NETWORKED TECHNOPOLITICS WITHIN THE SMART CITY: URBAN SOCIAL MOVEMENTS, PUBLIC POLICY, AND SURVEILLANCE CAPITALISM FROM BARCELONA TO TORONTO

by

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Abstract

The rise of modernity has been the history of urbanization, stoked by the trade of global capital through worldwide financial networks. This course has led to the city's primacy as an economic, cultural, and political fixture within an interconnected world order. With the advancement of information and communication technologies, we are now undergoing a radical shift in how we imagine cities from the ground up, creating an urban setting that reflects new technical systems, political arrangements, and economic priorities. Central players in this new *smart city* are urban social movements, firms specializing in surveillance, and urban regimes, negotiating rights, privileges, and expectations within an emerging *network society*. This thesis investigates precisely how urban social movements shape public policy and the development of the smart city. This research covers the outcomes of technopolitical practices employed by networked actors across physical and virtual terrains, contesting the balance of power between residents, firms, and public institutions. The following analysis utilizes a qualitative method with a case study approach, examining the public policy process in Barcelona, Spain, and Toronto, Canada. Included are examinations of literatures, original documents, and public statements by relevant participants in the struggle for dignity, respect, and voice. Conclusions from this inquiry paint a hopeful picture. In the race to dominate public purchase of technological infrastructure, firms have motivated urban citizens to mobilize resources through the same information and communications technologies deployed, resulting in new data governance and procurement processes that craft an innovative revision of the smart city. Whether through co-production of public policy using open-source software or centering privacy as a non-negotiable condition of

business, the findings demonstrate a normative change occurring in contemporary urban development.

Lay Summary

This thesis investigates the influence of urban social movements on the development of smart cities. In Barcelona, Spain, and Toronto, Canada, the public policy process is examined in the context of resistance by urban activists. The following research describes social movements and their effectiveness in shaping smart city public policy, whether involving telecommunications firms courting contracts or internet search monopolies developing real estate. Several policy recommendations are discussed, including free software and privacy in data governance.

Preface

This thesis is original, unpublished, and independent work by the author, Corey Recvlohe.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

BComú	Barcelona en Comú
CDC	Convergència Democràtica de Catalunya
COVID-19	Coronavirus Disease 2019
DECODE	Decentralised Citizen Owned Data Ecosystem
DESC	Observatory on Economic, Social and Cultural Rights
DGP	Digital Governance Proposal
DRY	Democracia Real YA
FCM	Free Culture and Digital Commons Movement
FSF	Free Software Foundation
GJM	Global Justice Movement
ICT	Information and Communication Technologies
IT	Information Technology
IoT	Internet of Things
OSI	Open Source Initiative
PAH	Plataforma de Afectados por la Hipoteca
SWL	Sidewalk Labs
TIF	Tax Increment Financing
TWRTF	Toronto Waterfront Revitalization Task Force
UDC	Unió Democràtica de Catalunya

WT	Waterfront Toronto

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Dedication

To my mother Nancy, my father Wathla, and my brother Adam, whose love I will carry with me forever.

Chapter 1: Introduction

The *Oldowan stone* was the first manufactured tool discovered in human prehistory. Crafted from river rock, its edges were slowly chipped away, leaving a weapon suitable for crushing bones or cutting meats. Reproducing this method required special knowledge, passed on from one hominin to another, storing with them the information necessary for their competitive survival. Boats, javelins, arrows, nets, ceramics, bronze, wheels, and writing systems emerged from the same primitive process. Sapiens of the present are no different than hunter-gatherers of millennia past, tapping into the same desire for environmental change to fit our particular wants and needs, productively pursuing technical inventions suited for our time and place. Just as our ancestors gathered flint along the water's edge to build their fires, we too accumulate precious space near the lakeside, assembling new forms of combustion for the material transformation of human experiences.

Data is *sine qua non* to 21st-century political power. Data are units of information collected through observation, made up of nominal, ordinal, discrete, and continuous measurements, whether describing geographical, cultural, scientific, financial, statistical, or meteorological phenomena around us. These data are generated from billions of internet-connected devices, be they computers, phones, cars, or even entire cities. Like electrification a century ago, communicational interconnectivity has become a transformational economic force essential for the industrial development of contemporary society. Data are the elemental effects of this new world order, necessitating the production of knowledge that combines economic, technological, and political descriptions of its significance.

The following research describes the political nature of data and communication technology in the emergence of 'Smart Cities,' more fully detailing their roles as catalysts for political change when adopted by urban social movements. *Smart Cities* are environments located in dense metropolitan areas that disembark from traditional notions of urban development. Infrastructure built for smart cities is radically different from the more familiar types we know. Roads, water treatment plants, and traffic lights might seem like fixed solutions to general problems created by close-knit human settlements, but it is through the utilization of data that public policy administering these systems is now becoming managed. Throughout the world, large industrial firms are racing towards the capture of public lands to build cities from the 'internet up.' Their interest stems from dominant economic positions that already trade data for advertising, internet search, and connections of devices enabling these applications. The conflict between urban social movements and global firms over the generation and management of data now decides the direction of municipal public policies, changing the balance of political power within those communities.

This thesis deals with the following research question: how do networked urban social movements shape public policies affecting development of smart cities? The focus is on two cases in Barcelona, Spain, and Toronto, Canada, where networked urban social movements, technology firms, and smart city projects have been—and remain—active. These cases present rich historical records from many sources involving political events that affect elections, city ordinances, and public engagement. My objectives are to examine how these actors influence public institutions and wield political influence in the urban context.

By beginning with definitions, I will present terms associated with the scope of smart city development, covering industrially important products procured for purchase or built to support

interconnectivity within the urban environment. Additionally, I will introduce the concept of *surveillance capitalism,* which is an emerging business model attached to the production of data. I will then describe urban social movements and why resource mobilization is crucial to their success, especially as communication networks disrupt traditional patterns of information consumption within the public sphere. Lastly in this section I will cover *technopolitics* as a synthesis of practical and theoretical action within an emergent *network society*, where political struggle and technical knowledge combine to create new forms of praxis.

The research methodology section will describe why I have chosen the cases included in this analysis and the leverage gained from comparison. The case sections are structured in three separate parts. Barcelona will first look at the prior regime primarily responsible for initiating smart city initiatives. Secondly, I will cover urban social movement politics in Barcelona, the mayoral challenger Ada Colau, and their technopolitical project. The third part of this section will look specifically at democratic policy software named Decidim, an open-source tool for public policy co-creation and democratic participation. The Toronto case will begin with the history of waterfront development in the city, including the history of Waterfront Toronto and the tripartite government effort to turn the Don lands into an economic engine. The second section will examine Sidewalk Labs and their interest in creating a specific vision for Toronto as a smart city destination. I will end with an analysis of the #BlocksideWalk resistance movement and its impact on public policy co-creation.

To build a technically sophisticated device demands time, effort, and will to realize. A smart city is no less complex or difficult to imagine than any human invention, but it requires tremendous capital in both political and monetary forms. These events are the first among many that will take place in nearly every known municipality, forcing urban regimes, residents, and

firms to choose between very different outcomes that define the limits of economic and political power within their locations. The following is one of many other attempts to describe this urban phenomenon in the context of those powerful enough to have a disproportionate influence and those only now realizing their power through networked communication.

Chapter 2: Literature Review and Definitions

2.1 Smart Cities

Within the literature there are divergent definitions of the term 'smart city,' with two dominant interpretations emerging (Mora, 2017: 12). The more holistic perspective has a human-centered focus involving socio-cultural, environmental, and technological factors that combine to transform and improve cities. One commonly cited definition is a metro that solicits "investments in human and social capital and traditional and modern communication infrastructure [to] fuel sustainable economic growth and a high quality of life, with wise management of natural resources, through participatory governance" (Caragliu, 2011: 77). In this tradition, capital and democratic participation are integral to sustainable economic growth achieved through smart city development. The alternative view takes a more technical approach, highlighting the role of integrated components in providing city services (Washburn et al., 2010). This perspective highlights efficiencies created through smart management of critical infrastructure, where practical concerns such as resource scarcity, energy shortages, international coordination, and demand for better economic opportunities can be resolved through application of Information and Communication Technologies (ICT) to areas of education, healthcare, real estate, and transportation by way of smart housing, smart education, smart healthcare, smart real estate and smart transportation. Both views consider ICTs as the main factor driving the logic of smart city development.

Research has highlighted the role of ICTs in the production of novel urban infrastructure (Gibson, 1992). ICTs include the scope of computing software and devices that utilize microprocessors to enable internet connectivity and remote processing capabilities (Castells,

2009). Indeed throughout the last few decades, new industrial information economies have arisen to meet the demands of citizens, businesses, and governments utilizing computer processing for market products, research, and government services (Castells, 2010: 77). The application of ICTs in the urban context involves critical functions of city administration, such as public safety, transportation, education, and healthcare. For example, in the city of Rio de Janeiro municipal authorities partnered with IBM to build an Intelligence Operations Center for Smart Cities (IOCSC), providing facilities for street crime monitoring, traffic flow observations, and weather pattern analysis, connecting more than 600 traffic cameras to Rio's privatized public transportation system (Gaffney & Robertson, 2016). In Dubai, AI-assisted facial recognition and walking-gait analysis are used in real-time across Dubai's public transportation network, aiding investigators pursuing crimes and tracking criminals (Breslow, 2020). The smart city vision is a mixture of disparate systems, interests, and ambitions to acquire computer processing for improving urban quality of life.

