“FOR BETTER OR WORSE”: IMAGINING INNOVATION IN SMART CITY MUNICIPAL DESIGN

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ABSTRACT

"FOR BETTER OR WORSE": IMAGINING INNOVATION IN SMART CITY MUNICIPAL DESIGN

by Kevin Matthew Kochever

The *smart city* concept recently (ca. 2010) emerged as a corporate-led system-as-a-service (SaaS) tool to meet city needs of accessibility and efficiency. I looked at three Western cities—Reykjavík, San José, and Toronto—to discover what it meant for city managers to meet municipal needs by embracing smart initiatives. Senior-level city managers, consultants, and technologists invoked vocabularies of smartness and innovation, adopting Internet of Things (IoT) and artificial intelligence (AI) as tools to facilitate human resource and service efficiency needs. I found persistent ambiguity in how city managers described and measured outcomes for city smartness. I also found stakeholders used smartness to participate in global knowledge sharing coalitions with public and private entities, amplifying negotiation potential, and producing values of prestige around novel technological innovation. In so doing, public and private stakeholders formed individual and organizational identities around technological innovation, creating invisible tensions between human resource and technology investments, characterized by celebration of innovation work to the detriment of maintenance labors. My findings inform ongoing scholarship by explaining how smart city technologists sold a discourse of innovation that was not entirely compatible with how cities bureaucratically functioned. Such distinction is important to communicate to scholarly audiences unfamiliar with techno-fetishisms, but familiar with urban management critiques. Moreover, my study opens paths to understanding how private interests influence municipal management through more obscured means.

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LIST OF ABBREVIATIONS

Abbreviation	Meaning
AI	Artificial Intelligence
AV	Autonomous Vehicle
BPA	Business Process Automation
CCPA	California Consumer Privacy Act
EU	European Union
GDPR	General Data Protection Regulation
IoT	Internet of Things
IT	Information Technology/Technician
LUKR	The Land Information System of the Reykjavík Area
NLP	Natural Language Processing
THON	Reykjavík's Services and Innovation Division
TIZ	Transportation Innovation Zones
TRBOT	Toronto Region Board of Trade
SaaS	System-as-a-Service
SCWG	Smart City Working Group

CHAPTER ONE

INTRODUCTION AND LITERATURE REVIEW

Introduction and Problem Statement

Introduction

In this study, I set out to understand the smart city trend in and around three self-described smart cities. Using a mix of ethnographic interviews and archival observation, I identified and queried key stakeholders and documentation to understand how municipal stakeholders define, use, measure, and coordinate municipal planning using smart city tools. I further queried stakeholders' future good and bad imaginations of smart cities to help understand feelings towards the smart city trend. The *smart city* concept is a placeholder for a set of discourses that revolve around municipal service efficiency, resource scarcity, and technological innovation. I show how technologists' language of innovation influenced managers in city government, serving to maintain existing hierarchies of power through top-down, Western-centric techno-myths. Such results often ran contrary to manager's promises of human-centered design. I also show how anthropological theories around techno-fetishism are helpful in thinking about the way organizational cultures of governance misalign with the organizational cultures of technology-producing for-profit companies.

I was not able to discover any definitive articulation of *smart city*, as individuals and organizations appropriated it interchangeably as a thing, goal, or process. Scholars argue *smart city* exists in a liminal space between idealism and materialization, accompanied by a discourse of entrepreneurial, techno-fetishistic language indicative of its corporate roots at IBM and Cisco (Söderström, Paasche, and Klauser 2014; Wiig 2016; Sadowski and Bendor

2019; Perng, Kitchin, and Donncha 2018; UN 2016). Imagined by technologists, *smart city* functioned as a discourse to direct senior-level city managers' imaginations of municipal futures through digital technologies and those who provide them.

Problem Statement

Senior-level municipal managers and technologists use smart city discourse to problematize city human and financial resources in meeting increasingly demanding constituent needs (Söderström, Paasche, and Klauser 2014; Wiig 2016; Sadowski and Bendor 2019). Thus, through smart city initiatives, technologists and managers describe cities as places of increasing need and dwindling resources. Managers and technologists alike embrace smartness as a panacea to resolve such challenges, though frequently lacking measurable outcomes. Smart cities lack a cohesive definition and, consequently, a means of measuring the number of successful and unsuccessful smart cities. Moreover, managers often fold smart city initiatives into similar initiatives no longer bearing the "smart" moniker, such as Reykjavík's Green Plan. Managers adopt technologists' vocabularies of smartness around themes of local-global sustainability and inclusivity, wherein innovation through digital technology enables managers to achieve both. But by adopting smart city solutions to address municipal needs, city managers enable corporate power to erode city power by relying on technologists' solutions, such as SaaS and ubiquitous computing, and networking, such as smart city conferences and competitions. Moreover, city managers adopt technologists' rhetoric of innovation, displacing the view of maintenance and other municipal labors as essential.

With many of the world's largest cities, and many smaller cities, officially announcing smart city initiatives, critical studies need to pay more attention to the implications of mixing smart city SaaS into city, state, federal, and larger governmental structures (Easy Park n.d; Government of Canada 2020; SCEWC n.d; UN 2016). I selected three diverse smart cities to understand the trajectories of smartness in each, looking at uniqueness and commonality in practice. I methodologically limited my city selection to those with employees and archives I could access during the global COVID-19 pandemic, though also to languages I could readily understand.

Thesis Brief and Research Questions

I set out to understand how individuals working on smart cities in three city governments—Reykjavík, San José, and Toronto—used *smartness* in municipal management, focusing on what problems senior-level city managers, consultants, and technologists identified, and how techno-oriented human values played a role. As I later outline in my methodology, each of these stakeholders represent a different orientation to smart city initiatives.

I structured my investigation through the following guiding research questions:

- Which stakeholders are making decisions that influence smart cities? What are the origins of smart cities?
- How do different city stakeholders define and use smart city discourse? What does becoming a smart city mean to each of them? What do stakeholders celebrate or value?

- Which case studies characterize smartness in cities, including the problems smartness is supposed to solve, and how smartness solves them? What do stakeholders cite as evidence? How did stakeholders gather such evidence?
- What do smart city stakeholders imagine the future of their city to be in ten years? What do stakeholders illustrate?

