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How Information and Communication Technologies Influence Urban Governance and Citizenship

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FOUCAULT AND THE CONNECTED CITY: HOW INFORMATION AND COMMUNICATION TECHNOLOGIES INFLUENCE URBAN GOVERNANCE AND CITIZENSHIP

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ABSTRACT

Over the last centuries, the worldwide competition amongst cities has increased, as they vie for capital, knowledge, and production. In order to keep their status as important economic, political, and cultural centers, as well as hubs for innovation, cities increasingly turn towards new information and communications technologies (ICTs). Cities hope to, simultaneously, achieve sustainability, economic growth, and a general improvement of the quality of life. Within these processes, private companies gain immense influence because of their roles as suppliers of technology and accumulators of data. Citizens are at the heart of every city and, therefore, they are the most affected by the changes instigated by the increased use of technology as well as subsequent data-based forms of governance and knowledge production. This paper offers an assessment of the current conditions of these changes utilizing Michel Foucault's concept of biopolitics. This concept offers the aspects of power, knowledge, and subjectivity to explain potential negative and counterproductive implications of urban ICT use. The analysis here reveals the daunting amount of influence over citizens, gained by private corporations; and how this influence extends into areas of governing, previously reserved for the state.

Los ciudadanos son el corazón de toda ciudad, y por lo tanto son afectados por la mayoría de cambios que son ocasionados por el aumento del uso de tecnología y las diferentes posteriores formas de gobernanza basadas en data y producción de conocimiento. Este artículo ofrece una evaluación de las condiciones actuales de estos cambios utilizando el concepto de biopolítica de Michel Foucault. Este concepto integra aspectos de poder, conocimiento y subjetividad con el fin de explicar el potencial negativo y las implicaciones contraproducentes del uso urbano de las TICs. El presente análisis revela el grado alarmante de influencia que las empresas privadas han adquirido sobre los ciudadanos, y cómo esta influencia se extiende a áreas de gobierno que anteriormente pertenecían únicamente al estado.

INTRODUCTION

Cities are central economic, cultural, and social units of today's world, especially since the global trend of urbanization has gained momentum in the last five decades. Urban areas host more people than ever before: The United Nations (UN) estimates that by 2050, around 68 percent of the global population will live in cities.[1] In many ways, cities around the world compete with each other over the well-being of their inhabitants, economic prosperity, and innovative influence.[2] In 1984, Jane Jacobs argued that the urban is crucial to understand the wealth of a nation.[3] Since then, the immense importance of urban areas has only increased and new information and communication technologies (ICTs), such as the 5G technology or internet connected sensors, offer new opportunities in urban development. The internet of things (IOT), Big Data, and Artificial Intelligence (AI) are technologies that promise to increase efficiencies, and with that, the overall quality of life. Citywide public WIFI or the wireless automation of streetlights according to traffic flows are two manifestations of such technologies. Concepts like the Smart City have gained substantial momentum over the last two decades and are examples of how private actors increasingly partner with cities, governments, and policy makers.[4] The effects of Smart City technologies on governance and citizens are not fully understood, and the different concepts of Smart City have become increasingly nebulous. Still, companies continuously invest into these technologies; it is estimated to be a multi-trillion-dollar business.[5]

An increasing number of cities are taking an active role in developing and implementing ICTs. Many of these implementations are related to the idea of the Smart City. Yet, there is no such thing as the one Smart City concept; rather many overlapping and sometimes even opposing concepts are being used by different actors. Something almost all concepts on Smart City share is the use of data for urban development. Hence, within this paper, Smart Cities are defined broadly, as the implementation of sensors and technologies in urban areas in order to aggregate large amounts of data on mobility,

01. "68% of the world population projected to live in urban areas by 2050, says UN," United Nations, last modified May 16, 2018, https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html.

02. David Harvey, "From Managerialism to Entrepreneurialism: The Transformation in Urban Governance in Late Capitalism," *Geografiska Annaler, Series B: Human Geography* 71 B, no. 1 (1989): 3–17.

03. Jane Jacobs, *Cities and the Wealth of Nations: Principles of Economic Life* (New York: Random House, 1984).

04. Anthony Townsend, Rachel Maguire, Mike Liebhold, and Mathias Crawford, *A planet of civic laboratories: The future of cities, information and inclusion* (Palo Alto: Institute for the Future, 2010).

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energy and weather—amongst others. Such data is usually processed by machines in order to create knowledge and insights, creating a new way of tracking movements and phenomena around cities; or put differently, of sensing urban areas.[6] The underlying idea of Smart City technologies is to improve urban efficiencies based on data insights. Improving traffic flows, energy management, and streamlining public transport solutions are three examples, which often promise to reduce energy consumption as well as carbon emissions while increasing the ease of use. Other aims of Smart City concepts are to make cities more accessible through technologies; to create more sustainable and inclusive urban environments; as well as to improve the general quality of life—ideally while saving money and fostering economic prosperity.[7]

The effects are unprecedented and particularly pressing in urban areas, where nets of surveillance techniques and strategies are tightly knitted. This article has three aims. Firstly, to draw a picture of how cities have been pushed to implement increasing amounts of ICTs; starting with the development of early liberalism, to modern American neo-liberalism, to competition between cities. Secondly, through the lens of biopolitics, to examine the effects on governance and citizenship, that are triggered by a heightened level of technology implementation. Thirdly, to show how private corporations obtain biopolitical powers, which used to be reserved for the state. Understanding how technology and data are changing governance logics hold important implications for a future understanding of cities, for citizens and city-makers alike.