At a finer scale, ICT maturity has led to an emerging Internet of Things (IoT), defined as the networked interconnection of everyday objects, equipped with ubiquitous intelligence through embedded systems, producing a "highly distributed network of devices communicating with human beings as well as other devices" (Xia et al., 2012). IoT can apply to a set of urban use cases where computer processing networks are used to assess infrastructure health, air quality, noise, city energy consumption, light pollution, and car parking (Zanella et al, 2014). IoT devices are elements of sustainable urbanism where energy is intelligently used to reduce CO2 emissions (ibid). The feasibility of services delivered through IoT infrastructure is varied, with some applications requiring extensive infrastructural costs depending on their complexity. Data generated through IoT networks are at the core of newly developing business models where

combined data gathered from corporate databases, open databases, devices, and sensors leads to the manufacture of information components in large-scale systems, producing information products with broad privacy implications (Chan, 2015; Canada, 2016).

The 'smart city' moniker also represents an opportunity for municipalities to rebrand their cities as areas for economic growth (Chan, 2019). Even in plans for the Toronto Waterfront—as is detailed later—proposals suggested city officials consider redefining themselves as "Smart Communities," "Intelligent Islands," or "Cyber Cities" to align themselves with other international centers for technological innovation, such as San Francisco, Shenzhen, and Singapore (Fung, 2000: 32). Prior literature has highlighted the behavior of land-holding elites who utilize local and nonlocal government resources to intensify land use by investing in growth-inducing resources to achieve economic expansion, turning the city into a "growth machine" (Molotch, 1976: 310). The explicit agenda of cities that brand themselves as 'smart' follows the 'growth machine' convention. The literature on *urban regimes* also suggests that governing coalitions are primarily responsible for the resources gathered in initiating and managing urban development agendas (Stone, 1993). The type of urban regime most similar to the cases involving smart cities is a *development regime* primarily concerned with changing land use to promote growth (Stone, 1993: 18). In addition, the types of businesses active in the smart city market are firms with high levels of technical expertise, building ICT and IoT products catering to municipal infrastructure development projects. The intersection of interests involved in smart city development is varied, with metropolitan elites and ICT product firms dominating discussions (March, 2016).

2.2 Surveillance Capitalism

To appreciate the economic and political implications of smart city development, it is essential to consider recent computer industry advancements in the context of *surveillance capitalism*. Coined by Harvard Business School Professor Emerita Shoshana Zuboff, the term 'surveillance capitalism' describes an emerging business model where technology focused enterprises commodify personal data to create models of behavior to influence economic decisions (Zuboff, 2019: 8). Since the early 2000s, companies such as Google have capitalized on troves of behavioral data collected from ICT and IoT devices (ibid: 65). These data are referred to as 'digital exhaust' and are signals collected from Google's (now Alphabet's) subsidiary companies. These behavioral-data model predictions about future behavior, which are sold as insights about consumer purchasing decisions or are used directly to influence those choices (ibid: 81). Surveillance is the underlying feature of this new change in global software production. These data are processed by recommendation engines, giving suggestions on what to buy, movies to watch, music to listen to, and who to network with (ibid: 160). Surveillance capitalism is the business model fueling Google and nearly every global business. It's a revolution in how computer processing firms approach profit generation and is at the center of the smart city phenomena.

These new capabilities are generated from large data volumes (Varian, 2014) and include transactions mediated by computers to actuate human behavior (Varian, 2010). Any form of software personalization utilizes behavioral data, cataloging your listening habits to find similar music, but this type of algorithmic learning applies to many more use cases (IBM, 2021). Indeed entire city blocks can provide the 'digital exhaust' necessary to create the kinds of behavioral models Sidewalk Labs and Alphabet are interested in selling (Brown, 2016). It is speculative to

imagine the many different ways firms may utilize this data. Still, they will do so by capturing the ebb and flow of people as they move through the urban environment (Sidewalk Labs, 2019). Indeed city governments may benefit from these behavioral models by measuring urban transportation more accurately through specialized IoT devices, building traveling pattern predictions across urban areas for planning engineers—rather than relying on imprecise in-person surveys (NHTS, 2021).

Without the science of software machine learning, the data generated from ICT and IoT sensors would be largely unleveraged. A variety of methods are used to reinforce the learning potential from large data (Yigitcanlar et al, 2020: 3). Natural Language Processing, Computer Vision, Bayesian Analysis, and other statistical techniques are applied to these behavioral data streams (Yigitcanlar et al, 2020: 10). Data is monetized through machine learning systems, building predictive analytics that firms use to gain competitive advantages in the pursuit of more customers and higher profits (Delen, 2020). Nearly any decision within an organization can be targeted with machine learning tools given sufficient data and algorithmic proficiency.

2.3 Urban Social Movements

In light of surveillance capitalism and technology firms that capture behavioral data, resistance to these trends are found within *urban social movements* that oppose these policies on several moral and ethical grounds. Urban social movements are fixtures of city politics throughout the world (Rabrenovic, 2008). Perceptions of injustice enabled by asymmetries of power can spark collective action from urban social movements (Tyler, 1995). Types of urban social movements include those based on residential issues, service delivery programs, ethnic self-help organizations, and grassroots citizen initiatives (Rabrenovic, 2008: 240). *Networked* urban social movements represent a new form of democratic resistance, advocating for political change

through internet-connected communities (Castells, 2015). Examples of networked urban social movements include Occupy Wall Street, the Arab Spring, and Black Lives Matter, each of which utilized ICTs to connect with virtual online communities, mobilizing action specific to their geographic area and interests (Gleason, 2013; Wilson, 2012; Hsiao, 2021).

Urban social movements must leverage resources to mobilize action, requiring time, effort, and money (Edwards, 2004: 116). ICTs are used by urban social movements to coordinate protests, raise funds, and plan events to show strength and support (Edwards, 2004: 132). Networked urban social movements start through online social networks, building audiences that engage in direct action at the local and global level (Castells, 2014). Yet networked urban social movements can be leaderless, making them less vulnerable to state repression (ibid). The resources utilized by networked urban social movements are dense online social connections that reach large audiences, delivering movement messages and narrative frames (Castells, 2015).

Specific networks used across ICTs by urban social movements vary but include products built by the world's biggest companies. Facebook is the largest network, providing access to more than 1.84 billion daily active users, with features allowing for the creation of groups to quickly disseminate communications through organic message sharing (Ha, 2021; Harlow, 2011). Twitter is a much smaller network with just over 192 million daily active users; however, its hashtag culture promotes dense public conversations that establish issue narratives (Perez, 2021; Dawson, 2020). With more than 2.3 billion monthly active users, YouTube is a network for disseminating video information, becoming an outlet for stories of social movement participants, and enabling public discussions (Lunden, 2021; Meek, 2011). Many communication networks adopt pseudonymity (e.g., Twitter, YouTube), making them attractive for social movement actors

that wish to organize and politically engage without fear of harassment from oppressive authoritarian regimes (Youmans, 2012).

2.4 Technopolitics

What has emerged in the last few decades are urban social movements that tactically and strategically utilize technology for direct action, known as *technopolitics*. Technopolitics is the practice of using technology to achieve political goals, leveraging ICTs for collective action, communication, and organization (Kurban, 2017; Toret, 2013). Technopolitical strategies can be understood along three dimensions, the first of which is their communicative power in spreading information within the public sphere (Kurban, 2017: 507). Second, there are legal situations where political processes are digitized, such as with an e-referenda or e-recall. Third, the organizational power of smartphone apps, social networking websites, and encrypted chat messaging services facilitates crowdfunding, candidate selection, and e-campaigning (ibid). Technopolitical actors often prefer horizontal, decentralized organizational structures that rely on collaborative modes of engagement (Deseriis, 2019). The technopolitical environment is one where individuals are linked by ICT networks, constituting the *network society* (Kurban, 2017: 511; van Dijk, 2006).

The network society is a social structure based on networks operating across ICTs, using computer processing devices to generate, process, and distribute information (Castells & Cardoso, 2006). The network society depends partly on the network economy, which is characterized as a "new economic order [...] based on computers, connectivity, and human knowledge" (McKeown, 2002). The practice of technopolitics used by actors in the network society shapes e-governance, impacting the balance of power in the urban environment (Castells

& Cardoso, 2006: 17). These changes are consequences of the information technology revolution, which rapidly expanded the reach of information processing and communication systems (Castells, 2010). Emerging today are networked individuals engaging with self-directed mass communication, using technopolitical practices to achieve political power.

Communication networks have opened up new opportunities for social movement mobilization. Several technopolitical struggles have emerged from the Latin American context, such as #YoSoy132 and the Chilean Education Conflict. #YoSoy132 ("I am 132" in English) was a student-led protest organized in response to actions taken by then-Mexican presidential candidate Peña Nieto (see Figure 1 below). Nieto had ordered state police to quash civil unrest in the community of San Salvador Atenco during his time as governor, which resulted in mass arrests, sexual assaults, and inhuman treatment of those arrested (Alcántara, 2006; Guillén, 2013). Nieto questioned the legitimacy of criticisms levied by students, inspiring 131 Universidad Iberoamericana (UIA) students to upload a video of their UIA ID cards to YouTube (Guillén, 2016: 473). Soon after, other students began uploading photographs of their UIA cards to Twitter. In solidarity, students from other universities spontaneously took to Twitter and Facebook under the hashtag #MarchaYoSoy132, organizing demonstrations across public and private college campuses in Mexico. These events led to a tightening in the 2012 Mexican general election, boosting Andrés Manuel López Obrador's candidacy (ibid: 475). Likewise, the Chilean Education Conflict reflected similar protests among students, although they targeted the Chilean education system, which they claimed suffered from inequality, segregation, and indebtedness (Cabalín-Quijada, 2014). Student organizers took the initiative by using networked ICT platforms (e.g., Facebook, Twitter, YouTube) to narratively frame information, respond to opponents, counter traditional media, and accentuate positive event outcomes while identifying

detractors (ibid: 31). Higher education reforms were passed in 2018 under the auspices of Socialist President Michelle Bachelet, although significant educational resource gaps remain (Hurtado, 2018; Nadworny, 2019).

Figure 1. Censura Cero - #YoSoy132 (Censura Cero, 2012).