Thesis Roadmap

Following this introduction, I give consolidated histories and demographics of each of the three cities I engage with, discussing the problems cities were facing (ca. 2016) and how managers and technologists positioned smartness as a solution for better constituency servicing. I then describe the city stakeholders I talked to, and why. Next, I describe the smart city initiatives of each city, tracking some of the history of the initiatives, and laying the foundation for understanding my later analysis. I include a section on literature to describe the anthropological and social theories I found useful in forming my argument and study procedure, ending with a section on my methodology. In Chapter Two, I restate my earlier introductions and background in a consolidated format, following with a discussion on the formal findings of my study, formatted to fit the style of the *City & Society* publication—an anthropological journal discussing urban anthropological theory. In Chapter Three, I expand upon my findings and methods, detailing my reflections, study merits and limitations, and opportunities for future research.

Background

Mutual between all three of my cities were two problems essential to my arguments: First, as I discuss in Chapter Two, these cities operated razor-thin budgets in a tumultuous

global economy to provide services for large, growing populations. As responses to cyclical global recessions, climate change, and the recent pandemic have shown, municipal budgets are increasingly mercurial. Moreover, the human population is growing exponentially, and with it, the rate of urbanization, particularly in cities along earth's coastlines (UN 2018, 2019; United States Census Bureau 2022). Second, these cities, San José in particular, maintain expansive city services with few human and financial resources.

Managers in each of these three cities announced smart city initiatives in 2016, approaching smartness with a combination of local particularity and shared principles and methodologies (City of Reykjavík n.d.d; City of San José n.d.e; City of Toronto n.d.b). Though each city organization maintained services with dramatically different needs and resources, managers in each adopted smartness for similar reasons of resource scarcity and global challenges (CIA n.d; City of Reykjavík n.d.b; City of San José 2021; City of Toronto 2021b, 2022; NSII 2021; Office of the City Manager 2021; Statistics Canada 2021; United States Census Bureau 2020; Census Reporter n.d). Next, I give an overview of how each city approached smartness.

Reykjavík

Starting with Reykjavík, it is in documents published around early 2016 that I began to see the first mentioning of *snjalla* (smart) and Reykjavík, with "Reykjavík Smart City" showing on Icelandic government websites.[1] On their official smart city announcement page, Reykjavík managers described their smart city as one that, "uses information,

[1] Though no longer accessible as of writing, I was able to access this website using an internet archive repository, WaybackMachine, at https://archive.org/web/.

communications, and telecommunications technology to improve the quality of life in a sustainable way…gather[ing] and combine[ing] data from different databases related to the infrastructure of the city and use[ing] it to improve services, quality of life, and [the] environment" (City of Reykjavík n.d.d).

Pandemic woes ultimately led to the opportunity for managers to fold earlier smart city initiatives into a more consolidated and focused *Græna planið* (The Green Plan). Drafted from the UN's 2030 Agenda for Sustainable Development, Reykjavík managers proposed The Green Plan on November 26, 2020, to guide city priorities and investment for the next decade (UN n.d.; City of Reykjavík 2020a). The Green Plan, which was approved by Reykjavík City Council, structured plans for intervention in specific areas: 1) *Vaxandi borg* (Growing City) focused on dense urban development, employment, and economic recovery; 2) *Græna borg* (Green City) focused on carbon-neutrality, a healthy, circular service economy, a healthy population, and a city weathered against the effects of climate change; and 3) *Borg fyrir folk* (City for People) focused on inclusivity of all in democratic processes, diversity of people and ideas in education and civics, justice, security, and care for all—especially vulnerable populations (City of Reykjavík 2020a).

In The Green Plan, city managers structured 175 billion ISK ($1.36 billion USD) invested over three years, with 10 billion ISK ($74.4 million USD) earmarked for investment in "information technology and digital transformation of the city" (City of Reykjavík 2020a, 20). Reykjavík managers divulged plans to award such funds to businesses and infrastructure projects that prioritized carbon-neutrality and promoted long-term optimization of the economy and people (City of Reykjavík 2020b). Managers also sought the expansion

Reykjavík's Office of Information Technology Services, part of its Services and Innovation Division (abbreviated as *ÞON*, or THON), which handles comprehensive management of computer and digital systems for the municipality (Reykjavík Office of the Mayor and City Clerk. n.d; City of Reykjavík 2020c, n.d.e).

In framing the Green Plan, Reykjavík managers leaned heavily on national successes in renewable geothermal energy and water utilization, green space access, and sustainability.[2] Managers further compounded green identity with identities around political progressivism, enshrining democratic inclusion and participation as a core requisite of success. The Horizon Europe mission, a part of the European Green Deal, with a budget of €95.5 billion ($104.8 billion USD), designates applicant cities as "experimentation and innovation hubs" for carbon-neutrality, to model and then apply to other cities by 2050 (European Commission 2022, n.d.a, n.d.b). In summary, Reykjavík features high homogeneity, progressive politics, green identity focused on environmental issues, strong Nordic and European ties, and a unique capital region (Nordic Council n.d; NSCN n.d).

San José

In 2016 the City of San José formally proposed its smart city vision, stating: "becoming a smart city means that game-changing technologies and data-driven decision-making will drive continuous improvement in how City Hall serves our community, and to promote concrete benefits in safety, sustainability, economic opportunity, and quality of life for our constituents" (City of San José n.d.e). On the cited website, city managers outlined several

[2] Both environmental sustainability through green space preservation and renewable energy investment, and local economic sustainability through reduction of dependency on imports, reducing vulnerability to recession.

objectives for the City, including: 1) *Safe City*, using data analytics to target first responders and code enforcement, optimize traffic on-the-fly through connected infrastructure, and increase transparency through accessible data visualizations and reporting; 2) *Inclusive City*, broadening access to digital infrastructure to all residents, such as broadband internet and the hardware to access it, building technological and digital literacy of residents, creation of an online rental registry to help homelessness, and support economic development in struggling areas through access to foot traffic illustrations; 3) *User Friendly City*, seeing creation of digital spaces for the community to actively engage in governance resulting in more responsive governance, expanding the role of taxpayers in city budgeting through ease of access, opening all city data by default in usable and understandable formats, and enabling digitized form submission for all city applications and fees; 4) *Sustainable City*, utilizing technology to provide real-time analytics of water and energy use and needs, installing city-wide sensors to measure greenhouse gas emissions, and using data analytics to benchmark best practices for water and energy use; and 5) *Demonstration City*, inviting the use of San José as a "platform" on which to trial new technologies such as autonomous vehicles, optimizing transit through IoT, and hosting public competition "demo days" to show the most innovative Silicon Valley smart city (City of San José n.d.e). Interestingly, the initiative included language for taking "appropriate risks" and "provid[ing] room for experimentation and failure" as the smart city takes shape (City of San José n.d.e).

