashis Biswas and Vallipuram Muthukkumarasamy (Biswas, 2016). With the proliferation of technologies such as Internet of Things (IoT), cloud computing, and interconnected networks, Smart Cities promise innovative solutions and more direct interaction and collaboration between citizens and local government, thereby driving local resiliency and global competitiveness. Using IoT devices to optimize the use of electricity and water, for example, can reduce resource consumption. Other tools can “reduce traffic congestion and air pollution through smart coordination of traffic lights, parking

availability, and public transportation...and harness the power of big data and ubiquitous IoT devices to enhance the efficiency and livability of the urban environment,” writes *The Hill*’s Vaughan Emery (Emery, 2018).

Given the potential, it is no surprise that a fully automated urban IoT has bandwagon appeal. Just imagine the scope of “smart macro development...to engulf...entire cities” (Stanley, 2018) with unmanned cars and trains controlled by code, infrastructure that does not deteriorate, “sellers that do not drive up prices, and medical cards that do not disappear,” writes Julia Magas for Cointelegraph (Magas, 2018). Technology research firm Gartner estimates there were 2.3 billion connected devices within cities around the world by the end of 2017, representing a 40 percent increase in just one year (Emery, 2018). Over 66 percent of international cities have made significant inroads in adopting technology-driven approaches to collect, aggregate, and analyze real-time data. McKinsey analysts predict that the number of Smart Cities will reach 600 by 2020 and that “almost 60 percent of the world’s GDP will be produced in them” by 2025, reports Magas (Magas, 2018). As the Smart City revolution takes hold, the question is how well the devices that drive the massive amount of data and translate into concrete services and resource efficiency can be integrated into the daily lives of city residents.

Recently, the organizations behind the development of smart cities have been called into question about concerns ranging from their data gathering practices to the exclusionary outcome of smart technology, making the city work for only the working upper class. An exemplary case of a deliberate technocracy is the city of Dubai’s frivolous use of oil money to fund smart technology projects as fast and efficiently as possible without being cautious about its impact to potential users of the city. Most recently, Dubai has created an initiative to go “paperless” meaning all transactions would be done through a card payment or even by cryptocurrencies,

further excluding people with no access to credit, debit, bank accounts, and even cryptocurrency wallets. This type of technocracy only serves asset-holding citizens, further overtly excluding the workers that commute into Dubai to take care of the city. Specifically, the 1990's Dubai eGovernance project, which was the first ever project of its kind, is characteristic of this especially given the time period it was implemented. eGovernance is a tool that is meant to make citizen participation easy and accessible by allowing citizens to vote online. The problem with this project is that it did not consider people who have no access to a computer. At the time of this project, not many people could have access to a computer unless they were very wealthy, therefore encouraging the problem this initiative is precisely trying to solve. This further excludes people from being a participant in a city that is already built only for the super-rich. Although there are important issues that can be solved with eGovernance, Dubai wasn't inspired to implement this based on how effective it would be for its citizens. Instead, it was based on the optics of futurism. This is one of the many ways a smart city technology can attempt to solve a problem that wasn't there for the sake of being a "techy" and futuristic city, furthering the problem it is trying to solve. It prioritizes the tech companies and their incentives rather than the issue itself, which, in fact, was a problem for other less wealthy cities and not a problem for Dubai in the first place. Dubai's role in smart technology innovation is not useless, however. This city is essentially a guinea pig for the rest of the world as to how smart technology projects can be successfully or unsuccessfully implemented and starts the conversation of best practice solutions for smart cities. Although Dubai's use of smart technology is not best practice, it is not completely useless.

Another example of a city adopting smart technology for their city, in a fairly unique manner, is the city of Sao Paulo. This city is looking to cryptocurrencies and blockchain

technologies to fund and modernize its infrastructure given its inability to find funding for much needed projects. It is important to know blockchain's use in the context of high tech solutions to city problems. It is also important to understand that blockchain technologies are not just another smart tech solution. It's a radical technology that has the potential to solve centralization problems; a unique problem of smart city development. At the core, A blockchain is a distributed and monitored ledger of actions to be verified or unverified by all monitors of the blockchain. monitored ledger requires the use of an online, instantly connected network. It is important to note that Blockchain is not a technology itself but a theory that is made possible with network technology. The reason this theory is so revolutionary is that it solves the problem of unequal information distribution without having a centralized overseer.