FROM LIBERALISM TO A NEW "*RAISON DE CITÉ*"

Urban areas have long been elevated in their meaning for people, the state, and the economy. As cultural, economic, and political centers, they have an enormous impact on shaping today's world. In the OECD countries, on average, 60 percent of countries' GDP is being generated in cities, which shows the power urban areas hold in relation to their size.[8] Urbanization as well as globalization have further pushed this development during recent decades. Cities have a strong urge to establish themselves as economically strong and innovative players in order to secure assets for prosperity.[9] This process is often imagined to be delivering a high quality of life for citizens at the same time. Two examples of how cities try to attract companies are tax cuts and the provisioning of land. Recently, this could be witnessed in Berlin, where the construction of a Tesla factory caused controversy as initial land prices were too low, seemingly to secure a prestigious and economically important project for the region. In this particular case, local governments were pushing for a quick realization of the project, despite environmental and citizens' concerns.[10] Another example could be organizations such as the Copenhagen Solutions Lab, a Smart City incubator initiated by the city administration. The aim of such organizations is to facilitate knowledge exchange between cities and companies, prepare the implementation of new technologies, and attract investments. As many cities establish such organizations, it becomes clear that cities have become active agents in a worldwide game of cities. Some scholars have questioned the idea that cities can be active agents, as many different actors influences process within urban areas.[11] Yet, it is argued here, that in the case of technology use and implementation, cities must be seen as active agents; particularly as city municipalities and governments actively push for technological investments and public private partnerships. Hence, when this article refers to cities as active agents, it implies a process in which municipalities and local governments are following a certain strategic aim, in particular, the accumulation of production, financial, and consumption flows. This extrinsic motivation can be described as a *raison de cité*, based on the concept of the *raison d'état*, which describes the state's motivation and strategy to secure its safety and pursue its interests within the competition with other states.

To understand how this development started, it is necessary to look at the rise of liberalism throughout the last centuries. In his lectures of 1977-78 and 1978-79, Michel Foucault demonstrated how liberalism had been rising throughout the past centuries, influencing politics, the *raison d'état* and governmentality. For Foucault, liberalism—which is not understood as a theory, but as a practice towards objectives based on self-reflecting regulation—is a form of rationalizing the exercise of government, with specific respect to the internal rule of maximum economy.[12] It is important to stress that government does not refer to the institution;

05. Sarwant Singh, "Smart Cities -- A $1.5 Trillion Market Opportunity," Forbes, June 19, 2014, https://www.forbes.com/sites/sarwantsingh/2014/06/19/smart-cities-a-1-5-trillion-market-opportunity/.
06. Jennifer Gabrys, "Automatic Sensation: Environmental Sensors in the Digital City," *The Senses and Society* 2, no. 2 (2007): 189–200, https://doi.org/10.2752/174589307x203083.
07. Martin Dodge and Rob Kitchin, "Codes of Life: Identification Codes and the Machine-Readable World," *Environment and Planning D: Society and Space* 23, no. 6 (2005): 857, https://doi.org/10.1068/d378t. Donald Leffers and Patricia Ballamingie, "Governmentality, Environmental Subjectivity, and Urban Intensification," *Local Environment* 18, no. 2 (2013): 146f, https://doi.org/10.1080/13549839.2012.719016.
08. OECD, OECD Regions and Cities at a Glance 2018 (Paris: OECD Publishing, 2018), 9, https://doi.org/10.1787/reg_cit_glance-2018-en.
09. Harvey, "Managerialism", 3–17.
10. "Streitpunkte und Fragen zu Tesla in Brandenburg," RBB, last modified January 25, 2020, https://www.rbb24.de/wirtschaft/thema/tesla/beitraege/tesla-gruenheide-brandenburg-faktencheck-wald-wasser-umwelt.html.
11. Harvey, "Managerialism", 3–17.
12. Michel Foucault and et al., *The Birth of Biopolitics: Lectures at the College de France, 1978-79* (Basingstoke: Palgrave Macmillan Limited, 2008), 318.

rather, it can be seen as the conduct of governing people by employing the tools of the state. With that, the economy starts to play a major role in the political and internal self-limitation of the state; "reason of least government" becomes the new principle. Large economic freedoms are created, opposing constraints, control and coercion; creating a complex relationship between the two aspects of freedom and control. Yet, this does not mean that economics are some kind of 'new' governmental reason; they should rather be regarded an art lateral to governing.[13]

Liberalism evolved into different forms over the centuries. One example is the German concept of *Gesellschaftspolitik*: the formation of the market and the ordering of society in accordance with the relating competitive mechanisms and the enterprise.[14] In short, the economic model of demand and supply is extended into the social. American neo-liberalism is built on those very ideas yet radicalizes and exhausts them. The extension of the market principle into the social is pushed to a level on which personal behavior is enciphered and used as intelligence.[15] This also includes the mapping of non-economic behavior in the logic of supply and demand, as well as applying the economic grid on politics and governmentality.[16] One could say that the language of governance is increasingly evolving towards a vocabulary of enterprise. That allows for political rationality to be 'translated' into attempts of governing social, economic or personal problems.[17] The economy has such an important impact, that it changes the *raison d'état* and dictates essential aspects of modern governmentality.[18]

Given that cities have become such important economical units and have entered into global competition, it can be argued that their external influences, their *raison de cité*, are also heavily influenced by economics. Nowadays, cities are inviting and collaborating with companies in order to create the most efficient cities, to generate economic growth, while also ensuring a high quality of life for their citizens. Technology companies bring capital, knowledge, and labor; they also cultivate a city's status for innovation within the global competition of cities. "New economies of cities" establish themselves, in particular information marketplaces with data and information as new forms of currency.[19]

With the rise of technology and new possibilities in data processing, liberalist ideas have become increasingly prominent within urban development and governance. City governments actively push for economic growth and partnerships with private corporations; especially in the realm of ICTs. These corporations are built on neo-liberal ideas and mainly with the economy in mind. As such the strive for economic growth influences essential parts of urban governance. This is especially worrying as data from Smart City technologies is used to gain insights and ultimately influence citizens' behavior. As such the neo-liberal ideas behind the increased number of urban technologies propel new techniques, strategies, and technologies of surveillance and control forward—especially in dense urban areas where corporations can generate a lot of data about citizens. To understand the exact influences of these forms of surveillance on governance and citizenship, it is necessary to understand some of the technical implications behind these processes. Hence, the next section will examine some of the technical aspects behind new forms of surveillance.