City managers, under direction of Mayor Liccardo, framed the initiative around the celebration of diversity in San José, the importance of workforce (creative) empowerment, top talent recruitment from the technology sector, and partnerships with the private sector,

foundations, local civic entrepreneurs, and universities (City of San José, n.d.e). In support of their smart city initiative, San José managers cite many ongoing projects, including San José 311 and mySanJosé for business process automation (BPA) (City of San José n.d.d), Open Data Community Architecture (ODCA) (City of San José n.d.c), Digital Inclusion and Broadband Strategy (City of San José n.d.a), IT Strategic Plan (City of San José n.d.b), SpeedUpSanJosé (City of San José n.d.j), Digital Privacy Working Group and the Digital Privacy Advisory Taskforce (City of San José n.d.h), and the Digital Services partnership with Harvard Business School Community Partners (HBSCP) (City of San José n.d.i). San José also makes use of artificial intelligence (AI) and natural language processing (NLP) to increase inclusion to marginalized populations in this diverse city.

City managers also created the Smart City Advisory Board, a new Office of Innovation and Digital Strategy within the City Manager's Office, and a dedicated City Council Committee on Smart City and Continuous Improvement to monitor and guide the initiative (City of San José n.d.e, n.d.f). Managers expanded on their smart city vision via the Smart City Advisory Board, writing:

> The purpose of the San José Smart City Advisory Board is to tap the rich experience and expertise of the local business community and help achieve Mayor Sam Liccardo's vision of making the San José City the smartest city on the planet. The San José Smart City vision was articulated and approved in mid-2016 and states:
>
> Just as the world looks to Silicon Valley to provide the most creative, impactful technologies to disrupt industries and transform lifestyles, so too can San José become a global leader for civic innovation. Becoming a 'smart city' means that game-changing technologies and data-driven decision-making will drive continuous improvement in how City Hall serves our community, and to promote concrete benefits in safety, sustainability, economic opportunity, and quality of life for our constituents (City of San José n.d.f)

Managers in The Mayor's Office also created the new Office of Strategic Partnerships to facilitate partnerships benefiting the new smart city initiative directly (City of San José n.d.g). San José managers also formed the Cybersecurity Advisory Board to guide the smart city transition by assisting with security and development of IoT (City of San José n.d.k). The Innovation and Technology Advisory Board was another committee to help with strategic planning, filled with IT and innovation talent from within the city, as well as private sector experts from Intel, Dell, Joint Venture Silicon Valley, and others (City of San José n.d.k). San José was a member city of the Cities Coalition for Digital Rights, a coalition of cities that focuses on forwarding legislation that enhances and protects constituents' digital rights—a coalition Toronto was also part of (CCDR n.d). In summary, the City of San José holds a unique history to digital technology and high-impact technology companies, complemented by deep diversity, economic austerity, and rapid development needs from successive tech booms.

Toronto

Toronto, much like Reykjavík and San José, is a city with increasing needs and fewer resources to meet them. Among its eighty-one long-term strategies, "Connected Community," also referred to as "Smart City TO," stands as Toronto's smart city initiative (City of Toronto n.d.e). In February of 2016, the City of Toronto partnered with the Toronto Region Board of Trade (TRBOT) to form a Smart Cities Working Group (SCWG), assembling more than fifty public and private sector members from TRBOT, with important members from within Toronto's Economic Development and Culture, Information &

Technology, and the Chief Transformation Offices (founded in 2017) (City of Toronto 2018a).

The SCWG served to inform city managers of smart city developments worldwide, with a set goal of determining what *smarter* would mean for the City of Toronto through partnering with experts local to Toronto, while also engaging with larger global forums. SCWG would come to define a smart city as one that: "uses technology and data to optimize resources and enhance the quality and performance of urban services, increase economic competitiveness, and engage citizens more effectively…develops and implements innovative policies and technologies to ensure these benefits are realized in a manner unique and consistent with its core values of economic, social, cultural and environmental vitality…[going] beyond technology; it is an opportunity for the City to drive service excellence and improve quality of life" (City of Toronto 2018a).

Toronto managers outlined specific reasons for investigating smartness, quoting challenges of "rapid growth, budget pressures, congestion, technological advancement, and climate change" as pertinent to their motivations (City of Toronto 2018a). Toronto managers went on to further define a smart city as affecting particular solutions, including: 1) investments in modernization of the city through digital governance and service delivery with a focus on customer experience; 2) enabling transparency through open data, engagement in governance, internet connectivity and digital inclusion, digital literacy, and data-analytics-driven improvements; and 3) innovating by engaging the city as a test bed for emerging technologies such as blockchain, IoT, AI, drones, sensors, ride sharing, and building innovation through human-centered and agile practices (City of Toronto 2018a, 2018d,

2018e). Managers cited projects to achieve smart city goals, including: a free Wi-Fi pilot project intended to address the Toronto's digital divide, transportation innovation zones (TIZ) testing ideas such as autonomous snow plowing, an open data project to democratically empower constituents, and automated water meters (MyWaterToronto) to automate user tracking of water use and digitize utility bills (City of Toronto 2018a, 2018c, 2019, 2020, n.d.c, n.d.d, n.d.f). In summary, the City of Toronto does more with less in serving their massive, diverse population, further achieving community communication and participatory governance through smart initiatives.

Background Summary

Overall, despite some differences in articulation, city managers maintained adherence to a core logic: *smart cities* used *digital technologie*s and *data* to find actionable insights, which managers used to strategically optimize *service* design to improve *quality of life, inclusive* to health of both constituents and earth's *environment.* In short, managers adopted IoT, automated data to themselves for monitoring, then focused on human service design using said data. Managers in each city went on to focus interventions in common domains of economy (e.g., employment, recession-proofing), democratic inclusion and internet connectivity (e.g., community engagement, bridging digital divide), diversity (e.g., ethnicity, expertise), service efficiency (e.g., business process automation), human-oriented design (e.g., green spaces, SJ311), transparency (e.g., open data portals), sustainability (e.g., energy, waste, growth), and city as a testbed for innovation projects (e.g. Transportation Innovation Zones, autonomous vehicles) (City of Reykjavík 2020a, n.d.a; City of San José n.d.a, n.d.c, n.d.d, n.d.e; City of Toronto 2018a, 2018c, 2021a).