A lose example of a blockchain is a shared Google document or a Wikipedia page where all parties can look at the revision history, make edits, and keep everyone's contributions in check by verifying them. A more consequential use for blockchain is in the supply chain of fish. A network that runs on a blockchain would provide real-time data to a shared ledger or document that could be accessed at all times by every party involved in a business ecosystem. Supply chain of fish is the go-to example: During the process of transporting the fish, there would be a temperature sensor inside the truck that relays the temperature to all parties on the blockchain so that the shipping company can't lie about the quality of their service and keeps everyone in check. However, it's important to ask who is installing and providing these sensors and this blockchain service? Can they be bought? A simple fix for this question would be for each stakeholder in the supply chain to put their own temperature sensor in it. But the context of implementation for this revolutionary solution still matters and it is important to ask those types of questions.

A cryptocurrency is where the people/computers verifying this data are rewarded in a digital token for verifying that everything is in check on the ledger. These tokens would be redeemable for other tasks by parties within a business ecosystem because keeping everything in check provides value to everyone involved. For example, Bitcoin's (and other popular cryptocurrencies') blockchain is valuable because it's like a basic blockchain template for anyone or any organization to use. And instead of having humans check for specified parameters, it uses computers ("miners") to check if said parameters are true. So, if this fish supply chain doesn't want to make its own system, it would proceed to use bitcoins' blockchain by setting up parameters agreed upon by all parties, for instance that the temperature related to the blockchain by the truck is at freezing temperature. This way, any "miner" could process this data and check if the real time data is consistent with the parameters set by the fish supply chain. So, the more applications this blockchain has, the more it demands of its miners, and the more valuable a Bitcoin becomes. Since there can be many ecosystems and verifiers on this blockchain, the tokens are redeemable for many different tasks or goods. Since the creation of cryptocurrency exchanges, Bitcoins even have an estimated exchange value to the dollar, almost identical to a floating rate currency. There are a lot of nuances about bitcoin and popular cryptocurrencies that complicate its application and each one has a differentiating factor, but it's important to outline these basics before proceeding.

Back to Sao Paulo, the city was looking to partner with the BuildCoin Foundation, an organization that helps implement blockchain and cryptocurrency technologies for other organizations by leveraging their own cryptocurrency called "BuildCoin". It would work as such: An engineer somewhere in the world who specializes in bridges could receive an invitation to collaborate on a feasibility study for a bridge commissioned by a local government in Brazil,

or a reconstruction of Sao Paulo's water supply system. He would receive payment in BuildCoins based on his overall contribution to the project, measured with a Reddit-like system where other participants can vote up or down the quality of his work. If all goes according to plan, these BuildCoins would be "redeemable for other services in the same business ecosystem, such as subcontracting from other participating firms, market research, or professional training" (Stanley, 2018). The Sao Paulo government is experimenting with and indulging this technology because of its weak capacity to fund and maintain infrastructure development and modernization. Through a decentralized funding method, Sao Paulo could see significant infrastructure improvements.

This "BuildCoin" solution has the potential to bypass the problem of weak governance not by strengthening the government, but by replacing its funding burden with decentralized technologies that directly empower the stakeholders in the infrastructure building process. It is possible that the democratizing force of blockchain technologies could hold the solution to city's infrastructure problems by translating the financially unrewarding incentives of maintaining and building a livable urban environment, to a directly rewardable one. However, with any kind of solution, the place and context in which the solution is deployed matters much more than the idea on paper. If a government struggles with the capacity to regulate and enforce, then a decentralized option might improve the situation, but for a government that runs efficiently, a decentralized funding/participation option, no matter how high tech, might do more harm than good. Even in a place like Sao Paulo, privatization of infrastructure funding could help systematize a weak state control on infrastructure funding.