TECHNOLOGY, DATA AND THE LOGIC OF ACCUMULATION

Mainly due to their density, cities have been common testing grounds for new technologies. In order to grasp the implications of urban ICT use, one must look at the technical aspects of data. The concept of identification codes proves particular helpful. Such codes can be used—as the name suggests—to precisely identify individuals within a greater mass of people. The information gained on a particular subject can then be used to "manage" and maybe even "reaggregate" the information to suit the processor.[20] Identification codes themselves are usually a sequence of numbers and letters which differentiate in length, formatting, granularity, and the extent of recognition and reputation. Every day, these codes are used million-fold and allow for the movement and actions of individual subjects to be pin-pointed exactly; through the tracking of phones, credit cards, or surveillance data. Whichever part of the code a constructor of a database or service decides to keep is called 'key capta'.[21] Key captas provide the platform on which information is then built. For that to happen, several key captas have to be put into a specific context and analyzed. In this way, it is possible to turn captas into packages information; forming the basis for Big Data.

The power of identification codes lies within "their ability to discriminate, to be rapidly and automatically monitored, updated, and processed, and to provide authentication and credentials that dictate various forms of access."[22] Access is not necessarily understood in the physical sense here, but rather focuses on the access to information and services for example. Deleuze expressed a similar idea;

13. Foucault and et al., 286.
14. Foucault and et al., 240-41.
15. Foucault and et al., 242-43.
16. Foucault and et al., 246-47.
17. Nikolas Rose, "Governing Enterprising Individuals," in *Inventing Our Selves: Psychology, Power, and Personhood* (Cambridge: Cambridge University Press, 1996), 154.
18. Michel Foucault and et al., *Security, Territory, Population* (Basingstoke: Palgrave Macmillan Limited, 2007), 348.
19. Ellie Cosgrave, Kate Arbuthnot, and Theo Tryfonas, "Living Labs, Innovation Districts and Information Marketplaces: A Systems Approach for Smart Cities," *Procedia Computer Science* 16, no. 13 (2013): 669, https://doi.org/10.1016/j.procs.2013.01.070.
20. Dodge and Kitchin, "Codes of Life", 853.
21. Dodge and Kitchin, 853-54.
22. Dodge and Kitchin, 855.

arguing that societies are built around a numerical language through which certain information can be accessed, or the access denied.[23]

In her immensely influential article "Big other: surveillance capitalism and the prospects of an information civilization," Shoshana Zuboff exemplifies these developments based on several interviews with a Google manager. For Zuboff, the combination of five sources form Big Data: (1) computer-mediated economic transactions, (2) billions of sensors, (3) corporate and government databases, (4) private and public surveillance cameras, and finally (5) non-market activities.[24] A logic of accumulation underlines these data flows and their analysis. The overall aim of this accumulation is revenue, which is won following a cycle of production. Through these processes, data is turned into what Zuboff calls surveillance assets that attract large investments, also called surveillance capital. This marks the birth of surveillance capitalism, which describes how the accumulation, processing and analysis of data is increasingly used by a few hyperscale corporations in order to widen their influence and to generate and attract capital. Zuboff calls these corporations "big others", arguing that they are embedded in every aspect of our life, enact constant monitoring, and who have commodified the modification of behavior.[25] Another important aspect is that corporations act in secret; something that can also partly be said about governments; as we have learned from Edward Snowden. But unlike governments, corporations like Google, Amazon, and Apple are not subject to any meaningful oversight; posing a profound anti-democratic threat.[26]

Crang and Graham offer an additional perspective, arguing that the interaction of data and its processing enables new ways of identification and stratification. For example, geolocating people becomes a central aspect of governing as the linkage between knowledge and social control can be utilized as geodemographic information.[27] Geolocating subjects has become very easy amid the widespread use of smartphones. Gabrys focuses on the alterations along the lines of spatial, material and citizenly aspects.[28] Especially marginalized, minority or hardly visible groups can easily be subjected to forms of environmental racism. Informal settlements for example are more likely to be blind spotted by technology due to a potential lack of state-built infrastructure. This is especially the case if disparities of access already exist or if a certain technology favors certain groups; gated communities or richer neighborhoods for example. Through these means, technology can easily enable disparity, inequality, and ghettoization.[29]

Discourses are used to frame and justify the rising use of identification codes and their processing. In the case of Smart City technology, efficiency is one of dominant discourse topics. Based around these discourses, governments find arguments in favor for extensive data use, overruling possible counterarguments. Security, safety, and efficiency are the dominating topics of these discourses.[30] The need for discourses mainly applies to public actors, which are subject to meaningful oversight. Yet, these discourses are not necessarily needed for multinational corporations which have been able to push towards something that has been called "infrastructure imperialism"[31] or a "new kind of invisible hand."[32] With meaningful oversight mechanisms missing, corporations are pushing into private territory until detected, without respecting laws and regulations. A great example to illustrate this is the illegal scrapping of private WIFI data by Google Street view cars, which was discovered only after Google got hold of the data; resulting in a settlement payment of 7 million dollars.[33] Another is the usage of private pictures by Clearview AI, a facial recognition start-up. By scrapping large amounts of pictures from websites, the company promises to be able to recognize people in surveillance videos almost in real time; potentially ending privacy as we know it.[34]

So far, it has become clear that the increased use of ICTs in urban areas has immense implications on governance and citizens. In the next section the theories of Michel Foucault are used once again to further describe the implications of urban ICT. Starting from biopolitics and utilizing the aspects of power, knowledge and subjectivity, this paper will examine some of the precise effects.