Chapter 3: Research Methodology

Of the many cities to choose from, Barcelona and Toronto offer the clearest examples of networked technopolitics in practice between urban social movements and the world's largest firms. Privacy is front and center, leaving little room for negotiation between tech companies and urban interest groups wanting heavier regulatory approaches. Both cases represent the use of successful technopolitical practices to shape urban policy in favor of participatory democracy. In Toronto's instance, Sidewalk Labs rescinded its waterfront offer while sister company Google is continuing to pursue 'smart city' initiatives in San Jose, CA (Elias, 2021). Barcelona has taken a different route but has no less resulted in a transformation towards e-government, creating a space for participatory democracy at scale. Additionally, these cases are relatively recent in the historical record, with many accessible public documents and communications.

Networked urban social movement actors are prominent in the cases of Barcelona and Toronto and are very open about their goals and strategies. Likewise, business leaders and politicians intimately part of these projects remain involved in other developments worldwide. Debates surrounding data governance, privacy, and surveillance are becoming leading policy considerations, with Barcelona and Toronto as examples of attuned technopolitical savvy involving these core concerns (Zuboff, 2019). Events in these two cases span years of negotiations, elections, and retrospectives involving choices made by urban residents, city officials, and technology firms. The record provides considerable information to critically examine the policy process as it developed from initial plans to final results.

These events lend well to the qualitative method with a case study approach. My objectives are to explore the earliest stages of networked urban social movements and describe

the technopolitical practices used to resist, as well as enact, policy. These cases will explain how networked urban social movement actors effectively use ICTs to sustain political pressure by relying on original records, statements, documents, publications, and public messages from relevant actors. A detailed analysis of the technopolitical strategies used by networked urban social movement actors can further increase our understanding of the political implications of the network society.

As highlighted above, the recency of both cases lends this analysis to many information sources. Documents from municipal governments detailing initiatives, meeting minutes, and official memorandums will be assembled, as well as newspaper articles to provide context about the timing and tone of official statements by movement actors and firms. Academic articles provide secondary analyses of events taking place. Published books offer much of the theoretical literature on social movements and the role of ICTs. Additionally, I will examine published statements by urban social movement actors on social media—particularly accounts representing their respective movement. Each of these sources brings distinct context to the cases of Barcelona and Toronto, examining networked urban social movements interacting with large firms and municipalities to shape public policy on the physical and cyber terrain.

In the following section, I will begin with Barcelona and its prior urban regime, which involved plans for a business-led smart city. Then I will trace the history of Barcelona en Comú and social movement politics in wider Spain, including the prominence of 15M. I will specifically cover Decidim and the digital commons approach to data governance in Barcelona and how networked movement politics pushed towards these frontiers. The Toronto case will cover a thorough evaluation of the Waterfront Project, those involved, and the purpose of public-private partnerships in urban policy frameworks. Additionally, I will review the ambitions

of Sidewalk Labs (sister company of Google and subsidiary of Alphabet) to dominate the 'smart infrastructure' technology market. And lastly, the social movement #Blocksidewalk will be analyzed in the context of technopolitical practices used to pressure city officials and acquire leverage at the table between government planners and technology firms.

Smart City Locations	*Prominent Technology Vendors*	*Urban Social Movements*	*Urban Regime Leaders*
Barcelona	Cisco, Accenture, Telefónica, Tradia Telecom	Barcelona en Comú, 15M, FCM	Xavier Trias, Ada Colau
Toronto	Alphabet, Google, Sidewalk Labs	#BlockSidewalk	Mel Lastman, John Tory

Table 1. Smart City Locations, Firms, Social Movements, and Regime Leaders.

Chapter 4: Cases

4.1 Barcelona

4.1.1 Prior Barcelona Regime

Barcelona's foray into smart cities began under the leadership of Xavier Trias, who became Mayor in 2011 running as the candidate for then centre-right *Convergència i Unió* (CiU) with 28.7% of the vote, beating out former socialist mayor Jordi Hereu and conservative Alberto Fernández Díaz (Generalitat de Catalunya, 2011). CiU was a mixture of factions within Catalonian nationalism, founded in 1978 as an alliance between the *Convergència Democràtica de Catalunya* (CDC) and *Unió Democràtica de Catalunya* (UDC) (Convergence and Union, 2015). Trias had served Barcelona since 2003 as a CiU city councilor, having failed a 2007 mayoral candidacy (CiU, 2011).

The Trias regime would be described as liberal, opting to support public-private partnerships between professional business interests and the city administration in their first initiatives. The attitude communicated from early announcements indicates a traditional business-friendly approach, organizing expos, congresses, and working groups with consortium partners in London, Bologna, and Genoa (Barcelona City Council, 2012a). Up to €1.3 million was budgeted to fund a series of business-led developments, including strategic agreements with large ICT and infrastructure vendors such as Cisco, Schneider-Telvent, Abertis, and Telefónica (ibid). Indeed as told by deputy mayor Antoni Vives, the "mantra" of the Trias administration was to reorganize how the city communicated with outside business interests by integrating several urban departments (e.g., housing, infrastructure, urbanism, architecture, metro planning,

etc.) into one holistic department named Urban Habitat (Vives, 2017: 34). Vives also reveals that the Trias agenda was to position Barcelona as a worldwide smart city brand, attracting international investment capital through global events and financial networking (Vives, 2017: 35).

In July of 2012, the City Protocol conference took place in Barcelona, bringing together international organizations, city representatives, conglomerate businesses, and universities (Barcelona City Council, 2012b). First to introduce their visions for smart cities were Chief Architect of Barcelona Vincente Guallart and Chief Information Officer Manel Sonromà, along with Cisco Systems executives Anil Menon and Nicola Villa. The presentations made over the two-day event covered a range of short and medium-term goals for smart city developers. Key messages highlighted were finding firm commitments from stakeholders, creating small pilot programs, and organizing research working groups. Importantly, it was noted that financial models for smart city economics were among the unknowns that needed attention. Even well-known internet protocol author and Google executive Vinton Cerf presented a video supporting the conference, asking audience members to consider many of the recommendations outlined by speakers (Cerf, 2012).

Prior research has identified depoliticization of the smart city as one of the main aftereffects of the Trias municipal regime, failing to engage citizens in policy co-creation. Instead, the overwhelming majority of activities were dedicated to courting global companies, directly pursuing a business-oriented campaign, driving interest in Barcelona's dense urban core as a location prime for ICT and infrastructure investment capital (March, 2016). As documented in video presentations of events during the City Protocol conference, business executives were keen to partner with Barcelona as it went "global" while remaining "local" (Menon, 2012).

Contradictions arising from the Trias approach capture the level of discontinuity between the ambitious economic goals of city administrators and the stark inequalities increasingly facing urban centers. One of the very sites selected for development was initially a location for homeless citizens and migrants (Europa Press, 2012; March, 2016: 823), but was scheduled for transformation into a self-sufficient island hosting service companies that specialize in managing urban environments, creating "new models of financing" (Barcelona City Council, 2012c; March, 2016). Chief Architect Vincente Guallart acknowledged that to create the type of smart city envisioned by Trias and others requires the "most capitalised [ICT] companies in the world" (Guallart, 2012; March, 2016: 824). While the broader goals of the Trias vision were laudable for prioritizing environmental carbon-zero efficiency, they existed more or less as vehicles for investment capital seeking out new business opportunities. Even projects that seemed to have idealistic aims—such as City OS—were sponsored by large business groups, including global consulting firm Accenture, ICT vendor Tradia Telecom, and international energy supplier GDF Suez Group (El Periódico, 2015). In what was presented as an innovative standardizing body setup to integrate municipal information systems, City OS amounted to a "purchasing formula" for public-private collaborations, backed by a commitment from the city of Barcelona for €1.7m.

4.1.2 Barcelona en Comú

In May of 2016, the prospects for a Barcelonian conglomerate-centered smart city began to fade when *Barcelona en Comú* (BComú) candidate Ada Colau won the mayorship contest with 25.2% of the vote defeating incumbent Xavier Trias and centrist challenger Carina Mejías. Colau was initially a founding member of *Guanyem Barcelona* ("Let's win Barcelona"), a local political party created to deliver "true metropolitan democracy" that would tackle inequalities facing

Barcelona's urban residents confronting access to housing, education, healthcare, and social justice (Guanyem Barcelona, 2014). Guanyem Barcelona membership consisted of networked urban social movement activists from PAH (Plataforma de Afectados por la Hipoteca, Platform for Mortgage Victims) and DESC (Observatory on Economic, Social and Cultural Rights), many of whom were intimately involved in the 15M movement and Podemos, a left-wing populist national party with an anti-austerity, anti-corruption, and anti-establishment platform (Podemos, 2014). Referred to as "Colau's group" by the media, the party would soon change its name to Barcelona en Comú ("Barcelona in Common"), directly referencing the *Free Culture and Digital Commons Movement* (FCM) that took hold during 15M.

Understanding BComú's technopolitical orientation requires realizing the influence of 15M and FCM. 15M was an urban social movement mobilization initiated by members of *¡Democracia Real YA!* (DRY) that occurred on the 15th of May, 2011, where activists and other Madrid residents spontaneously took over the Plaza del Sol to "denounce the deplorable situation in which citizens suffer from severe abuse caused by political and economic powers" (Morell, 2012; see Figure 2 below). DRY consisted of tech-savvy 'hacktivists' inspired by the Arab Spring and many other veterans of the Global Justice Movement (GJM) and, in general, young citizens engaging in political activity for the first time (Morell, 2012: 388). GJM had prior experience with mobilizations in the early 2000s, organizing action against the World Bank, International Monetary Fund, and the European Union; however, it was the younger participants who strategically utilized "info-actions" across networked media (e.g., Facebook, Twitter) to organize mass mobilization occupying urban public space. From a communication framing perspective, FCM contributed to 15M by advocating for a "digital commons" that embraced Creative Commons licensing for intellectual property. Creative Commons is a licensing structure

that grants permission to use creative work under copyright law (Creative Commons, 2021). This *commons* copyright philosophy took hold with 15M, with the occupation of *common space* being a symbolic representation of DRY's technopolitical efforts to combine offline and online activism. By taking control of the urban commons, 15M participants generated an informational ecosystem by which content would spread across networked digital platforms, bypassing traditional mass media and reaching potential adherents through trending Twitter hashtag topics (Morell, 2012: 391). The interaction between FCM and 15M created the necessary conditions for the emergence of a technopolitical tradition, later inspiring BComú's founding leadership.