Managers primarily sought to actualize smart city efficiencies by enhancing participation and self-service through service digitalization and internet connectivity. Such programs included Better Reykjavík, an online forum where constituents could post, comment, and vote on issues to reach City Council's attention (City of Reykjavík n.d.a; City of San José n.d.a; City of Toronto 2021a). Central to both San José and Toronto's initiatives was mapping and solving digital divides in their constituencies, indeed as the COVID-19 pandemic forced an abrupt shift to remote work, making quality internet connectivity an essential service (City of San José n.d.a; City of Toronto 2021a). Similarly, Reykjavík managers placed internet connectivity high on their list, seeking to use the internet to mediate as many city services as possible (City of Reykjavík 2020a).

City managers contended not only with local needs, but global problems of cyclical recession, climate change, and pandemics, further problematizing limited human and financial resources in maintaining service compliance. By structuring smart plans inclusive of topics like climate change, managers contended that cities do not exist in a bubble. Thus, MyWaterToronto enabled not only "service excellence," but allowed constituents to monitor their real-time water usage to practice climate consciousness (City of Toronto n.d.c). Moreover, managers adopted language of crisis around such topics, illustrating urgency for cities to collaborate in reaction to *and* anticipation of such crises (UN 2018, 2019; City of Reykjavík 2020a; European Commission n.d.a; CCDR n.d). Structured this way, such acknowledgments read as a move towards collective action in a global world, even as city organizations competed for awards, titles, and associated prestige.

City managers oriented their initiatives around a need for collaboration with public and private entities beyond city borders, seeking the best knowledge possible by maximizing networks. Such coalitions served to not only enhance the ability of a city to fund, learn, and negotiate, but to also participate in an international community focused on tackling larger global problems that symbiotically filtered back down into how a city functioned (Ilum 2022). Managers also used coalitions to amplify negotiating power beyond the political power of the city. Managers avoided spending precious city resources on negotiation by utilizing regulations already in place, such as the GDPR or CCPA.[3]

Since urban communities have diverse needs and risks, including the risk of service non-compliance, managers must directly listen to know what to deliver and how successful delivery is. In the context of my study, managers used *innovation* to do more with less, reduce friction in service encounters, reduce the burdens of overworked city workers, make circular use of local resources to reduce worldwide waste, and refocus city workers to constituent outreach.[4] Moreover, managers engaged in knowledge sharing coalitions around domains of technology, efficiency, and sustainability to share knowledge, funding, amplify negotiation potential, network achievements, and garner prestige. Providing effective services to constituents influenced managers to engage in increased outreach and inclusionary efforts, especially as the internet cemented as a staple of global society.

[3] European Union's General Data Protection Regulation, and California's California Consumer Privacy Act.

[4] Reducing friction in service encounters, such as reducing the number of steps and increasing the convenience of access to a process like electricity billing through business process automation (BPA).

In practice, senior-level city managers focused heavily on a discourse of innovation developed by technologists. Moreover, many smart projects and case studies cited by managers pre-dated their smart city announcements (e.g., Better Reykjavík, Data-Driven Inspections for Safer Housing, Waterfront Toronto), calling into question how to verify smart city claims (City of Reykjavík n.d.a; City of San José n.d.g; City of Toronto 2018b). Time will tell whether smartness actualizes service efficiency, therefore alleviating pressures on city resources and earth's climate. Until that time, I wanted to understand why smart city managers appropriated technologists' language of innovation and technology.

Literature

Cities, Services, and Anthropology

Anthropology and ethnography bring a few insights to understanding smart city initiatives. First, scholars note typologies are simply not helpful (Low 1996). At best, typologies oversimplify cities, and at worse they distract from meaningful historical narratives (Low 1996; Little 2014). What criteria describe a city as *smart*? How do we know when we have solved crises? Scholars show it is better to study what stakeholders *do*, and how they come to value, understand, and practice (Lefebvre, Kofman, and Lebas 1996; Low 1996; Little 2014). Second, when looking at what city stakeholders do, scholars argue we should look at what services provide people, what process(es) services replace, how services inform organizational structures, and how different stakeholders approach service design and use in-context. Third, scholars argue that by understanding local and broader histories, we discover foregrounded or obscured things, and how either occurs (Lefebvre, Kofman, and Lebas 1996; Brenner 1998; Little 2014). In the process, we can discover definitions,

practices, identities, and hidden dynamics, and help city managers understand and design more transparent, equitable city systems for constituents. Fourth, by understanding technologists' histories and rhetoric, we can better understand the origins and trajectory of city smartness, decoding the mess and myth of technology-innovation orientation (Mattern 2021; Pype 2017). Finally, anthropologists have an opportunity to help correct popular histories away from a technology primacy to being inclusive of, or perhaps focused on, the importance of maintenance. As Russel and Vinsel (2018, 17) argue, "infrastructure minus maintenance equals disaster." Innovations may be sexy, but they pale to the significance of maintenance. I further explain the importance of this distinction in Chapter Two.

Anthropology has a long history of using deep, meticulous descriptions of human behavior in the illustration and understanding of human services. Malinowski's study of the Kula ring is perhaps the earliest and most famous anthropological study of services, describing how investments, accountability, performance, and the role of transformations are each important in organizing social life (Malinowski 1920). Moreover, anthropologists employ the methods of ethnography in observing behaviors, actions, and values from an insider perspective (Batteau 2001; Forsythe and Hess 2001; Blomberg and Darrah 2015).

Blomberg and Darrah (2015, 20) use "service worlds" to describe how services are integral components of production processes and contribute to the organization of society. Blomberg and Darrah (2015, 20) argue that "services can replace activities we perform"—such as tax preparation or cooking—and that such services "increasingly exist in bundles that create and support new kinds of activities, often in ways we barely comprehend." This concept of service worlds is pertinent to understanding smart city services. Embedding

digital technologies into governance requires the "social production of people who need and value" such technologies and services (Blomberg and Darrah 2015, 20). Furthermore, service logics can blur the relationship between goods and services as material and immaterial, respectively (Blomberg and Darrah 2015). Focusing only on transactional service encounters (e.g., money exchanges, formal exchanges) is too restrictive to form conclusions from—we must also focus on the social influence inherent to each encounter (Edgerton 2007; Blomberg and Darrah 2015). Anthropologists seek to elicit information from designers and users alike to help in the perpetual (re)design of services, with explicit observation of people's practices, going beyond individual interactions (Murphy 2015). Thus, one method of understanding what cities do is by following the ways in which constituents and governors negotiate smartness into ongoing city services, and the socioeconomic ramifications.