23. Gilles Deleuze, "Postscript on the Societies of Control," *October* 59 (1992): 4.
24. Shoshana Zuboff, "Big Other: Surveillance Capitalism and the Prospects of an Information Civilization," *Journal of Information Technology* 30, no. 1 (2015): 78, https://doi.org/10.1057/jit.2015.5.
25. Zuboff, "Big Other", 80-82. See also Yochai Benkler, "Degrees of Freedom, Dimensions of Power," *Daedalus* 145, no. 1 (2016): 23, https://doi.org/10.1162/DAED_a_00362.
26. Zuboff, "Big Other", 83.
27. Mike Crang and Stephen Graham, "SENTIENT CITIES Ambient Intelligence and the Politics of Urban Space," *Information, Communication & Society* 10, no. 6 (2007): 791, https://doi.org/10.1080/13691180701750991.
28. Jennifer Gabrys, "Programming Environments—Environmentality and Citizen Sensing in the Smart City," *Environment and Planning D: Society and Space* 32, no. 1 (February 2014): 35, https://doi.org/10.1068/d16812.
29. Elisa Tangheroni, "Contemporary Urban Paranoia," *Amateur Cities*, August 15, 2018, https://amateurcities.com/contemporary-urban-paranoia/?fbclid=IwAR3ddnCFQ6tMuZBBCCwPbBoXXlK4j3zADBNcjgFykZ81RMOU0vpi23frPzg.
30. Dodge and Kitchin, "Codes of Life", 856.
31. Siva Vaidhyanathan, The Googlization of everything (Berkeley: University of California Press, 2011), 2.
32. Zuboff, "Big Other", 82.
33. Zuboff, 78.
34. Kashmir Hill, "The Secretive Company That Might End Privacy as We Know It," The New York Times, January 18, 2020, https://www.nytimes.com/2020/01/18/technology/clearview-privacy-facial-recognition.html.
35. Foucault and et al., *Security*, 1.

BIOPOLITICS AND GOVERNMENTALITY

Foucault's concept of biopolitics, which emerged from his late lectures at the end of the 1970s, offers an interesting approach towards understanding the changes imposed by an increased use of ICTs. Biopolitics describe a situation where basic human, biological features become the object of political strategy.[35] This idea dates to a time when sovereigns were able to decide over life and death of their citizens. To illustrate this, Foucault offers the picture of two poles: one pole focuses on the body as a machine, its optimization and integration into efficient and economic control systems (amongst other things); the other pole marks the body within the mechanics of life, such as birth and mortality.[36] Rabinow and Rose argue that at its most simplified, biopolitics describe the inference with the vital characteristics of human existence: birth, morbidity, mortality, and longevity.[37] Foucault never fully developed his ideas on biopolitics, and different authors have picked up on his start of the discussion. Two understandings worth noting are presented by Negri and Agamben. The former describes biopolitics as something omnipotent, all pervasive; the latter as a power which is eventually based on the possibility of taking someone's life. Rabinow and Rose take another approach by focusing on three main aspects: (1) knowledge of vital life processes, (2) power relations which have humans as living beings as focus, and (3) modes of subjectification through which subjects work on themselves.[38] This paper follows the idea of Rabinow and Rose; focusing on the aspects power, knowledge, and subjectivity. One of the main arguments, which will be developed in the coming section, is that corporations gain immense influence on biopolitical power; especially in the sense of bodily optimization and the body's integration into efficient systems.

In order to fully understand the concept of biopolitics, it is necessary to look at the relationship between biopolitics and governmentality, since both concepts relate and refer to each other on different levels. With both governmentality and biopolitics aiming at the construction, articulation and management of population, the differences are subtle. While biopolitics focus on the body and essential life processes, governmentality focuses more on the relationship between the governing of the state, of ourselves, and of others.[39] Rose described it as governance which is not only being enacted on 'life' itself but also on the 'way of life'; this came to be known as conduct of conduct.[40] Foucault himself addressed the concept in his 1977-78 lectures and focused on three main aspects; two of which are relevant here. The first aspect is the power that focuses on populations, has "political economy as its major source of knowledge", and apparatuses of security as technical instruments. The second aspect is the fact that government always had a pre-eminence over other forms of power, such as sovereignty and discipline; creating specific forms of governmental apparatuses and series of knowledges.[41] Furthermore, governmentality does not necessarily originate from or have the state as point of reference.[42] An example here would be the discourse on efficiency—saving time and resources—which is used to further the implementation of technology by actors, such as city governments. The discourse is advanced by corporations in order to implement their services and sell their products, while municipalities want to achieve better quality of life. These discourses on efficiency are not necessarily about how things are, but the focus often shifts to how things should be.[43] Garbys initiated an interesting discussion on this specific issue by using Foucault's concept of environmentality and pointing towards the changes fostered by ICTs.[44]

But how can the concept of biopolitics, established before the digital age, be helpful in explaining the changes imposed through ICT use? The value of the concept lies in offering an understanding on how corporations gain influence on vital aspects of life through data. It is important to emphasize that the rising use of technology not only penetrates the outer layer of our being as subjects; it goes down to the bone. This process puts technology and data over everything, mass-customizing each and everyone's life. Corporations especially try to gain influence on the aspects of optimizing bodies and integrating them into the efficient economic systems. Successfully organizing this process would lead to more revenue for those corporations. Streamlining energy consumption through Smart Meters, mobility flows through personalized mobility/geo data, and health aspects through air sensors are just three examples. A recent example for this is the "Sidewalk Project" in Toronto, a collaboration between a Google subsidiary and the city of Toronto to design a new neighborhood. The high-tech neighborhood was supposed to be revolutionary in many ways; smart technologies, cheap housing, intelligent traffic, and green lifestyles were all part of the proposal. Since its start in 2017, the project and Google's input have been increasingly criticized and some of the plans cancelled; mainly due to privacy and data misuse concerns.[45] Yet, the general scope of the projects shows that companies such as Google, by planning complete neighborhoods, gain an unprecedented amount of influence over our many aspects of our lives and the data we produce. The increasing influence of corporations is