Figure 2. Democracia Real YA demonstration in Madrid on May 15, 2011 (Wikimedia, 2011).

Once elected, Colau began a process that produced a seminal document guiding Barcelona down a digital path very dissimilar to the Trias administration and quite different from any perspective established by traditionally liberal, neoliberal, or centrist urban regimes. The *Barcelona Digital City Plan* (Barcelona City Council, 2016) outlined a series of philosophical, political, social, and economic goals for the Barcelona City Council, codifying their designs for a smart city in the image of the *commons*. Throughout the document, references are made to "common good," "common heritage," "common ground," "common discourse," and "common data space." The vision authored by Colau and her colleagues made explicit the commitment to move "beyond the smart city" as it had been conventionally known to Trias and other corporate partners. The mission stated that "democratic development of technology" was to be the theme of Colau administration, such that the creation of a more "plural economy" would foster a "social and environmental transformation" that would empower the citizenry (ibid). In addition to the commons approach, the term "open" (*obert* in Catalan) is mentioned approximately seventy times, whether about "open data," "open standards," "open source," "open democracy," "open [...] procurement," "open infrastructure," or "open hardware." The Barcelona Digital City Plan is the document that guides the direction of departments, officers, and budgets responsible for planning Barcelona's digital future.

A second influential document produced by the Barcelona City Council under Colau's watch was the *Barcelona City Council technological sovereignty guide* (Barcelona City Council, 2017b), which outlined the formal rules underpinning Barcelona's approach to the procurement of ICT services and software for digital infrastructure. The sovereignty guide set out an FCM inspired legal framework that explicitly advantages the use of "free licenses" when building smart city services. Free licenses refer to software as defined by the Free Software Foundation

(FSF) and meet Open Source Initiative (OSI) standards. Initially written in 1986, FSF defines a software program as free when it fulfills four standards of operation: the freedom to run the program as you wish; the freedom to study how the program works so you can change it to compute as you wish; the freedom to distribute copies; and the freedom to distribute copies of a modified version of the software. Likewise, OSI defines open source as meeting the following requirements: free distribution; free source code; free distribution of modifications; integrity of author contributions; non-discrimination against person or groups; non-discrimination against fields of endeavor; and heritable terms of the license for all redistributions. In total, these guidelines inform the transformational policy set out by Colau, reinforcing the technopolitical principles established by FCM through 15M mobilization only a few years prior: using open standards for smart city digital services, prioritizing free software for IT resources, creating a new model between providers and free software communities, and enabling an open intellectual property policy.

By authoring a "digital sovereignty" framework that relies on free software and open-source code, the technopolitical strategy first pursued by networked urban social movement actors has transitioned to an actualized policy stance that informs infrastructural smart city development directly at the procurement level. As stated in the *Barcelona City Council ICT Public Procurement Guide* (Barcelona City Council, 2017a), digital sovereignty "facilitates the re-use of systems," "[reduces] the costs associated with providing and procuring ICT services and products," "[guarantees] interoperability," delimits public use of "technology solutions from specific vendors," "[avoids] vendor lock-in," and contributes to "long-term [financial, infrastructural, and environmental] sustainability" (ibid: 12). Indeed at the selection stage in the

ICT procurement process, digital sovereignty is front and center, mandating the acquisition of systems that use open source code and open data by default in pursuit of the 'common good.'

4.1.3 Decidim

Urban citizenship is a central pillar of BComú's party platform under Colau, which advocates for participatory democracy through technopolitical activity, borrowing directly from 15M, PAH, and Podemos. To achieve a digital politics that elevates participation, knowledge gathering, and informational awareness, the Barcelona City Council set out an agenda relying on Decidim, a free, open-source software platform for democratic communication and policy planning (Barcelona City Council, 2016). Used by more than 40,000 Barcelonian citizens, Decidim organizes deliberative, collaborational projects that urban residents use to create initiatives, voting consultations, and proposal analyses (Barcelona City Council, 2017). Decidim is a virtual system for the co-production of strategic urban policy, where thousands of discussed proposals are authored by residents, either through wiki-style contributions or commentaries that bring contextual understanding to specific urban issues. Decidim is functional architecture for virtual assemblies that channel political participation through a *digital commons*, coordinating commitments to collective action through free and open-source software (Decidim, 2021).

Decidim is a collection of powerful modules that produce pathways for direct digital democracy at the municipal scale. Decidim uses Creative Commons and Open Access Database licensing, guaranteeing transparent, trustworthy, auditable content written by volunteer programmers. Data created through Decidim is always accessible and downloadable, building a history log of contributions, cataloging debated discussions. Notable sub-components include management of calendar meetings, commentary blogs, static informational pages, polling

surveys, voting results, and discussion sections. Decidim is a purposeful "technopolitical" product, as is explicitly stated in documentation authored by its contributors (ibid). Set in the context of democratic crisis, the Decidim whitepaper states that "surveillance capitalism" has exploited "information, knowledge, affects, and social relations" to generate economic value, and combatting this phenomenon requires "free software, knowledge, and culture" (ibid).

Deliberations occurring over Decidim would be without significance if not informed by an open budget that transparently details the allocation of financial resources. In 2016, the Barcelona City Council under Colau built additional digital tools that publish budgetary information by department and year, making available invoicing information, public expenditures, forecasts, and interactive infographics (Barcelona City Council, 2017c: 17; see Figure 3 below). All data generated through the open budget platform is exported in open formats, downloadable in Catalan, Spanish, and English. This type of data allows urban citizens to understand how much the city council spent on security, revenue generated through tourism, money invested in guaranteeing housing for all, and main operational expenses. Every facet of the city's balance sheet is openly accessible: adjusted budgetary overruns, average payment periods, cash surpluses for general expenses, expenditure rules, net savings, outstanding debts, real estate taxes, and special contributions are just some of the many specific line items open for review (see Figure 4 below).

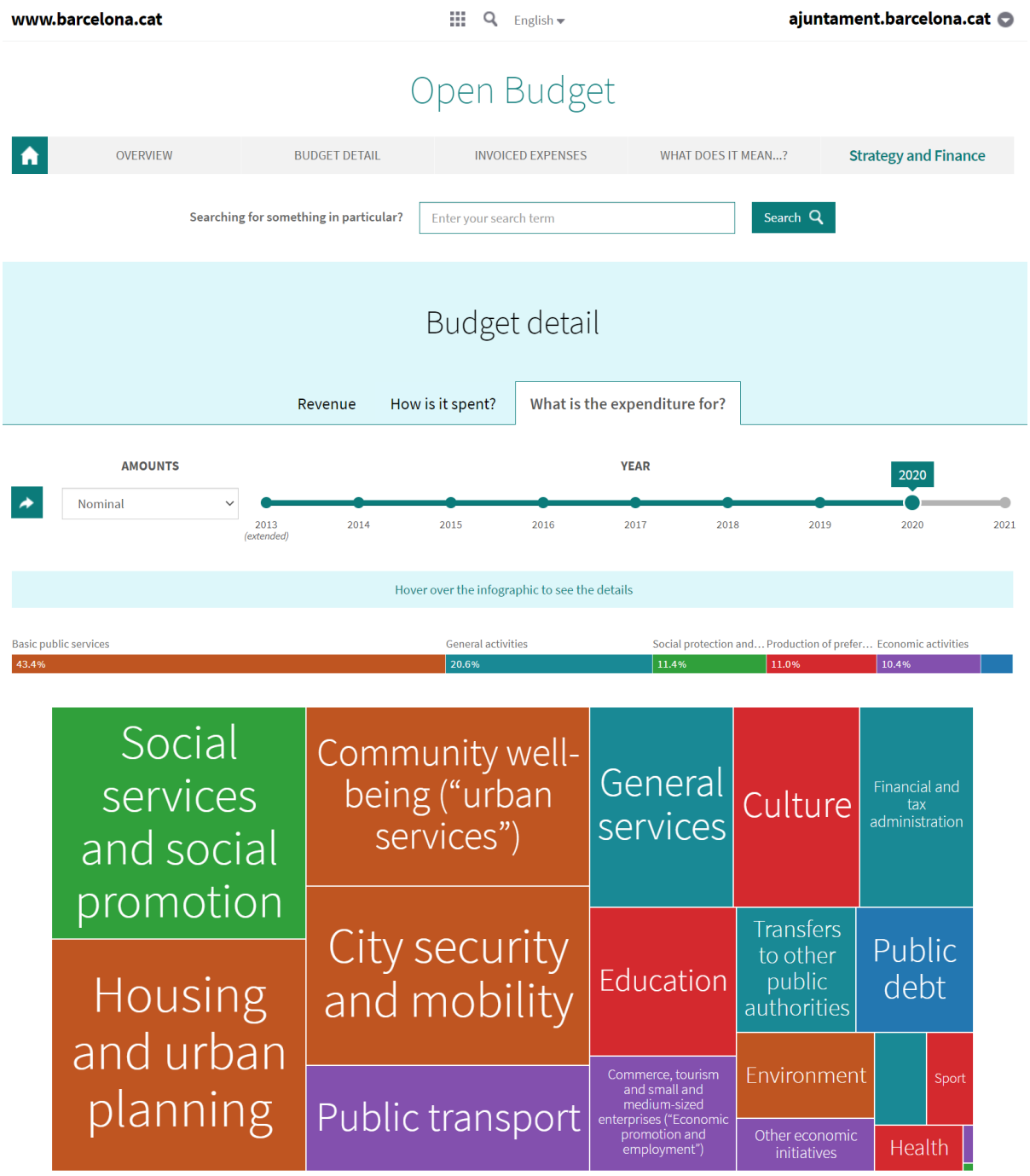

Figure 3. Barcelona Open Budget - Expenditure visualizations (Barcelona City Council, 2021a).