Parallel to service worlds is a growth of services worldwide. Blomberg and Darrah (2015) argue that seven factors drive the growth of the services sector: 1) average income growth, 2) increasing demand for healthcare services, 3) increasing demand for educational services, 4) public sector size demands, 5) globalization, 6) technological interconnection, and 7) digitization of services. Expansion of services has also led to the blurring of international economic borders by further influencing the already entangled system of service dependency between public and private entities (Scott 1998; Blomberg and Darrah 2015). Understanding these drivers of service growth helps the study of smart cities by providing a lens to measure efficacy. By understanding service drivers one can more acutely assess technologies and their contributions to city services.

Modern computers, be they analog or digital, have a history of use in both cultural and counter-cultural applications (Edgerton 2007). In stories of oppression and liberation (Turner 2006). Digital computers, specifically, functioned as a Cold War instrument of weaponry, control, and censorship by state institutions (Turner 2006; Edgerton 2007). However, digital computers have also been a countercultural tool for individual empowerment, creativity, democratized knowledge, and power decentralization—an important distinction for smart cities, where constituents and governors hotly debate the role of digital technology in cities, producing locally-unique narratives (Turner 2006; Mattern 2021). For instance, as I explore later, managers in San José, Toronto, and Reykjavík each display unique understandings of smartness, both in how to define and affect it in the city space.

Structural Norms

Because cities are describable by service worlds, inherent to understanding what cities do is understanding what historical forces—racism, sexism—remain preserved, and by what means they remain enforced. Managers in the Cities of San José and Toronto can outline initiatives on *justice* and *inclusivity* in their smart city initiatives, but what do such initiatives mean? How are they realized? Moreover, how do we know smart city digitalization will not worsen entrenched structural norms? Digitalization of city services, governance, and historical datasets opens an important opportunity to query structural norms, their maintenance, and the effect of digitalization on them.

For instance, Noble (2018) shows how search engine algorithms influence and preserve structural forces of racism and misinformation in maintaining a heteronormative, patriarchal, white America as the dominant norm. Popular culture tends to interpret the internet as

apolitical, as its mainstream use is synonymous with commerce, research, and other "legitimizing" uses (Noble 2018). However, the internet is not apolitical in practice, with search engines operating by reducing complex ideas of identity, such as *Blackness*, to simple keywords, sold by businesses as a ranking element (advertisement) to the highest bidder. Unchecked, this process serves to maintain historical structures of power. Moreover, those with capital can set up the webpage's keywords point to, which search engines index, which the user then sees and clicks on. Thus, such systems are also open to abuse.

Digital algorithms have permeated into bureaucratic systems—the educational, financial, criminal justice, insurance, job management, and other systems—and reproduced and exacerbated existing structures of inequality, monetization, and discrimination (O'Neil 2016). Digital algorithms and ubiquitous computing exist in a space of tension. Technologists see digital algorithms as objective things, removed from direct human tampering (Edgerton 2007; Dourish and Bell 2011; Noble 2018). But critics show digital algorithms are not so pure, corrupted (intentionally and unintentionally) by the humans that write them, datasets scientists train them on, or the purpose(s) they serve (Edgerton 2007; Rothstein 2017; Noble 2018). So, if cities risk all this, why bother with smartness in the first place? I explore answers to this question in Chapter Two.

Methodology

Methodological Objectives

As I explain above, I set out to discover how individuals working on smart cities used *smartness* in municipal management. I began with close readings of online primary sources, including official city websites, proposals, committee minutes, plans, and budgets. I

compounded these archival observations with semi-structured ethnographic discussions with smart city senior-level managers (who manage both human resources and strategic visions of their city), and consultants (operationalizing at the managers' behest). I then used discursive analyses to compare various aspects of each city, including demographics, histories, needs, and resources (Jick 1979; Graffam 2010). I focused on aspects aligned directly to smart initiatives, such as language, coalitions, technologies, and case studies.

Site Selection

By briefly probing the literature and other documentation on smart cities prior to my formal study, I was able to get an idea of the data I would need, and the methods I could use to gather them. I then selected cities that met the following criteria: 1) had a formal public smart city initiative announcement; 2) operated on similar governmental principles (such as democracies); 3) had a government internet presence, ideally published in English or easily translatable; and 4) had time to enact and trial their smart city policies through individual case studies. From these criteria, I settled upon three Western cities for inquiry and comparison: Reykjavík, San José, and Toronto. I also selected these cities due to the unique histories and cultures of each. Moreover, managers in each city established their smart city policies around the same time—2016. Each city also presented interesting differences in demographics, resources, and needs—especially San José.

Population, Sampling, and Recruitment

Within each city, I identified pertinent offices, people, and committees working on smart city initiatives or projects. I began by focusing my data collection on individuals working within or for offices aligned to technologists' languages—Office of Technology, Innovation,

Information—and those offices aligned directly with smart city initiatives, such as the Mayor's Office and other committees. From each of these sources, I built out a spreadsheet of people to contact, consisting of one-hundred-two individuals and ten offices and committees that I directly emailed and/or called (many multiple times). Due primarily to complications from COVID-19 and its resulting crunch on city human and financial resources, only six of these one-hundred-two potential participants were receptive to discussion with me.

I chose to focus my study on those with strategic power in city organizations—managers who structure internal human and financial resources, and proctor long-term strategic visions. In my research, I identified two main distinctions: senior-level city managers and the consultants they hire, and technologists. For sake of clarity, I need to qualify these populations:

When I say *managers*, I am referring to senior-level city managers, such as those in executive positions and City Manager roles. Such managers oversee not only internal human and financial resources, but also proctoring deals with external stakeholders, such as SaaS providers. In my early archival explorations, I found it was typically these actors who were directing offices of interest (Office of Innovation, etc.), and thus affecting municipal strategic visions aligned to smart city initiatives. These managers are also in charge of structuring how work operationalizes strategic visions, which they often hire consultants to help carry out.