36. Michel Foucault, *The History of Sexuality* (New York: Vintage Books, 1990), 139.
37. Paul Rabinow and Nikolas Rose, "Biopower Today," *BioSocieties* 1, no. 2 (2006), 196-97, https://doi.org/10.1017/S1745855206040014
38. Rabinow and Rose, "Biopower", 197.
39. Mitchell Dean, *Governmentality: Power and Rule in Modern Society* (London: SAGE Publications, 1999), 2.
40. Rose, "Governing", *152*.
41. Foucault and et al., *Security*, 108.
42. Rabinow and Rose, "Biopower", 200.
43. Peter Brand, "Green Subjection: The Politics of Neoliberal Urban Environmental Management," *International Journal of Urban and Regional Research* 31, no. 3 (2007): 623, https://doi.org/10.1111/j.1468-2427.2007.00748.x.
44. Gabrys, "Environmentality", 30–48.

especially worrisome, as data about every aspect of our life is available and used to govern our behavior. Suddenly, issues like health, birth, and mortality are influenced the same way as subjects' personalized online advertisements or their decision on which cologne to buy. The more power private corporations gain in the process of behavior alteration, the greater the role of economic factors will become; increasingly undermining the power of state actors. Furthermore, the concept of biopolitics emphasizes the connectedness of the aspects power, knowledge, and subjectivity. The importance lies in the fact that only the interplay of all three aspects will allow an entity to gain influence on biopolitics.

POWER, KNOWLEDGE, AND SUBJECTIVITY

Private actors are gaining increasing amounts of access to and influence on subjects' lives through technology and data, inherently changing urban governance and citizenship. To better understand these changes as well as their potential negative implications, the three aspects of power, knowledge, and subjectivity prove especially helpful. Knowledge always played a large role in Foucault's theories; especially knowledge about life and its influence on the fields of power and intervention.[46] In his 1977-78 lectures, Foucault emphasizes the birth of statistics as one of the secrets to power.[47] He claims that the sovereign's knowledge has changed, from a knowledge of law to a knowledge of things. Foucault called that knowledge statistics, today the expanded knowledge through data can be called Big Data. Rabinow and Rose underpin this point with their argument that apparatuses of knowledge are ever growing; not only on the state side, but non-state actors have also influenced these apparatuses.[48] While back in the seventeenth century these statistics were used to maintain the state's power, today Big Data secures the power of a few private corporations. The development of technology allows for the collection and accumulation of manifold varieties of data; especially as people feed the data machine by using networked services.

Moreover, Foucault's concept of the *dispositif* describes an assemblage that combines different discourses, institutions, laws and ethical propositions; all of which are inherently influenced and linked to knowledge.[49] As such, *dispotifs* are key influencers. They dictate which kind of data is accumulated and analyzed, and what is perceived as acceptable. As stated above, corporations are often outside these 'dispositifs', partly because they are not under meaningful oversight. Yet, if the state and cities want to recapture more influence on technology and data use, then the inclusion of private corporations into these *dispositifs* are key. Otherwise state and city actors won't establish themselves as strong regulators and the door to data misuse or underregulated data use will be open for a long time to come.

Turning to the discussion of power, it is important to note the relational character of power, in the foucauldian sense. Power only describes the strategic direction which societies follow—something that can be described as a network of relations.[50] These networks and the power they establish vary across different areas. Yet, the networks only work when several actors have a certain relation to each other. Zuboff suggests that there are massive shortcomings to this precise idea with the new logic of data accumulation and analysis by corporations—mainly because of missing "structural reciprocities."[51] For a long time, corporations were dependent on the population as a source of customers and employees, which is no longer the case. Google and other hyperscale corporations are pushing into new spheres in terms of revenue but also in terms of independency from the population—ultimately leaving them with a huge amount of power. In doing so, they build a regime which is recording and modifying behavior based on a commodified logic—"everyday […] from toasters to bodies."[52]

In his 1975-76 lectures, Foucault writes that the individual must be seen as a power relay through whom power passes on.[53] This implies that subjects are not oppressed by power but rather produced through it; power, in a certain way, actually creates the individual. This is not the case if the relationship between actors within a power network becomes one sided or non-relational, which is the case with many new data-based technologies.[54] Furthermore, the absence of dialogues in the process of data extraction, between the extractor and the subject it is taken from, redistributes power in the favor of the extractor. A similar trend can be witnessed in the mounting asymmetries within the redistribution of privacy rights, allowing corporations to become even more powerful as they hold substantially more rights to privacy than the normal citizen.[55]

As the third focal point, the notion of subjectivity offers a useful lens through which to understand the impact of ICTs on urban governance and citizenship. Subjectivity is concerned with the question how subjects—humans and non-humans—are socially constructed and produced through forms of knowledge as well as techniques of power, and do not naturally exist.[56] The process of 'making' subjects is thus closely linked to a time, a space, and to political realities; with the latter providing the environment for the process of subjectivity.

45. Matthias Sander, "Wem gehört die Smart City? Toronto ringt mit dem Google-Konzern," Neue Zürcher Zeitung, October 10, 2019, https://www.nzz.ch/international/wem-gehoert-die-smart-city-toronto-ringt-mit-dem-google-konzern-ld.1513002.
46. Foucault, *Sexuality*, 142.
47. Foucault and et al., *Security*.
48. Rabinow and Rose, "Biopower", 203.
49. Foucault, *Sexuality*, 101.
50. Foucault, 96.
51. Zuboff, "Big Other", 80.
52. Zuboff, 81.
53. Michel Foucault, *Society Must Be Defended, Lectures at the College de France 1975-76* (London: Penguin Books, 2003).
54. Zuboff, "Big Other", 79.
55. Zuboff, 83.

In Foucault's view, subjects enter a relationship with certain values and/or codes through which they establish themselves as subjects within a society. This is based on the assumption that subjects do not simply exist, but are a product of the norms, rules and institutions which surround them. Hence, depending on each society and time in history, subjectification is influenced by different factors.