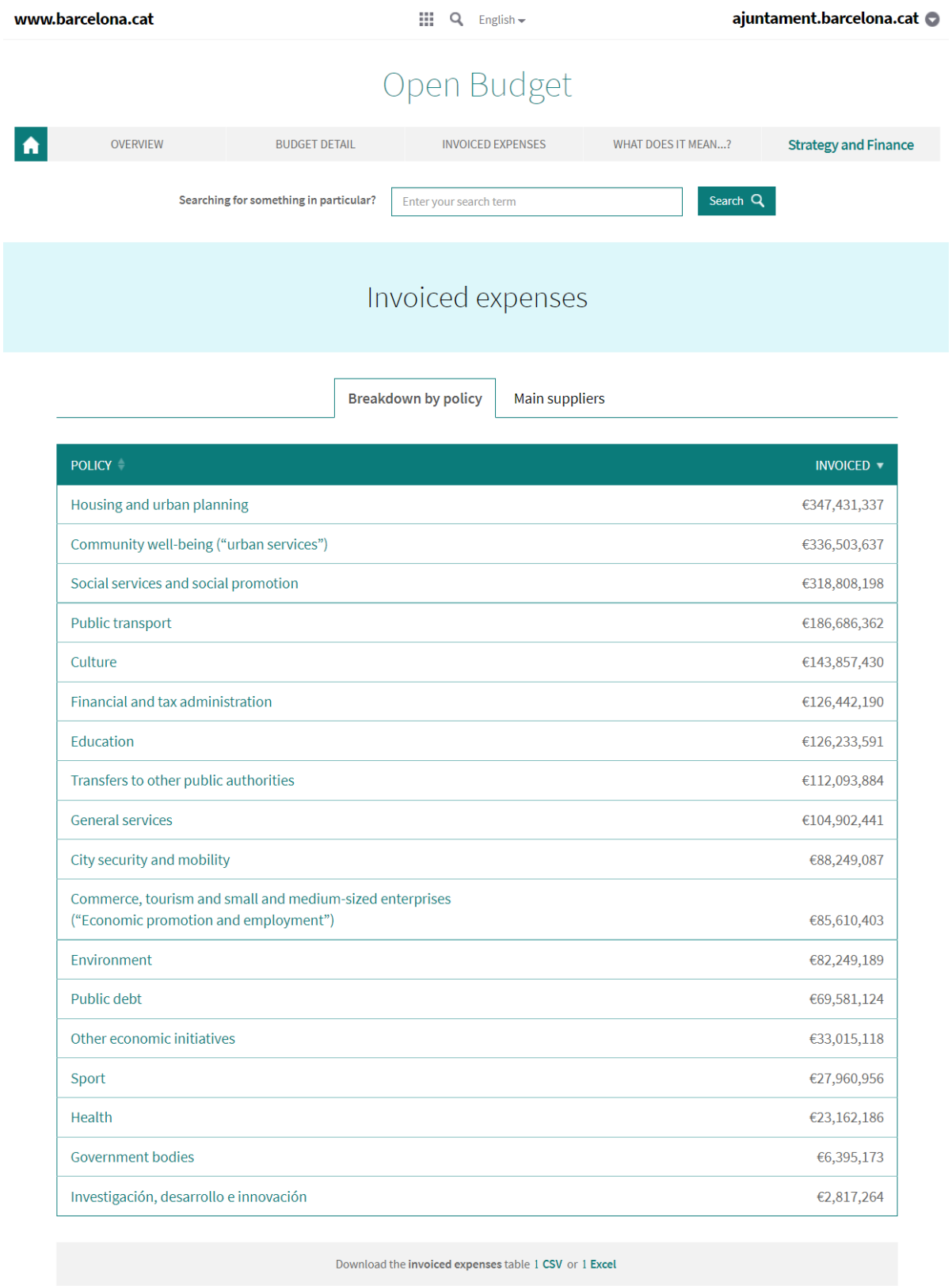

Figure 4. Barcelona Open Budget - Invoiced expenses (Barcelona City Council, 2021b).

One additional piece needed for data sovereignty is the permission layer, the technical method used by individual residents to claim control over their data. As part of the overall effort to enable citizen-led data governance and to implement secure processes for digital democracy, Colau and the city council implemented the existing Decentralised Citizen Owned Data Ecosystem (DECODE) through two pilot projects (Bass & Old, 2020). DECODE is a free, open-source, distributed computer file system for managing cryptographically secure data profiles connected to digital city services. DECODE uses cryptographic signatures to enable digital identities and data generated by those identities, with privacy-protecting, permission-granting features needed for use across the "digital commons." DECODE lets Barcelona residents tailor access to their data, sharing identity information without revealing non-essential attributes. For instance, a profile might indicate they are a resident of Barcelona or are of legal voting age, without revealing their name, age, or sex (Bass & Old, 2020: 21). The number of attributes available is essentially limitless, although practically might include only a few core descriptors. Once assigned, a secure digital application can be installed on a computerized phone, no longer needing any further interaction from the issuing authority. According to role, location, department, and other related factors, data stored through DECODE can be shared with the city or other organizations. Indeed DECODE was first integrated into Decidim to secure petition signatures, online consultations, and feedback from authorized citizens. DECODE also integrates with IoT smart devices (e.g., noise, pollution sensors) without handing over personal data to private firms (Bass & Old, 2020: 30).

Political crises within Spain and in particular Barcelona led to the emergence of BComú. Achieving electoral success was not guaranteed, however, urban social movement action across networked media made the difference between a smart city crafted by movement actors using

open source tools and one engineered by private global firms using proprietary products. A technopolitical culture embraced by social movement actors necessarily informed procurement decisions at the institutional level, introducing new forms of e-government while improving democreatic participation, leading to residential co-production of urban public policy. Toronto is another case where we see the prominence of social movements in the development of smart cities. The following will examine the actors, firms, and municipal institutions involved with creating policies governing technology procurement involving lakeside land in Canada's largest city.

4.2 Toronto

4.2.1 Toronto's Waterfront

The vision of a Toronto smart city would not have materialized absent plans for megaprojects before it. Located at the center of urban planning debates for more than one-hundred and seventy years, Toronto's waterfront development has involved everything from railways to municipal services and other large-scale independently managed systems (Reeves, 1992). It was in 1999 that Canadian Prime Minister Jean Chrétien, Ontario Premier Mike Harris, and Toronto Mayor Mel Lastman joined together to begin a 30 year, $17 billion initiative transforming the deteriorating harborside area into a "green gateway" for Canada and all of North America (Lehrer, 2009). Positioned as a partnership between three levels of government and international investment capital, Lastman appointed noted banker Robert A. Fung to head the Toronto Waterfront Revitalization Task Force (TWRTF). Other task force members included Steven Hudson, financier and Chair of the Executive Committee for the Toronto 2008 Olympic Bid; William Farlinger, Chair of Ontario Power Generation; Ruth Grant, insurance executive and

Toronto Olympic Bid member; Rod Phillips, investment banker and Chief of Staff for Mayor Mel Lastman; Mark J. Wilson, IBM executive and Chair of the Don Watershed Regeneration Council; and Robert Wright, corporate lawyer and securities regulator (Fung, 2000: 10).

In the hope of bringing an Olympic-sized megaproject to Toronto's waterfront, beginning plans stated that objectives were to create a new economic model that privileged environmental protection while promoting cultural and recreational growth (Toronto City Council, 1999: 3). From the onset, the vision explicitly stated that in order to surpass other world cities such as "Barcelona," Toronto's waterfront would have to transform into a "financially viable" tourist destination that attracted "new investment" for blended infrastructural space, incorporating commercial, residential, and recreational facilities (ibid: 5). Indeed the long-run plan sought to create a "virtuous cycle" that would generate new business and thus increased levels of property taxation, better funding public services, and goods, attracting even more investment. Achieving this vision required a unified political will among various governments whose diversified interests were critical to the coordination required for success. For example, the federal government owned the Toronto City Centre Airport and other marine terminals, including the Outer Harbour Marina; Ontario Province regulated the environment and operated Ontario Place and land throughout West Don Lands and Port Lands; the City of Toronto owned half of the land in the Port Area and was responsible for Exhibition Place (ibid: 27). TWRTF was a solution for the "maze of owners and regulators" involved in Toronto's waterfront, proposing a public-private partnership that might overcome any potential jurisdictional gridlock (ibid).

On the 17th of March, 2017, after more than a decade and a half of design initiatives, secondary plans, and strategic reviews, the newly named Waterfront Toronto (working title for TWRTF) published a request for proposal seeking an innovation and funding partner for the

Quayside development project (Waterfront Toronto, 2017). Of the many requirements detailed throughout the document, Waterfront Toronto (WT) highlighted the need to build urban spaces that tackled climate change, communal inclusiveness, and future-oriented infrastructure. In particular, WT desired a development partner that would help "realize fully the benefits of emerging technologies," including IoT, Artificial Intelligence, and big-data analytics (ibid: 8). The primary objective of this revitalization was to deliver "key economic and social benefits" that would allow Toronto to better compete as a top-tier destination for global capital, technology, and talent. WT explicitly noted the importance of establishing an "innovation cluster" consisting of demonstration spaces, project testbeds, and industrial-academic partnerships that would drive entrepreneurial activity, leading to technology-focused industrial growth (ibid: 9). One of the more interesting sections of the document briefly discusses the need for not just partners that can meet the technical demands of a Toronto-crafted smart city but who could offer financially innovative funding solutions, stating the importance of mitigating diminishing access to public funds.