When I say *consultants*, I am referring to human resources external to the city organization hired temporarily by city managers to help operationalize managers' smart city plans. Consultants perform labors over a relatively brief period, and typically are not present

to see the fruits of their labors. This is important to point out in the context of a city, as city workers are conversely long-term, salaried workers. Salaried workers are simply more conscious of their contributions, as having a job is nice and controversy can threaten employment. Managers hire contractors to do some of the *sexy* innovative work that cities otherwise have trouble procuring in a bureaucratic environment. Contractors do not need to worry about sticking around to watch any such work flop. Moreover, temporary workers like contractors have likely little impact on how a city bureaucratically functions.

When I say *technologists*, I am referring to proponents of smart city design in municipal governance. As outlined in my literature review above, technologists represent a large but not necessarily uniform ideological orientation. Scholars identify particular technologists operating in smart city spaces, typically those tasked with marketing or selling corporate visions to municipal stakeholders (Söderström, Paasche, and Klauser 2014; Wiig 2016; Sadowski and Bendor 2019; Mattern 2021). Thus, I refer less to the creators of technologies and more to those in public relations who market such technologies, and the stories inherent to such marketing. Scholars frequently use *technologist* to refer to ideological and historical orientation around a primacy of technology and innovation rhetoric (Dourish and Bell 2011; English-Lueck 2017; Bezaitis and Robinson 2011). Technologists' rhetoric can complicate tracing actor to act in determining the who and what of innovation. Thus, my need for clarity.

Semi-Structured Interviews

I involved each participant in semi-structured discussions, focusing on a few topics to help understand smart cities: 1) a brief personal and professional history of the participant with respect to the city they work with; 2) how their interests affect the focus of their work;

3) how they characterize their city to an outsider; 4) their definition of *smart* in the city; 5) case studies from within their city they can reference to help illustrate smart progress; 6) important city histories or developments that affect ongoing smart evolution of the city; and 7) closing the interview by asking them to imagine themselves and the city ten years in the future, to help look at plausible scenarios of optimism and pessimism in application of technologies to municipal governance.

Archival Strategy

In tandem with setting up semi-structured interviews, I engaged in semi-structured and structured observations—*close readings*—of online published documentation (Higashi et al. 2017). I sampled all data in 2022, using the latest published data from each source I cite. I selected primary documents officially associated with the cities I studied, including: case studies, council meeting minutes, assemblies, reports, requests-for-proposal, news articles, history articles, and websites. Of the websites I selected, I limited myself to official webpages ending in domains notarizing ownership by states: .ca, .us, .gov, .to, .is, .un, .eu. From these samples, I pulled all manner of demographics, including: municipal areas, populations, diversity, ages, education, computer access, internet access, electricity access, smartphone saturation, city employees, city budgets, city GDPs, histories, cultures, and more.

Analytical Procedure

I engaged in discourse and thematic analyses as my main methods of analysis (Bucholtz 2001; Bernard 2011; Philips 2013; Wasson 2016). As I noted in my literature above, successful studies have demonstrated that it is important to pay attention to a couple of things, including how stakeholders invoke technologies and their narratives, authorship, and

prestige around innovation language (Söderström, Paasche, and Klauser 2014; Wiig 2016; English-Lueck 2017; Pype 2017; Sadowski and Bendor 2019; Mattern 2021). For example, Sadowski and Bendor (2019) argue a logic in how technologists' market smart cities to city stakeholders. Mattern (2021) and Pype (2017) show how different classes of people practice and define *smartness* differently in the same city. And English-Lueck (2017) shows how networking can intensify and reinforce techno-fetishistic practices.

I transcribed and coded my ethnographic structured interviews of city stakeholders, looking for patterns in language: metaphors, definitions, contexts, tones, images, designs, and more (LeCompte and Schensul 2010; Schensul, Schensul, and LeCompte 2013). I used spreadsheets to organize and identify major themes, reflexively (re)organizing as I proceeded, using my archival findings to help focus my coding and thematic observations. I did the same with archival contents, pulling together documents to understand what language, case studies, and partnerships contributed to the evolution of city smartness, also using my ongoing participant interviews to reflexively focus my archival readings.

In my close readings, I observed a blurring between projects and initiatives formally categorized under smart city, and those not listed under such initiatives, but which displayed strong correlation. Indeed, such blurring is indicative of the extent to which smart city ideas have permeated across city policy and planning circles. However, I needed to interpret what directly relates to smart cities, and what was peripheral or unrelated. Furthermore, producing exhaustive lists of projects, partnerships, and legislation was neither feasible nor required for the scope of this study. I used findings from my participant interviews and early archival explorations to design criteria that I used to determine where to focus my close reading of

archival discoveries (Jick 1979; Graffam 2010). I included initiatives and projects that met one or more of the following criteria: 1) direct association to smart initiatives, such as listed by name, mentioned by a coalition, or mentioned by an interview participant; 2) umbrella association to smart initiatives, such as a disclosure of funding from smart funds or mentioned in committee minutes—though I limited such association to no more than one degree of separation to keep scope manageable; and 3) assumed association, such as an initiative coming from the Office of Innovation, announced at a time after the smart city initiative went public.

In compliance with the thesis requirements of the Anthropology Department, I synthesized my data to create a streamlined article for an appropriate journal. Since my study engages with urban topics, I selected *City & Society*. *City & Society* is the primary journal for the American Anthropological Association's Critical Urban Anthropology Association (formerly the Society for Urban, National and Transnational/Global Anthropology), encouraging a comparative and transdisciplinary perspective. Thus, in Chapter Two, I present an article written in the style of *City & Society* in which I condense the purpose, practical and theoretical background, analyses, and findings of my study.

CHAPTER TWO

"FOR BETTER OR WORSE": IMAGINING INNOVATION IN SMART CITY MUNICIPAL DESIGN

Abstract

The *smart city* concept recently (ca. 2010) emerged as a corporate-led system-as-a-service (SaaS) tool to meet city needs of accessibility and efficiency. Yet stakeholders have so widely applied and extended the concept such that its real meaning for urban planning and policy has muddied to the point of abstraction. I looked at three Western cities—Reykjavík, San José, and Toronto—to discover what it meant for city managers to meet municipal needs by embracing smart initiatives. Senior-level city managers, consultants, and technologists invoked vocabularies of smartness and innovation, adopting Internet of Things (IoT) and artificial intelligence (AI) as tools to facilitate human resource and service efficiency needs. I found persistent ambiguity in how city managers described and measured outcomes for city smartness. I also found stakeholders used smartness to participate in global knowledge sharing coalitions with public and private entities, amplifying negotiation potential, and producing values of prestige around novel technological innovation. In so doing, public and private stakeholders formed individual and organizational identities around technological innovation, creating invisible tensions between human resource and technology investments, characterized by celebration of innovation work to the detriment of maintenance labors. My findings inform discourses at the intersection of urban anthropology and the anthropology of technology by explaining how smart city technologists sold a discourse of innovation that was not entirely compatible with how cities bureaucratically functioned. Such distinction is

important to communicate to scholarly audiences unfamiliar with techno-fetishisms, but familiar with urban management critiques. Moreover, my study opens paths to understanding how private interests influence municipal management through more obscured means.