The internet and its continuous rise in the last three decades brought the opportunity to find a space for self-determination, expression, information and influence—a non-market-based space where subjects are made. Yet, the alteration of subject behavior pursued by corporations, is based on data and knowledge which said subjects have produced themselves; turning the idea of the internet on its head. The subjects rely on the same tools for social production which then again feed the "data exhaust". Hence, a false consciousness is created through the "hidden facts of commoditized behavior modification."[57] Graham warns about similar issues and the effects of neoliberal tendencies in technology implementation. He argues that entire public and private areas in urban environments are being mass-customized and coordinated through networked technologies—creating inequality through technology along spatial lines.[58]

The influence that corporations and private actors gain through this process is unprecedented; nudging, for example, has become an incredible powerful tool through data. Subjectivity has always been influenced by different players, especially the state; yet the problem with private actors is the lack of oversight, the missing structural reciprocities between society and corporation, and the high degree of commodification. Especially hyperscale corporations like Google, Amazon, and Apple are able to exploit the emerging asymmetries to heavily influence the process of subjectivity. To use the words of Giddens, this establishes two extremes within the process of subjectivation: one that is personalized and one that is commodified.[59]

THE ROLE OF FREEDOM

Up to this point the influence of technology on governance and citizenship has been discussed with focus on power, knowledge and subjectivity. Yet, is imperative to also discuss the aspect of disciplinary power, and with it, freedom. This is necessary to establish how new forms of data-based surveillance differ from "traditional" forms of surveillance. Older forms of surveillance were mostly based on disciplinary power; new forms build on other forms of power. Foucault claims that freedom is not something that is simply given to subjects, but something that must continuously be practiced and perfected.[60] As a consequence, freedom is nothing static but ever evolving and important for ethics and norms within a society, as freedom builds the basis for those ethics.[61] This freedom can then be used in its right to establish a new form of subjectivity; the only way of liberating oneself from the state.[62] Some would even extend that argument and point out that governing in modern liberal democracies only works through the freedom and aspirations of the subjects, rather than in spite of it.[63]

Previously described forms of freedom are eroding quickly as our societies are increasingly organized around the knowledge generated through technology and data. As corporations pursue data-based forms of commodified behavior modification, they create a new form of sovereign power which "annihilates the freedom achieved by the rule of law."[64] New forms of surveillance and monitoring basically replace trust from the equation of contracts. Insurances for example could use surveillance to raise premiums, based on the behavior of individuals.[65] For Hannah Arendt, the fallibility in the execution of such contracts manifests the price of freedom—if the former is taken, then so is the latter.[66]

This inevitably leads one to the idea of the city as a panopticon—a commonly used idea in the discussion on surveillance; originally introduced by Jeremy Bentham in the form of a prison design. It describes the influence of omni-present possibility of surveillance on citizens. A higher degree of surveillance pushes self-regulation, as subjects know that their behavior could be monitored; similar to the effects that were aimed at with prisoners in the original context. Nowadays, surveillance does not necessarily happen through a camera lens, but is manifested through all the codes people use, and the "data points" they leave behind. Consequentially, an increasing amount of identification codes, CCTVs, and other technological possibilities of surveillance, will increase the behavioral self-reflection of citizens as they know they might be "watched" constantly. The fact that for many modes of surveillance we don't know who, or even if, someone is watching furthermore leads to an "anonymization of authority."[67]

56. Nick Butler, "Subjectivity and Subjectivation," in *Key Concepts in Critical Management Studies*, ed. Mark Tadajewski (London: SAGE Publications, 2011), 211.
57. Zuboff, "Big Other", 79-82.
58. Stephen Graham, "Software-Sorted Geographies," *Progress in Human Geography* 29, no. 5 (2005): 574, https://doi.org/10.1191/0309132505ph568oa.
59. Anthony Giddens, "Modernity and Self-Identity," in *Social Theory Re-Wired: New Connections to Classical and Contemporary Perspectives: Second Edition*, ed. Wesley Longhofer and Daniel Winchester (New York: Routledge, 2016), 518.
60. Catherine Mills, *Biopolitics* (New York: Routledge, 2018), 30.
61. Michel Foucault, "The Ethics of Concern for the Self as a Practice of Freedom," in *Ethics: Subjectivity and Truth, The Essential Works of Michel Foucault, 1954-1984, Volume 1*, ed. Paul Rabinow (London: Penguin, 1997), 218.
62. Michel Foucault, "The Subject and Power," *Critical Inquiry* 8, no. 4 (1982): 785, https://doi.org/10.1086/448181.
63. Rose, "Governing", 155.
64. Zuboff, "Big Other", 82
65. Zuboff, 82.
66. Hannah Arendt, *The Human Condition* (Chicago, IL: University of Chicago Press, 1998).

Haumann, Eike. 2020. "Foucault and the Connected City:How Information and Communication Technologies Influence Urban Governance and Citizenship." *in*forma 13: 194–207.

But how helpful is the concept of the panopticon in urban environments? Koskela suggests that cities will always be less knowable and controllable than pure panopticons, as surveillance is never completely hegemonic and certain kinds of resistance will persist.[68] Others even claim that the 'imperfect' panopticon—meaning incomplete surveillance possibilities—should be renamed into *oligopticon*; sites at which knowledge and consensus is produced, but which are too small to deliver the insights of a full panopticon.[69] Dodge and Kitchin label a similar phenomenon 'capta shadows' or put simply: missing pieces in a net of information.[70]

The concept of the panopticon and its meaning in modern time has been questioned by several scholars. In particular the issue of awareness about surveillance has sparked some questions about the use of the panopticon to explain modern forms of surveillance. In the panopticon people know they might be watched; with modern surveillance techniques that is not the case. Galič, Timan and Koops offer a useful overview of this strain of critique.[71] An example from the recent protests in Hong Kong suggest that people are rebelling against visible and known forms of surveillance. Hong Kong citizens hid their faces from facial recognition technology after they realized they had been surveilled.[72] Other forms of critique mostly focus on the argument that individuals are empowered through surveillance, and not cut in their power. Albrechtslund argues that the aspect of self-surveillance, which the panopticon is based on, cannot be understood strictly hierarchical but rather participatory. Social networking, for example, allows for individuals to share their activities, but also see the activities of others.[73] Similar aspects have been brought forward by Koskela who focuses on the empowering nature of visibility, arguing that it can be liberating and help to rebel against the shame of not being private.[74]

At this point a vital turning point in the discussion must be established. The panopticon and its effects might still be relevant for governments and their disciplinary strategies; especially as the state is bound to a certain oversight and is not able to work in complete secrecy. Corporations, on the other hand, with massive capabilities of data accumulation and analysis, are not bound in the same way and there is no escaping from them.[75] New forms of surveillance techniques can't be explained solely through disiplinary power; this again emphasizes why biopolitics offer an important perspective on the understanding of the changes implied in increased ICT use.