Exactly seven months later, on the 17th of October, 2017, Toronto Mayor John Tory joined with Ontario Premier Kathleen Wynne and Canadian Prime Minister Justin Trudeau to formally welcome the partnership between Waterfront Toronto and selection bid winner Sidewalk Labs (SWL) (Tory, 2017a). Stating his inclination for "forward-thinking, sustainable, affordable & mobile design[s]," Tory pitched SWL as having a transformational impact on New York City's post-9/11 revival, suggesting the same designs seen across Hudson Yards could be replicated in Quayside. Tory also mentioned Toronto's "tech sector" as one of SWL's primary motivations for choosing Toronto, with companies of SWL's tier wanting access to the city's "wealth of talent & quality of life" (ibid). However, according to provincial auditors, Mayor

Tory's office received "almost no information about the project" before WT's decision (Lysyk, 2018: 689).

4.2.2 Sidewalk Labs

SWL was first announced in 2015 on the personal blog of then Google chief executive Larry Page (Page, 2015). Pitched as a way to "[incubate] urban technologies," Page suggested that in order to achieve success with "long-term, 10X bets," SWL would create technologies and partnerships that focused directly on affordable housing, public transport, pollution, and common quality-of-life issues affecting cities (ibid). Page also identified Dan Doctoroff, former CEO of Bloomberg and Deputy Mayor of Economic Development and Rebuilding for the City of New York, as the initial executive heading Google's subsidiary. SWL was a close collaboration between Doctoroff and engineering manager Adrian Aoun, a principal urban technology researcher at Google (Lohr, 2015). In the first published policy article on SWL's website, Dan Doctoroff stated the firm's priorities were to build a suite of data tools to transform civic life, including autonomous systems and real-time sensors to provide precise location and personalized social services (Doctoroff, 2016).

SWL produces a mix of software and hardware products built for real estate developers, city planners, commercial building owners, tenants, parking operators, architects, engineers, contractors, suppliers, and utility providers (Sidewalk Labs, 2021a). For example, their Delve software planning tool gives designers information about parcelization, zoning, and open space strategies essential for mixed-use projects. In addition, quality of life data is integrated into structure planning, such as available daylight, walkability, sun hours, and amenity access. These data are used as inputs for financial outcome models that calculate construction costs, capital

value, net profit, and profit-on-cost. Computational machine learning methods are employed, building large numbers of experimental designs based on priority outcomes and ranked options, leaving only the highest-performing configurations recommended for commercial use (Sidewalk Labs, 2021b). Data generated through this software is sold to many of the world's largest real estate development firms, including Beyer Blinder Belle, Quintain, Roche, Mitsubishi Estate, Samya, and Sumitomo Corporation (ibid). As a subsidiary of Alphabet, Inc., and sister company of Google, Inc., it is unclear to what extent data created through SWL's internal software is linked to other firms associated with the parent company (Lysyk, 2018: 692).

A pivotal factor guiding SWL's entrance into Toronto's smart city development was the generation, management, and ownership of data created through their software and devices. Data governance was so critical that SWL drafted a *Digital Governance Proposal* (DGP) to highlight their commitment to *Privacy by Design* as principles the firm would abide by and promote to address concerns raised by networked social movement actors and other city officials (Sidewalk Labs, 2018). However, even the Information and Privacy Commissioner of Ontario at the time, Brian Beamish, was not impressed (Beamish, 2019). Privacy by Design is a systems engineering approach to data privacy originally proposed by Ann Cavoukian in her role as former Information and Privacy Commissioner of Ontario and was designed to curtail "ever-growing and systemic effects of [ICTs], and [...] large-scale networked data systems" (Cavoukian, 2009). Some of the many principles include firms taking proactive rather than reactive approaches to data privacy; privacy as the default orientation of IT systems and business practices; embeddedness of privacy protection at the architectural hardware level; and a user-centric orientation that encourages appropriate notices and options that are clearly understood by users (ibid). SWL even consulted with Ann Cavoukian in the process of generating their DGP, a role

from which she resigned in protest as SWL could not commit to a DGP that included Privacy by Design as a contractual requirement of future partnerships with firms working with SWL in the designated Quayside area (CBC, 2020). Additionally, SWL's DGP made a distinction in their Privacy by Design framework between "urban data" and "traditionally collected data," otherwise known as *transactional data*, an important computational commodity identified by Google's Chief Economist nearly a decade prior (Varian, 2010). Transactional data results from commercial activity, such as when customers pay for a service or product (e.g., buying coffee, purchasing an app on the Google Play store). Even under a Privacy by Design framework, SWL remained committed to mining data as long as those data interacted with transactions. By coining a new definition for collected data that does not currently exist in Canadian law, like 'urban data,' SWL essentially remained committed to monetizing transactional data as a core aspect of their business model while muddying the distinction between consent and non-consent based data harvesting (Tusikov, 2019).

It should not be lost on observers that the name of SWL's parent company, Alphabet, is not a reference to the list of letters used in the English language; rather, it is a sly combination of the finance concept *alpha* and gambling term *bet*. Alpha being an investment strategy where one gains a return in excess of the expected rate, where a manager *beats* the market with an abnormal rate of return (Chen, 2021). When Google executive Larry Page mentioned investing in "10X bets" during the launch of SWL, he meant exactly that: wagers that would generate ten times the capital invested. The strategy of Alphabet, Google, and indeed SWL is to *only* invest in opportunities where the possibility of profit far outpaces any modest risk. What better segment of revenues to approach than the largest revenue streams available: taxes. In February of 2019, Toronto Star investigative reporters revealed that SWL had precisely these plans, to

negotiate—in secret—access to property tax revenues from the City of Toronto (Oved, 2019). In leaked confidential slides, SWL managers presented their tax strategy to Alphabet executives, whom they told could potentially reap returns from a pool of $6 billion over the next thirty years through the method of tax increment financing (TIF). TIF would allow SWL to solicit bondholders for initial development funds, then use incremental tax revenues to pay the debt on those bonds (Donovan, 2019). All this after negotiating securitization of $1.25 billion spent on the Port Lands to protect future assets from flooding and other water-related natural disasters (Waterfront Toronto, 2018). SWL would only have to invest a small fraction of the total capital needed to begin the overall project (Austen, 2017). These revelations made SWL extremely nervous, much so that CEO Dan Doctoroff released a prepared response to the leak wherein the NYC political veteran emphasized SWL's level of excitement while ignoring the issue of TIF, choosing to instead focus on how little SWL would be spending to achieve "timber construction" and "vibrant neighbourhood[s]" (Doctoroff, 2019).

A day before Waterfront Toronto's contract revaluation meeting on October 31st, 2019, additional confidential SWL documents were leaked from anonymous sources to investigative reporters at The Globe and Mail (Cardoso, 2019). Internally referred to as the "yellow book," the coffee-table sized, 437-page spine-bound text detailed SWL's initial business strategy as it was envisioned during their earliest 2016 planning meetings. The document outlined a series of goals for the organization that centered around radical new proposals for contemporary urban development to the chagrin of networked social movement actors, municipal representatives, and provincial authorities. From a density perspective, SWL's model community would support 25,000 urban residents for every square kilometer, nearly five times greater than the average density of Toronto City proper, accomplishing a target density third highest in the world, behind

only Dhaka, Bangladesh, and Manilla, Philippines (ibid; Statistics Canada, 2016; Bangladesh Bureau of Statistics, 2011; Philippine Statistics Authority, 2016). Real-estate value appreciation was noted as the key objective, as the firm would target decrepit land in cities such as Detroit, Denver, and Almedia, Calif. SWL additionally proposed an urban policy regime similar to Disney World, Florida, where The Walt Disney Company negotiated exclusive administration of state territory for business operating activity, giving SWL the legal authority to "create and control its own public services, including charter schools, special transit systems and [...] private road infrastructure" (Cardoso, 2019). The plans also discussed a 'data-driven' approach to public safety and law enforcement policing, granting SWL similar latitude as University police departments, where SWL could create a testbed for alternative criminal justice procedures. Indeed data collection would be utilized in "real-time," tracking positioning of all urban "entities," building a vast historical record of public movement throughout the Don Lands (ibid). "[E]very person, business or object registered in the district" would be tracked using "unique data identifiers" (ibid). Ultimately, SWL imagined a dense urban space where "good behavior" would be rewarded, building a de facto "social credit system" to "hold people or businesses accountable" (ibid).

4.2.3 #Blocksidewalk

Just as SWL inspired WT's boardroom, they likewise motivated networked social movement actors throughout urban Toronto. In mid-February 2019, politically active residents across the city formally began an information campaign labeled #BlockSidewalk. Using the syntax of a Twitter hashtag, combined with an explicit message of restricting SWL from developing Quayside, a tightly networked group of activists created an online presence that published

content and media (BlockSidewalk, 2019b). The early roster of #BlockSidewalk members involved prominent academics, entrepreneurs, technology professionals, creatives, criminologists, urbanists, artists, and activists from around Toronto. Initial material included in sign-up messaging on the #BlockSidewalk website forwarded newly recruited members to three important introductory links (BlockSidewalk, 2019a): a Twitter search of all messages mentioning #BlockSidewalk, a published Medium post by #BlockSidewalk campaign chair Bianca Wylie, and an article by Jacobin Magazine editorial board member Nicole Aschoff (Twitter, 2019; Wylie, 2019; Aschoff, 2019). Written pieces by Wylie and Aschoff communicated deep cynicism about WT's management of Toronto's harborside development. The overriding message identified an asymmetry of power between urban citizens and SWL's parent company Alphabet. Networked urban social movement actors framed SWL's interest in Toronto as a monopolistic power grab, indicting the perceived cozy relationship between neoliberal business-oriented elites and Silicon Valley technology executives.