Part of that answer relies on precision tailored technology. Adoption of Smart City approaches for its own sake is counterproductive unless the unique landscape of the aspiring,

high performance city ecosystem of the future is considered in full. Globalized collaboration is essential to bringing impactful infrastructure projects to fruition, but the facts on the ground will always dictate the best practices. Take São Paulo's plans for implementing blockchain technology (DLT), a cornerstone of smart city development, to finance and fortify transportation, housing, sanitation, and other infrastructure reforms. In this deeply indebted Brazilian metropolis, city planners are looking to a future in cryptocurrency.

Godsil identifies key arenas in which blockchain data gathering and communications exchange can have enormous impact in various industries including healthcare (for secure sharing of medical information and enhancement of diagnosis, treatment, and patient care); identity (to store and validate user profiles, thus curtailing identity theft and related fraud); microfinance (to revolutionize the exchange of monetary value globally); sovereignty (to reduce the power of central trust brokerage authorities, facilitate freedom of movement across borders, and empower social enterprises); government (for building transparent contracts that digitize citizen rights, especially in elections); e-commerce (to provide a level playing field for local providers of goods and services in their fight to survive the onslaught of behemoth e-tailers); and social platforms (to allow individual citizens to control and monetize their own data) (Godsil, 2018).

Evidently, there exists enormous potential for technology like this. But it will never be as simple as taking something that works somewhere else, and translating it to a unique economic, political, and social ecosystem. Even though decentralized ledger technology is one of the most promising democratizing, privacy protecting technologies, in the case of Sao Paulo, it may also lay the groundwork for a system that cannot and will not allow for a financially and democratically strong government.

In the US, for example, the one small aspect of blockchain technology that resonated with America was not that it was a way to protect privacy, secure supply chains, improve bureaucratic efficiency in the government, and to solve infrastructure funding problems urgently needed in cities across the US. What caught people's attention was the fact that it was a new and secure, investable, digital, *asset*. The boom-bust cycle with the dollar value of Bitcoin, caused in large part by American capital, was so predictable in the American context, American economic sociologist Thorstein Veblen, who wrote about American finance capitalism in the early 20's, would be rolling in his grave. And yet still blockchain technologies' legitimacy in the US rests on the way Bitcoin's value as an asset behaves, not the actual use case. The multi-edged sword of blockchain technology is just one example of how technology creates a nuanced and daunting issue for regulators and adopters. Without attempting to define positive and negative use of technology, it is evident that technology has a purpose, a use, and a misuse. Predicting and protecting against its misuse and encouraging its purpose is different for spy tech; for green energy tech; for blockchain tech; for sharing economy tech like Airbnb, Uber, and Bird scooters; and even for tech led gentrification in capitalist societies.

Unpolished Segments

3) Modern Technology in the Public Realm

Home camera devices, “smart” doorbells, and “neighborhood watch” apps have helped to reduce the theft of daytime mail deliveries in many neighborhoods. These devices have also raised questions about privacy, equity, and community trust. Stakeholders, from experts to residents, deserve to be represented in the decision-making process of how these technologies are used and deployed, not just profit maximizing agents for a corporation.

Along with a skyrocketing rise in—and demand for—home deliveries has come a spate of home safety apps, each promising to keep your neighborhood, your street, and your front door safe. “Nextdoor” provides a social network for neighbors where citizen informs each other of local crimes in progress. “SimpliSafe” promises to keep “porch pirates” at bay. Amazon's Ring gives you a doorbell and security camera in one. Some of these surveillance apps are actually free in terms of dollar fees too. However, it's your personal data (where you live, what you do there 24/7, even what you say) that holds the real value for these companies. This data can be translated into even more valuable assets than dollars, yet can be potentially more costly, in a less quantifiable way, to the one's whose data is to be harvested than a dollar amount. In addition to these technologies directly related to the public realm, service products like Amazon Alexa, Google Home, and the slew of digital advertising companies like Facebook that track your online activity extensively softly infiltrate ones' private life too.

The implementation of surveillance technology begs a variety of questions; Do smart surveillance apps deliver safety or the opposite? How can there be a cost benefit analysis to consumers when money isn't the commodity? How can we hold providers accountable for the

consequences of emerging technology on our city as a whole and on vulnerable populations in particular? In a less American way to frame the previous question; Can states both adopt and regulate the private sector in this technology?