[smart city; municipal; technology; identity; anticipation; Reykjavík; San José; Toronto]

Introduction

> I absolutely hate the hype. And that is so much of what the smart city marketing machine is around…It's a buzzword that I think is on its dying legs…When you go to cities where leaders are struggling with the real issues, the last thing that they want to talk about is how the blockchain is going to solve their housing crisis…But there is a huge role that existing off-the-shelf technologies could play in modernizing and improving…the service delivery that we do. (Kyle, pers. comm.)

Senior-level municipal managers[5] and technologists[6] use smart city discourse to problematize city human and financial resources in meeting increasingly demanding constituent needs (Söderström, Paasche, and Klauser 2014; Wiig 2016; Sadowski and Bendor 2019). Thus, through smart city initiatives, technologists and managers describe cities as places of increasing need and dwindling resources. Managers and technologists alike embrace smartness as a panacea to resolve such challenges, though frequently lacking measurable outcomes. Managers adopt technologists' vocabularies of smartness around themes of local-global sustainability and inclusivity, wherein innovation through digital technology enables managers to achieve both. But by adopting smart city solutions to address municipal needs, city managers enable corporate power to erode city power by relying on

[5] When I say *managers*, I am referring to senior-level city managers, such as those in executive positions and City Manager roles. Such managers oversee not only internal human and financial resources, but also proctoring deals with external stakeholders, such as SaaS providers.

[6] When I say *technologists*, I am referring to proponents of smart city design in municipal governance.

technologists' solutions, such as system-as-a-service (SaaS) and ubiquitous computing, and networks, such as smart city conferences and competitions. Moreover, city managers adopt technologists' vocabulary of innovation, displacing the view of maintenance and other municipal labors as essential. With many of the world's largest cities, and many smaller cities, officially announcing smart city initiatives, critical studies need to pay more attention to the implications of mixing smart city SaaS into city, state, federal, and larger governmental structures (Easy Park n.d; Government of Canada 2020; SCEWC n.d; UN 2016).

In this article, I set out to understand how individuals working on smart cities in three city governments—Reykjavík, San José, and Toronto—defined and used *smartness* in municipal management. In particular, I focus on: what problems senior-level city managers, consultants[7], and technologists identified and solved; cited case studies and efficacy; human values; networks and coalitions; and future imaginations. I structured my investigation to answer these questions, beginning with close readings of online primary sources, including official city websites, proposals, committee minutes, plans, and budgets. I compounded these archival observations with semi-structured ethnographic discussions with senior-level managers and consultants in smart city management who worked either directly for, or tangential to, municipal governments with smart city declarations: Stephanie, a senior technology and innovation manager in a Silicon Valley city; Nick, a sustainability consultant

[7] When I say *consultants*, I am referring to human resources external to the city organization hired temporarily by city managers to help operationalize managers' smart city plans. Consultants perform labors over a relatively brief period, and typically are not present to see the fruits of their labors.

working with Silicon Valley cities; David, a senior information and technology manager in a Silicon Valley city; Jennifer, a senior management consultant and designer working with Toronto; Timothy, a history and innovation consultant working in Silicon Valley; and Kyle, a city manager in a Silicon Valley city.

Smart city, imagined by technologists, functions as a discourse to direct senior-level city managers' imaginations of municipal futures through digital technologies and those who provide them (Wiig 2016; Sadowski and Bendor 2019). Argued by social scientists to exist in a liminal space between idealism and materialization, smart city discourse incorporates a mass of entrepreneurial, techno-fetishistic language indicative of its corporate roots at IBM and Cisco (Söderström, Paasche, and Klauser 2014; UN 2016; Wiig 2016; Sadowski and Bendor 2019; Perng, Kitchin, and Donncha 2018). Importantly, smart cities are reducible to neither single technologies nor social processes alone, requiring a complex confluence of both (Pype 2017; Drew 2020; Mattern 2021). Furthermore, ambiguity in how to define smart cities stems from an ambiguity in how to measure smart city actualization (Söderström, Paasche, and Klauser 2014; Vanolo 2016; Wiig 2016). As an urban management model, *smart city* spans a binary of crisis and stability, wherein technological innovation through SaaS is the balancing agent that gives clarity and control to local city stakeholders amidst the noise of global forces (Sadowski and Bendor 2019).[8]

In what follows, I begin by discussing the problems cities were facing (ca. 2016) and how managers and technologists positioned smartness as a solution for better constituency

[8] City organizations would pay private companies like IBM and Cisco to provide hardware, software, and consultancy services to actualize smart city visions.

servicing. I then discuss how, by adopting technologists' vocabularies, managers attended to a technologists' vision of smart cities structured around achieving *innovation*. Further, by overfocusing on novel technological interventions, managers rendered the primacy of maintenance labors invisible and devalued the role existing technologies could have played in affecting service efficiency. Finally, I share several smart city municipal futures as imagined by my management and consultant participants to help understand smart city sentiment now and into the future, closing with a summary of my major findings and intellectual contributions.

Cities and Smartness

> I was in charge of our Emergency Operations Center for 526 days, but who was counting…we're all tired and fatigued, and not everybody gets to take a sabbatical. (Kyle, pers. comm.)

Despite some differences in articulation, city managers generally adhered to a core logic: *smart cities* used *digital technologie*s and *data* to find actionable insights, which managers used to strategically optimize *service* design to improve *quality of life*, *inclusive* to health of both constituents and earth's *environment* (Sadowski and Bendor 2019). Managers, by adopting autonomous sensing to automate service work, inscribed action partly onto the city itself (Drew 2020). In short, managers adopted IoT, automated data to themselves for monitoring, then focused on human service design using said data. Furthermore, definitions tended to be the product of entanglements of local needs (e.g., economy, resources, services) and global forces (e.g., recessions, climate change, coalitions) complicating the role of simplistic definitions.