In the idea of the panopticon, freedom is something that is sustained as citizens actively evade surveillance and constantly fight for more freedom; something that is quite different within the system of surveillance capitalism. Firstly, the "surveillance" here is very much happening in secrecy. Secondly, the idea that people are willing to give up freedom and privacy as long as they get something in return persists.[76] It draws a picture of citizens willing to give up freedom as long as it makes their life simpler. Richard Sennett expresses a similar idea in his book *Building and Dwelling: Ethics for the City.*[77] Thirdly, the inherent connection between spaces of subjectivity and the corporations who create those spaces makes it easy to miss the exact implications for one's freedom.

Summarizing this turning point, it becomes clear that these new forms of technologies trigger serious changes within governance and citizenship. Often, the negative effects of this development are brushed away in favor of gains in other areas, efficiency or emission reduction are just two examples. Furthermore, the alteration of behavior through these technologies happens behind closed doors. Suddenly, the potential empowering effect of surveillance is lost, and power becomes asymmetrically distributed. If cities continue to use technology at the same level and to increase the quality of life in the future, they need to thoroughly examine the negative effects of technology and look into corporate oversight.

COMMODIFIED BIOPOLITICS, MONOPOLIZED FREEDOM

So far, the effects of urban ICT use on power, knowledge, subjectivity, and freedom have been examined. Amongst the described effects, two stand out: the commodification of biopolitics, and the monopolization of freedom; both of which have unprecedented and direct influence on life, and governance.

Regarding the commodification of biopolitics, it is important to understand that the state and its

67. Matthew Hannah, "Imperfect panopticism: envisioning the construction of normal lives," in Space and Social Theory, ed. Georges Benko and Ulf Strohmeyer (Oxford: Blackwell, 1997), 348.
68. Hille Koskela, "'Cam Era'—the Contemporary Urban Panopticon," *Surveillance and Society* 1, no. 3 (2003): 306, https://doi.org/10.24908/ss.v1i3.3342.
69. Bruno Latour, *Reassembling the Social an Introduction to Actor-Network-Theory* (Oxford: Oxford University Press, 2005), 175.
70. Dodge and Kitchin, "Codes of Life", 878.
71. Maša Galič, Tjerk Timan, and Bert Jaap Koops, "Bentham, Deleuze and Beyond: An Overview of Surveillance Theories from the Panopticon to Participation," Philosophy and Technology 30, no. 1 (2017): 9, https://doi.org/10.1007/s13347-016-0219-1.
72. Paul Mozur and Lin Qiqing, "Hong Kong Takes Symbolic Stand Against China's High-Tech Controls," The New York Times, October 3, 2019, https://www.nytimes.com/2019/10/03/technology/hong-kong-china-tech-surveillance.html.
73. Anders Albrechtslund, "Online Social Networking as Participatory Surveillance," First Monday 3, no. 3 (2008), https://journals.uic.edu/ojs/index.php/fm/article/download/2142/1949.
74. Hille Koskela, "Webcams, TV shows and mobile phones: Empowering exhibitionism," Surveillance and Society 2, no. 2/3 (2004): 208.
75. Zuboff, "Big Other", 82.
76. Zuboff, 83.
77. Richard Sennett, Building and Dwelling: Ethics for the City (London: Allen Lane, 2018).

biopolitics currently focus on "making live" instead of "letting or making die."[78] Data from all kinds of sources allow corporations to mass-customize whole areas of society, in order to generate revenue. These mass-customized solutions seemingly fetishize technology and make it the prime tool of building influence on subjects. Optimizing bodies and incorporating them into efficient systems is increasingly done by corporations, granting them new forms of biopolitical powers. For citizens, that means that the power enacted over them increasingly pursues commodified goals—and not necessary their best interest. Facebook's secret and heavily criticized attempt to influence its users' mood based on data is one daunting example of this.[79] For cities and their governance, relying and cooperating with private actors could result in failed planning processes, non-functioning solutions, and increased inequality along spatial lines. Masdar, a strategically planned Smart City in the UAE, is an example of how such technology-focused planning processes can fail. Opposing and rivaling technologies and solutions were introduced, eventually failing to create an integrated and suitable system of solutions.[80]

Influencing and managing every aspect of peoples' life has become the aim of many corporations, as they utilize technology and data to influence behavior with the aim of increased revenues. By accumulating data about air quality, traffic safety, and mobility flows, populations can be managed in the sense of "making live." Governments use data from such flows to potentially increase the general quality of life, while corporations always will be focused on revenues. As the amount of available data increases and spans all aspects of subjects' everyday life, bare life is not only influenced by the state but also private actors; a major turning point. If large facial recognition systems were able to read health data such as body temperature, heart rate, and other metrics, this would mark a serious change in forms of surveillance—not only during a pandemic. Private corporations could gain access to data about health, birth, and morbidity; allowing those companies to intervene at the level of life. Other examples are public WIFI networks, provided through a cooperation between cities and private enterprises; New York offers a service like that called LinkNYC. Such networks can be found in many cities worldwide, offering free internet access and other information services to citizens. Yet, these technologies also allow for the tracking of people through location and phone data. Today, these influences may not seem as daunting but examples like the geolocating of people or the tracking of peoples' behavior could only be the beginning of further reaching influences.