These questions get at the culture of tech regulation in the US in particular where... contentious, fractured goals, different expertise (or lack of expertise) within the institutions. Institutions of private and public sectors in US are so structurally and fundamentally different, it's impossible for them to have a cohesive partnership.

Police Body Cameras scan face...

- Barth, Brian. "Smart Cities or Surveillance Cities?" *American Planning Association*, American Planning Association, Mar. 2019, www.planning.org/planning/2019/mar/smartcities/.
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Government actors are supposed... Yet, elected officials and their team's jobs don't hinge on their ability to provide services often needed in the background of people's lives, but their ability to get elected. Even the non-elected officials' jobs hinge on their ability to best serve their elected boss. Once someone new comes into office, the elected official is out along with their team. When the incentives align... even when it comes to regulation and legislation, the governing bodies are nearly clueless in how it works. Conservative and liberal politicians alike are quick to treat technology as if it's a singular phenomenon. The reactions, regulations, and rhetoric on Facebook sound the same as they do for Amazon, as for Google, all very unique companies that provide different services and function differently.

Shoshanna Zuboff makes a key point in her book *The Age of Surveillance Capitalism* about this nuance when it comes to the government's relation to these type of companies that employ

new-age technologies in unprecedented ways. She notes that “The unprecedented nature of surveillance capitalism has enabled it to elude systematic contest because it cannot be adequately grasped with our existing concepts” (Zuboff, 14). She notes that there are real issues with concepts like “privacy”, “convenience”, and “monopoly” but they fail to identify the critical facts of this unprecedented form of capitalism that would allow us to understand it contest it properly. Elected officials on both sides of the aisle, as well as the government apparatus to address phenomena like this, are archaic. Zuboff calls this the “horseless carriage syndrome” (Zuboff, 12). When the automobile was first invented and released to the public, the concepts to understand it didn’t exist and it was called the “horseless carriage” instead of a car. “When we encounter something unprecedented, we automatically interpret it through the lenses of familiar categories, thereby rendering invisible precisely that which is unprecedented”. In the realm of government legislation and regulation, the same has applied. The familiar lenses of liberal and conservative politics have provided an easy set of lenses to view the unprecedented through, neither of which are adequate to understand and effectively mitigate the harms of technology used to gain from surveillance capitalism. She notes that “calls to break up Google and Facebook on monopoly grounds could easily result in establishing multiple surveillance capitalist firms, though at a diminished scale, and thus clear the way for more surveillance capitalist competitors” (Zuboff, 23). Do we really want lower prices, longer work hours for employees, and two Jeff Bezos types competing against each other? Given the problems Amazon poses, it worsens the problems. The same logic can be applied to many surveillance capitalist companies, yet prominent politicians in 2020 still use the same logic of early 19th century oil industry regulation strategies.

Airbnb – Sam stein lecture on the 27th

Iphone/airpods – Jerimiah moss – isolation = gentrification

UBER – Nicholas Ochiutto

Bird Scooters

“Is Airbnb Helping – or Worsening – Inequality in Cities?” *U.S. News & World Report*, U.S. News & World Report, www.usnews.com/news/cities/articles/2019-05-02/airbnbs-controversial-impact-on-cities.

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Pandey, Erica. “The Side Effects of the Transportation Revolution.” *Axios*, Axios, 18 Sept. 2019, www.axios.com/transportation-revolution-bird-uber-lyft-electric-scooters-a03a6d9b-24fd-4bab-83f3-a2139ef5d297.html.

4) Tech Gentrification in cities (Google/FB campus, Amazon Seattle)

Hollow City - Hollow City captures the gentrification of San Francisco in a way that shows the brute force infiltration of the dot com boom in the 2000's using a kind of historic ethnographic method. A large portion of the book is dedicated to photos showing the destruction caused by hyper gentrification to one of America's most vibrant and diverse communities throughout history. Something that is exemplified in this book is how capital carries so much socio-economic torque along with it. What I mean is that capital doesn't just plop down and build things, it restructures entire ways of living and disrupts social (and even pre-existing capital) ecosystems too. Construction worker - "This whole city is a construction zone. I came from

Phoenix. I can't afford to live here, so I am sleeping on the floor at a friend's house. I came here because there is so much work. There are a lot of guys like me on the job." The coercive force of capital has created a situation for this worker where the best choice he has is to sacrifice his quality of life for work, at the additional expense of thriving community. Solnit and Schwartzberg also talk about the draw to San Francisco throughout history as a bohemian oasis for the creatives away from Robert Moses's concrete car cities that, unfortunately, capital always finds its way too as well.