The earliest coordinated social movement activity organized through #BlockSidewalk's public Twitter account occurred on April 1st, 2019, when Bianca Wylie, Julie Beddoes, Sam Burton, and Melissa Goldstein announced a media advisory inviting the public to #BlockSidewalk's first press conference at City Hall (BlockSidewalk, 2019d). This initial post was boosted by other social movement actors in the region, including greater Toronto's largest hospitality union Unifor. Coverage of the event was published in The Toronto Star shortly after, introducing mainstream readers to movement leaders and their protest against secret negotiations between WT and SWL (Rider, 2019). On April 2nd, 2019, #BlockSidewalk received support from author and Toronto social movement activist Cory Doctorow (no relation to Dan Doctorow), whose social media activity made #BlockSidewalk accessible to hundreds of

thousands of Twitter followers (BlockSidewalk, 2019e). Several days later, #BlockSidewalk received added support from academics intimately involved with research on data collection, surveillance, and smart city development, such as Ben Green, Assistant Professor with the Ford School at the University of Michigan, and Shoshana Zuboff, Professor Emerita at Harvard Business School (BlockSidewalk, 2019f; BlockSidewalk, 2019g). #BlockSidewalk published successive calls-for-action and additional press releases throughout the following weeks, receiving continued mainstream coverage promoting movement messaging (BlockSidewalk, 2019h; Bendix, 2019).

#BlockSidewalk's first campaign meeting occurred on April 17th, 2019, gathering a crowd of local supporters, residents, activists, and politicians, some of whom were directly involved with WT negotiations (BlockSidewalk, 2019i; see Figure 5 below). Included in attendance were Paula Fletcher, Councillor for Ward 15 Toronto Danforth, and Liberal House of Commons member for Spadina—Fort York, Adam G. Vaughan. Bianca Wylie led most of the discussions, presenting several questions about the policy process, such as why the development was legally structured the way it was, the opportunity costs of not choosing other development paths, and issues with final development approvals. Wylie objected to the secrecy of the Framework Agreement & Plan Development Agreement while also identifying a policy and legal vacuum where issues of privacy, power, consent, and agency remained largely unaddressed. Additionally, Wylie questioned why inputs into public service and policy were privatized through the WT legal structure. Audience members identified themselves as residents or community activists, most concerned with privacy, affordable housing, public health, and indigenous relations (Frei, 2019). One member, in particular, noted Shoshana Zuboff's work on 'surveillance capitalism' and how important it was for the community to understand the broader

business objectives of Google and Alphabet. Not to be left out, Swerhun Facilitation head Nicole Swerhun and WT Innovation and Sustainability manager Aaron Barter also gave their assurances to broader questions regarding public consultations between WT, SWL, and area residents in upcoming information events.

Figure 5. Initial #BlockSidewalk movement meeting (BlockSidewalk, 2019j).

#BlockSidewalk movement actors continued a persistent campaign attracting continued mainstream press coverage throughout the next year, increasing social media engagement while mobilizing movement followers to participate in WT/SWL organized events—mostly in

response to concerns raised by #BlockSidewalk. Founding #BlockSidewalk movement members Bianca Wylie and Milan Gokhale continued publishing on Medium, dissecting privatization of municipal infrastructure and suggesting ways for Canadian journalists to cover #BlockSidewalk across networked social media, television, and newspapers (Wylie, 2021; Gokhale, 2021). Workshop meetings, public consultations, and academic discussions were continually promoted as ways for movement adherents to engage with the urban policy process (BlockSidewalk, 2019k; BlockSidewalk, 2019l; BlockSidewalk, 2020). On May 7th, 2020, #BlockSidewalk released their last publicly issued press statement when SWL pulled out of Toronto, canceling their intention to develop Quayside and 800 other acres of the Port Lands (BlockSidewalk, 2020b). Framed as a victory against "Google's corporate takeover," #BlockSidewalk member Thorben Wieditz thanked residents of Toronto for their "on-the-ground organizing" that made resistance to SWL possible. Six months later, #BlockSidewalk took full credit for blocking the SWL development in a blog post encouraging Toronto residents to attend additional WT meetings over new plans for the waterfront (BlockSidewalk, 2020c).

In comparison to BComú, #BlockSidewalk remained a narrow urban social movement that did not lead to regime change. However, movement actors utilized networked media, pressuring WT, SWL, and the City of Toronto to alter their negotiations. While we cannot definitively confirm SWL left Toronto because of efforts organized by #BlockSidewalk, nonetheless years of effort and millions of dollars spent by SWL lobbying municipal representatives resulted in failure. While the spread of COVID-19 may have influenced SWL, it is more likely that continued efforts by #BlockSidewalk hampered their expectations for successful implementation of a TIF centered business model—especially as it relied on new classifications for data that circumvented conventional notions of informed consent.

#BlockSidewalk successfully extended the window of consideration, forcing WT to evaluate additional contingencies unforeseen by SWL according to leaked documents.

Chapter 5: Discussion

This section will discuss four crucial areas of analysis stemming from experiences in Barcelona and Toronto. From a public policy perspective, it is vital to cover data governance, procurement, and privacy, as they have broad implications for municipal budgets and infrastructure projects. From a social movement perspective, it is important to cover technopolitical practices and their rising significance.

5.1 Data Governance

Whether as 'digital exhaust,' signals generated from IoT devices, or behavioral analyses of transactions, data becomes a public asset when it interfaces with public institutions. Digital platforms form the contemporary public square, where discussion, debate, and disagreement can occur between like-minded and oppositional political forces. Ada Colau's intimate participation with urban social movement mobilizations after the 2008 Financial Crisis qualitatively changed her and others' technical, organizational, and rhetorical strategies. The shift to a technopolitically aware culture, where digital systems are purposefully used to influence political outcomes, has become a valuable tool for collective action within urban social movements. What was explicit for BComú became implicit for #BlockSidewalk, which, although it was not a movement for municipal regime change and had a singular focus, nonetheless advocated for distinct policy outcomes favoring public data governance.

Governance of data generated through public activity, be it measuring pollution as was the case in Barcelona or actively recording residents' movements as they pass through urban territory built and managed by private firms like SWL, must wrestle with questions of credibility

and legitimacy. The nature of contracts and vendor lock-in was a distinct concern for Colau and her political supporters, resulting in the promotion of free and open-source licensing that contractually freed Barcelona from the constraints often imposed by private vendors. #BlockSidewalk understood from its inception that the use of publicly sourced data was SWL's *raison d'être* and that public governance of these assets had to be a cornerstone of their policy objectives. Whereas in the Barcelona case, public governance of public data had become an institutionalized consequence of BComú's mayoral ascension, movement actors in Toronto fell just short of implementing a similar, legislatively bound policy—however, technopolitically, their work made public data governance a critical smart city policy concern. Indeed throughout the last year of SWL's lobbying efforts, addressing the issue of 'urban data' became an obstacle to their development plans. #BlockSidewalk changed the narrative path of the data governance discussion, achieved through tactically effective engagement with Toronto residents across networked media—particularly Twitter—resulting in political pressure unforeseen by WT or the City of Toronto.

Municipal politicians, city administrations, and urban residents should understand that public data governance is no longer a policy afterthought. Any organized effort to digitize city services must begin with a thorough evaluation of the rights, objectives, and liabilities inherent to generation, collection, and monetization of data created through digital products leveraging public assets—be they parks, streets, or environmental effects. Political parties, social movements, and private firms cannot effectively pursue comprehensive public data governance without considering the same questions raised in Barcelona and Toronto; or if they choose to ignore, will undoubtedly face opposition from technically savvy networked actors, whether they seek out municipal regime change or not. Regardless, future research on more fully developed

systems of public data governance is necessary. Public data governance schemes are ever-changing and adapting per legal precedents that have yet to determine the definitive boundaries of general public data regulation. Ad hoc solutions are the current norm as different municipalities, states, provinces, and national governments grapple with an emerging *network society*.

5.2 Procurement

Acquisition of goods and services is a focal task of governments, especially as public administrations have transitioned to contractual service delivery over the last several decades. For good or bad, procurement of 'smart city' products are often reduced to economic analyses, where cost/utility-benefits drive purchasing decisions. As was observed in Barcelona, aggressive corporate lobbying resulted in a coordinative relationship between the Trias regime and international technology firms such as Cisco, limiting to a large degree which technical products might be available for use within their vision of a smart city. Efforts by BComú radically changed their approach to municipal technological procurement, by implementing their own technopolitical orientation towards free and open software, institutionalizing that very set of ideals. By optimizing for free and dynamically competitive sourcing, they implemented a policy process for procurement absent private share-holder incentives, preferencing open rather than closed platforms.

Social movement actors in Toronto understood the same themes in their opposition to a single-sourced vendor partnership with SWL. Perhaps in Barcelona, many powerful well financed firms might have had some option to bid for a variety of municipal contracts; in Toronto, it was one, very large firm—Alphabet—that would have had all of the negotiable

leverage across wide acreages of urban space. Procurement wasn't so much the issue, but rather it was a wholesale handover of public territory to a private entity free from democratic petitions. Both cases demonstrate that traditional closed source, private vendor procurement bidding strategies are not the only choices available for cities upgrading their systems. Indeed there are opportunity costs to closed systems, as there exist competitive open source alternatives to nearly all hardware and software smart city products. As Bianca Wylie mentions in the very first #BlockSidewalk campaign meetup, Requests-for-Proposals that prioritize innovation can limit technical possibilities rather than promote them, especially when dealing with extremely large firms that have financial objectives antithetical to whichever markets they might be currently operating in.