Recently, a US federal study provided another example of how the changes in technology are related to biopolitics. It revealed that many leading algorithms concerned with facial recognition are biased in respect to age, race, and ethnicity.[81] Such biases have an immense impact on the life of subjects, as they might be falsely implicated for a crime or their behavior falsely interpreted. Furthermore, they may be kept from accessing surveilled areas and pushed into non surveilled areas. As such, technology can massively contribute to forms of ghettoization. In a bigger picture, groups lose an immense factor of representation if they are not included in spatial data or systematically discriminated through technology. One simple example could be sensors measuring air quality only being installed in certain, potentially richer and better-connected neighborhoods, marginalizing poorer areas. Another would be mobility flow data, which discriminate groups who cannot afford certain forms of transport. Again, Clearview AI is a useful example for this. In the early stages of the development, the company granted access to certain richer and influential people and corporations, despite having stated that their technology would be available only to law enforcement agencies. Hoping to attract investments, Clearview opened up the access, making the software a "secret plaything for the rich."[82] Cases like these show that technologies can inadvertently foster social, economic, and cultural disparities; inequalities through spatial lines; and ghettoization. If cities continue to use data from ICTs to create development policies and strategies, it must be ensured that no biases exist and that all groups are represented correctly.

The monopolization of freedom is the second finding, which further emphasis should be put on. Through the surveillance opportunities presented by technology, some degrees of freedom have moved from a personal level to the level of the (or at least some) corporations. A few corporations, especially those with the biggest capacitates to analyze and commodify data, do not seem to be the target of any meaningful oversight. These corporations hence gain a lot of freedom in their action, allowing them to use their power to modify behavior and generate revenue. At the same time, it seems like freedom of subjects is decreasing with omni-present and constant surveillance. Traditionally, evading

78. Rabinow and Rose, "Biopower", 203.
79. Robinson Meyer, "Everything We Know About Facebook's Secret Mood Manipulation Experiment," The Atlantic, June 28, 2014, https://www.theatlantic.com/technology/archive/2014/06/everything-we-know-about-facebooks-secret-mood-manipulation-experiment/373648/.
80. Federico Cugurullo, "Exposing Smart Cities and Eco-Cities: Frankenstein Urbanism and the Sustainability Challenges of the Experimental City," Environment and Planning A: Economy and Space 50, no. 1 (2018): , https://doi.org/10.1177/0308518X17738535.
81. Patrick Grother, Mei Ngan, and Kayee Hanaoka, *Face Recognition Vendor Test Part 3* (Gaithersburg: National Institute of Standards and Technology, 2019), https://doi.org/10.6028/NIST.IR.8280.
82. Kashmir Hill, "Before Clearview Became a Police Tool, It Was a Secret Plaything of the Rich," The New York Times, March 5, 2020, https://www.nytimes.com/2020/03/05/technology/clearview-investors.html.

surveillance was possible and citizens might even have gained power through the evasion—but nowadays, subjects are not aware that they are being watched. Instead of a potential empowerment, subjects lose power and freedom as they actively drive their surveillance, using networked services which are built on the exact tools to extract data in order to modify behavior. Hence, the perceived freedom for subjects might be greater than ever, as they can choose from different providers and with networked services facilitating many areas of life. Yet, many degrees of freedom are transferred to a level of some corporations, with them being able to use new forms of surveillance and behavior modification without real oversight.

CONCLUSION

This article sheds light on why cities increasingly turn towards technology, as well as on the negative aspects of increased ICT use; from the rise of liberalism, over the implication of data accumulation, to biopolitics. As economic perspectives dictate essential parts of modern governmentality, cities are increasingly driven by an external motivation, a *raison de cité*. Through that logic they are pushed into competition with other cities over capital, knowledge, and consumption. Yet, the implementation of new forms of technology has unprecedented and unknown effects on citizens and modes of urban governance. Michael Foucault's concept of biopolitics offers an important perspective on those changes; especially as new modes of surveillance are established through modern ICTs. Data as invisible hand of control is replacing "classic" forms of surveillance, such as CCTV cameras, at a blistering pace. Forms of disciplinary power can no longer explain these new forms of surveillance. The concept of biopolitics and the aspects of knowledge, power, and subjectivity it includes, show how the life itself as well as the way we live is heavily influenced by new urban technologies. One of the main findings is that biopolitics are no longer only a domain of the state. On the contrary, the domain is increasingly invaded by private actors, as providers of technology and accumulators of data. As such, these actors gain a staggering amount of influence on the processes of knowledge production and subjectivity as well as power over citizens. Especially as some of the new urban technologies are biased in relation to race, ethnicity and age, the increasing influence of private actors could have seriously negative implications, such as increasing inequality, environmental racism, and the marginalization along spatial lines.

Furthermore, the monopolization of freedom plays a key role within urban ICT use. With older forms of surveillance, freedom was still possible, as citizens were aware of their monitoring. New technologies and the data generated through those technologies allow corporations to surveil subject in secret, making it impossible for citizens to evade surveillance. Driven by this development processes of social production suddenly rely on the same tools which then again feed the data machine of corporations. We use tools for social production which gather data to influence behavior; which in turn will bring increased revenues for the corporations owning those tools. As such these forms of subjectivity lack structural reciprocities between corporations and the population; advocating new power relations with an uneven distribution in favor of the corporation. Unequally allocated privacy rights are a major aspect here; corporations surveil citizens in secret and use data which in turn exploits citizens privacy. Similar aspects can be observed with respect to freedom. With the lack of serious oversight over corporations, freedom accumulates on the side of the corporation while citizens are stuck in what are effectively closed systems of knowledge, power, and subjectivity. Thus, freedom moves from the personal level to the level of a few large corporations.

The implementation and use of ICTs have been on the rise for the last three decades, and urban areas have been especially affected by this development. Smart Cities have become a huge topic in contemporary urban planning efforts and the future planning of cities. Overall, city governments need to consider the implementation of new technologies carefully. These technologies, and the companies behind them, have the power to eradicate just and transparent forms of urban governance and citizenship, creating new forms of inequality, discrimination, and spatial exclusion; and with it, a potential urban surveillance dystopia.

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