Oracle in Austin TX.

(P. 81 of Generation Priced Out)

- "Gay Shame: Fighting Techies and YIMBYs in the Bay Area; 3rd Wednesday w/ Portland Assembly." *KBOO*, 21 Aug. 2019, kboo.fm/media/75008-gay-shame-fighting-techies-and-yimbys-bay-area-3rd-wednesday-w-portland-assembly.
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Bad legislators → gentrification

- "Column: Freelancers Fear California's New Gig Worker Law Will Wipe Them Out." *Los Angeles Times*, Los Angeles Times, 25 Oct. 2019, www.latimes.com/business/story/2019-10-25/hiltzik-freelance-writers-gig-worker-law.
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- Sam stein
- Generation priced out – SF vs Seattle
 - o **Google Bus in SF vs Seattle**
- Amazon HQ2

- **Government serves capital almost completely**

5) High tech infrastructure in China → displacement – state driven (current data and information on displacement in china is hard to find...)

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- “Real Estate in China.” *Wikipedia*, Wikimedia Foundation, 30 Sept. 2019, [en.wikipedia.org/wiki/Real Estate In China](http://en.wikipedia.org/wiki/Real_Estate_In_China).

Surveillance state of China (comparison between technology in undemocratic capitalist context)

So in the US, government actors are supposed... Yet, elected official’s jobs don’t hinge on their ability to provide services often needed in the background of people’s lives, but their ability to get elected. Even the non-elected officials’ jobs hinge on their ability to best serve their elected boss. Once someone new comes into office, the elected official is out along with their team. When the incentives align

But in China, the state operates differently.

Facial recognition is the new hot tech topic in China. Banks, airports, hotels and even public toilets are all trying to verify people’s identities by analyzing their faces. But the police and security state have been the most enthusiastic about embracing this new technology. The pilot in Chongqing forms one tiny part of an ambitious plan, known as “Xue Liang,” which can be translated as “Sharp Eyes.” The intent is to connect the security cameras that already scan roads, shopping malls and transport hubs with private cameras on compounds and buildings, and integrate them into one nationwide surveillance and data-sharing platform. It will use facial

recognition and artificial intelligence to analyze and understand the mountain of incoming video evidence; to track suspects, spot suspicious behaviors and even predict crime; to coordinate the work of emergency services; and to monitor the comings and goings of the country's 1.4 billion people, official documents and security industry reports show.

A goal of all of these interlocking efforts: to track where people are, what they are up to, what they believe and who they associate with — and ultimately even to assign them a single “social credit” score based on whether the government and their fellow citizens consider them trustworthy. “Surveillance technologies are giving the government a sense that it can finally achieve the level of control over people's lives that it aspires to,” he says Adrian Zenz. In this effort, the Chinese government is working hand-in-glove with the country's tech industry, from established giants to plucky start-ups staffed by graduates from top American universities and former employees of companies like Google and Microsoft, who seem cheerfully oblivious to concerns they might be empowering a modern surveillance state.

The name “Sharp Eyes” is taken from the Communist slogan “the masses have sharp eyes,” and is a throwback to Mao Zedong's attempt to get every citizen spying on one another. The goal, according to tech industry executives working on the project, is to shine a light into every dark corner of China, to eliminate the shadows where crime thrives. The Sharp Eyes project also aims to mobilize the neighborhood committees and snoopy residents who have long been key informers: now, state media reports, some can turn on their televisions or mobile phones to see security camera footage, and report any suspicious activity — a car without a license plate, an argument turning violent — directly to the police. To the eyes of the masses, in other words, add the brains of the country's fast-growing tech industry.

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- **Pending sources from Professor Abigail Coplin**

6?/Conclusion) Synthesis – can there be a combination of state driven innovation and data use and democratic regulation?

- **System of non-monetary (happiness) economics for legislation assessment and research? May help refocus priorities of city municipalities that have to face consequences of technology → more about city users and their happiness**

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