There are no one-size-fits-all procurement approaches for every situation. Mixed open and closed source strategies might be desirable depending on needs and goals of any one local, provincial, or national government. However, adopting zero-cost, technically proficient solutions is not only an advantageous technopolitical strategy, it opens up policy planning to a universe of available solutions that are safe, secure, and appropriate for use by public institutions. No policy process should go forward without considering software and hardware built using open source and free platforms. There are also beneficial ramifications for choosing procurement strategies that prioritize open source, as not only does it create urban branding opportunities, but it attracts bright and technically talented contributors from across the world to locations that align with their technopolitical beliefs, curating mutually beneficial relationships that are potentially far more valuable on an ongoing basis than present material infrastructure.

5.3 Privacy

In the Western tradition, Aristotle's distinction between the public sphere of political activity (*polis*) and the private realm of domestic family life (*oikos*) began an ongoing discussion on the meaning and value of privacy. It remains the same today, and no less so in the context of crafting public policy regulating the development of smart cities. The technopolitical objectives of BComú necessarily led to the adoption of DECODE precisely for its privacy-protecting features, especially since the municipal regime implemented Decidim for organizing public initiatives requiring interaction with Barcelona residents. Securing signatures, validating identities, and authorizing permission-based access while also mitigating disclosure of personally identifiable information was essential to their political project. Indeed the FCM advocates for licensing structures that prevent private firms from operating legal strategies that privilege collection and sale of privately gathered data—with open-source legal frameworks, heritable privacy protections are legally conferred to derivative products. Toronto movement activists recognized the same risks when SWL proposed that none-explicitly consenting 'urban data' would sufficiently meet current legal standards. In actuality, it created a new legal paradigm advantaging an emerging business model predicated on harvesting behavioral data through surveillance of the public sphere.

The keen instincts of social movement activists in both cases have resulted in similar technopolitical practices. Both traditions contain constituencies that supremely value privacy in all its forms, aggressively defending challenges to these values whether from organizational, institutional, or legal sources. However, the two social movements differ in their maturity, with BComú enforcing technical privacy through procurement of open source products *after* winning an electoral challenge; #BlockSidewalk achieved resource mobilization through networked

media and applied political pressure during municipal contract negotiations, but it remains to be seen if prominent actors will seek out political offices. #BlockSidewalk will likely transform into a different form of technopolitical project, spreading to municipalities throughout Canada and perhaps all commonwealth countries, including the United States. It should be noted that movement leader Bianca Wylie has in the past cited Ada Colau and BComú's efforts in Barcelona, pointing to linkages between social movements already occurring in earnest (CIGI, 2018). Further research might identify the distinct intellectual, technopolitical, and practical commonalities between existing networked urban social movements involved in smart city policy regulation *and* other movements that are currently emerging in other municipalities grappling with the same conflicts.

In light of the paths taken by both Barcelona and Toronto, challenges to privacy norms are continually ongoing. Municipal regimes, firms, and states will at times differ in their approaches to privacy as a universal value. Indeed both Cisco and SWL produced educational material for residents, city administrators, and interest groups that promoted their distinct visions of smart cities. Privacy protections are always touted as considerations, however, firms are careful to carve out considerations that may give them advantages, becoming apparent only once market power is achieved.

5.4 Urban Social Movement Action

Urban social movements throughout the past have depended on the organizational capacity of their members, whose efforts collectively result in mobilizations of resources that change the political character of the societies they operate in. Whether concerning civil rights, environmental protection, or distribution of economic benefits, social movements of earlier eras

had many more obstacles that limited the speed and direction of their growth. The emergence of the network society within an informationally dependent economic order is qualitatively different from ancient or modern societies before it. Both Barcelona and Toronto demonstrate that networked media now directly influences the depth of public policy discussions determining technological provisions at the municipal level. Local activists are now able to reach wider audiences without mediation by elite institutions or narratives; political differences are becoming more than distinctions between economic, ethnic, or class-based interests—the flow and source of information now shapes which priorities become political, resulting in the material makeup of city structures.

Dissatisfaction with the political status quo led to the activities of BComú under the leadership of Ada Colau. By combining technology with political activity they built an urban social movement for change. Hacktivists involved with prior social movements in Africa and the Middle East promoted FCM and a commons approach to activism, merging virtual and physical theatres of action. In tandem, PAH and Podemos built links across networked media, creating resources from which to mobilize action affecting electoral contests in Barcelona. From a position of power, movement actors implemented radical policy changes regulating the procurement of smart city infrastructure, directly impacting management of data and privacy, resulting in co-production of public policy through open source software.

Contract secrecy between SWL and WT led to disappointment from Toronto residents. Promoted as a smart city from the 'internet up,' SWL harnessed excitement from city planners, however it also motivated social movement action. Borrowing from Twitter's hashtag culture, #BlockSidewalk produced digital calls-to-action that organized meetups and digital discussions, questioning the wisdom of handing over public property to a private entity. Throughout the

period of negotiations, #BlockSidewalk applied continuous pressure through their online presence, directing their audience to ask important unanswered questions of SWL and WT. By becoming active in the public policy process and demanding answers from those intimately involved, #BlockSidewalk successfully changed Toronto's smart city narrative focus—forcing city authorities to evaluate data privacy as a primary consideration. In total, these technopolitical practices demonstrate an emerging form of urban social movement action.

Chapter 6: Conclusion

Politics is the application of practical wisdom in the management of human affairs. Nowhere is this more true than in the creation of a city. But an electronically connected smart city presents both economic opportunity and political crisis in that it grants immense leverage to the technically minded among us. ICTs and the data they generate are infrastructures for a new type of human settlement, integrating computational processing into the essence of urban living. However, the unintended consequence of virtualized electronic communication is the proliferation of surveillance and the growth of firms that best understand how to harness behavioral information to pursue wealth. Those best positioned to challenge the asymmetries of power existing in the smart city are urban social movements. Through technopolitical resistance, they mobilize networked resources, using technology to effect political change. Technopolitics is a new form of direct action, whether it involves spreading informational awareness or procuring municipal services; it is the politics of the network society and every smart city to come.

The literature on smart cities is fast-growing, with some disagreement on its definitional scope. Nonetheless, there is little controversy on the significance of ICTs and the qualitative influence they have on social organizations, in the business context, and increasingly so within the political sphere. The rise of the network society is a consequence of ICT and IoT proliferation, attained through the cheap fabrication of microprocessing equipment, finding their way into every conceivable form of tool and institution. Competition between firms in this industrial space has led to surveillance-dependent business models leveraging algorithms to predict human behavior. These developments challenge normative views of privacy, democratic notions of citizenship and fundamentally alter the relationship between the firm and the state.

Having arisen to contest these changes are urban social movements, adopting technology through direct action as technopolitical practice. This emergent culture shapes public policy, particularly regarding smart city infrastructure, but is extendable to many other domains where networked technology is finding use (e.g., cryptocurrency, encrypted communications).

The methodology chosen in this analysis was qualitative with a case study approach. By examining official statements by government representatives, firms, and movement actors, interactions between these participants as they sought out economic, political, and technopolitical outcomes were comprehensively evaluated. Barcelona's plans for a smart city began as a corporate initiative. However, resistance from urban social movements to prior economic crises led to a culture of networked activists using ICTs—ironically in a way—to resist further urban encroachment from highly capitalized ICT firms. Politically this had ramifications for electoral power, ushering in a new urban regime that radically altered the smart city procurement process. Similarly, Toronto faced the same threat, except one firm, Alphabet, posed a dominant challenge. Unlike Barcelona, Toronto movement activists did not seek out explicit regime change; instead, they organized an informational campaign that questioned every step of the negotiation process, forcing public-private partnership Waterfront Toronto to reconsider residential input. Both cases are successes in that networked urban social movements fortunately shaped smart city policies in their favor.

There are limitations to this analysis. First, this approach cannot precisely identify which causal mechanisms are responsible for forming urban social movements in the covered contexts. Interviews were not conducted, restricting the information collected about the motivations of movement actors, firms, and municipal regimes involved. Perhaps other attempts might apply process tracing methods to locate potential confounding factors at play in the events involved.

Second, because a Social Network Analysis (SNA) was not performed, this research cannot identify engagement between movement actors across networked media. Unidentified participants likely contributed to message virality, enhancing the quality of information spread between movement adherents. Promising paths for further research might rely on using SNA to identify distinctly networked groups across different media. Time series analysis of network formations may reveal development patterns useful for identifying social movements before reaching their optimal and effective size.

In light of the limitations, several policy recommendations stem from this analysis. First, municipalities should implement robust data governance frameworks to protect residents from privacy intrusions, whether by tracking movement within public space or collecting environmental information. Any data collection should occur with active acknowledgments by parties participating, not through implicit signage warnings or passive notifications. Second, all software and data generated by municipal computer systems should use open source licensing, allowing transparent evaluation. Open source software code is available for anyone to see, granting other parties access to test system security and verify data integrity. Third, city governments should encourage public policy co-creation when and where appropriate, building collaborative virtual assemblies that integrate policy notifications, feedback, and validated residential signatures. Although there remains a 'digital divide' affecting the accessibility of digital public services, options for digital participation free up physical infrastructure for better utilization. Any one of these recommendations may be implemented in part or total, strengthening public confidence in public systems management and encouraging democratic participation.

The notion of a smart city emerged during the information technology revolution, spurred on by investment in ICT infrastructure. Today, municipalities around the globe are rushing to digitize while at the same time courting businesses without compromising public confidence. Public administrations want to be perceived as forward-thinking, recognizing opportunities that fairly benefit all. However, as the cases above show, private firms can often crowd out the table at the expense of public knowledge and debate. Fortunately, urban social movements have incorporated new technologies into direct action, developing new forms of activism. These activities are *technopolitical*, leveling the field between large multinational interests and movements for dignity, respect, and voice. As the decades move on, every city will in their way deal with the same questions, urging locals to decide what type of 'smart city' best represents their values and beliefs.

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