Managers in each of the three cities I studied announced smart city initiatives in 2016, approaching smartness with a combination of local particularity and shared principles and methodologies (City of Reykjavík n.d.d; City of San José n.d.e; City of Toronto n.d.b). Reykjavík managers described their *snjalla* (smart) city as one that, "uses information, communications, and telecommunications technology to improve the quality of life in a sustainable way…gather[ing]…data from different…infrastructure of the city and use[ing] it to improve services, quality of life, and [the] environment" (City of Reykjavík n.d.d).[9] For San José managers, "becoming a smart city means that game-changing technologies and data-driven decision-making will drive continuous improvement in how City Hall serves our community, and to promote concrete benefits in safety, sustainability, economic opportunity, and quality of life for our constituents" (City of San José n.d.e). Toronto managers, in partnership with Toronto Region Board of Trade, defined smart city as one that "uses technology and data to optimize resources…enhance the quality and performance of urban services, increase economic competitiveness…engage citizens more effectively…develop and implement innovative policies…it is an opportunity for the City to drive service excellence and improve quality of life" (City of Toronto 2018a).

Managers in each city went on to focus interventions in common domains of economy (e.g., employment, recession-proofing), democratic inclusion and internet connectivity (e.g., community engagement, bridging digital divide), diversity (e.g., ethnicity, expertise), service efficiency (e.g., business process automation), human-oriented design (e.g., green spaces,

[9] Though no longer accessible as of writing, I was able to access this website using an internet archive repository, WaybackMachine, at https://archive.org/web/.

SJ311), transparency (e.g., open data portals), sustainability (e.g., energy, waste, growth), and city as a testbed for innovation projects (e.g. Transportation Innovation Zones, autonomous vehicles) (City of Reykjavík 2020a, n.d.a; City of San José n.d.a, n.d.c, n.d.d, n.d.e, n.d.l, n.d.m; City of Toronto 2018a, 2018c, 2021a).

Managers primarily sought to actualize smart city efficiencies by enhancing participation and self-service through internet connectivity. Such programs of inclusion included Better Reykjavík, an online forum where constituents could post, comment, and vote on issues to reach City Council's attention (City of Reykjavík n.d.a; City of San José n.d.a; City of Toronto 2021a). Central to both San José and Toronto's initiatives was mapping and solving digital divides in their constituencies, indeed as the COVID-19 pandemic forced an abrupt shift to remote work, making quality internet connectivity an essential service (City of San José n.d.a; City of Toronto 2021a). Similarly, Reykjavík managers placed internet connectivity high on their list, seeking to use the internet to mediate as many city services as possible (City of Reykjavík 2020a).

Demographically, all three cities have very strong household broadband internet adoption rates, with 99 percent (2019) in Iceland, 93 percent (2020) in San José, and 98 percent (2021) in Toronto (NSII 2019; United States Census Bureau 2020; City of Toronto 2021a).[10] In San José and Toronto, managers reported most constituents who lack internet access were those below the poverty line, particularly ethnic minorities (City of San José n.d.a; City of Toronto 2021a). Likewise, managers in each of these cities established open data portals where they

[10] No data were available for Reykjavík at the city level.

continue to publish reports and raw datasets as acts of transparency (City of San José n.d.c; City of Toronto 2018c; City of Reykjavík n.d.c).

After assuring internet connectivity, managers invoked business process automation (BPA) and artificial intelligence (AI) as areas of significant investment. According to my informants familiar with San José, managers there had already found success in using BPA and AI, particularly through their mobile application with natural language processing, SJ311, developed in partnership with Google. As David (2021, pers. comm.) illustrated, "Google kicked us in that direction, rebranded what was mySanJosé, our mobile app…into SJ311…take a picture of a pothole, drop a geo-pin on top of it, automatically fires up a request…sends an email out to you…'hey, got your request…within the next seven days expect for it to be filled,' sends a service request over to DoT, and then they go and fill the pothole…What we're moving to is really empowering our residents to…self-serve themselves with city services." Managers saw self-service through BPA as not only reducing the burden of city labors, but also empowering constituents with convenience and quickness, reducing friction in city service encounters. Managers in all three cities implemented similar programs using BPA, including MyWaterToronto and ONPOWER, each of which centralized service reporting, and gave constituents better service experiences (City of Toronto n.d.c; City of Reykjavík n.d.d).

Everyday Realities

By introducing digital services, managers also introduced the opportunity to ask questions, raising the importance of human-centered, reflexive design. As Kyle (2021, pers. comm.) described, just because managers christened BPA apps like SJ311 did not mean

constituents would use them: “I only have 170 people who use it…you try these things to leverage technology to make it into a smart city. But maybe…there's a piece we're missing? How do you connect it to the residents?” Kyle asserted the process of smartness was not as simple as plopping an AI service or mobile app for BPA into city governance. Separate from the problem of procurement was a problem of utilization. If constituents were not using SJ311, managers needed to dedicate human and financial resources on discovering why. Thus, cracks appeared in the one-size-fits-all model of smart city governance.

However, digital services also allowed opportunities for managers to optimize city human and financial resources. In a separate case from above, San José managers utilized partnerships that made datasets useful to understanding problems of city program utilization (City of San José n.d.b). As Kyle (2021, pers. comm.) illustrated, “during the pandemic…we worked with a group at Stanford that uses SafeGraph…and that's actually the first time where we realized there was a big distinction between incomes around who was able to follow the shelter-in-place…and we were able to use it to tailor our messaging and change the focus of our programs.” Similarly, Kyle described a “registry where property owners…make sure that they're paying fair rents…that was originally a paper-based system which was a hassle and ineffective to everybody…a simple process improvement of moving that from paper to digital allowed us to take the team of six and redeploy four of them to actually doing non-paperwork helping out renters.” Thus, as Jennifer (2021, pers. comm.) succinctly characterized, “AI allows the little amount of human labor there is to be redeployed for user-centric outreach and research in the ongoing design of the city.” As automation freed up city workers from labor shortages and burdensome bureaucratic tasks, managers refocused them

into constituent outreach. Managers approached melding big data with constituent outreach as a strength of infusing governance and digital technologies. Interestingly, in so doing, city managers and technologists reframed constituent outreach, long practiced by city organizations, as *human centered design*, reframing a language of maintenance around a more novel term associated with high-tech.

City managers contended not only with local needs, but global problems of cyclical recession, climate change, and pandemics, further problematizing limited human and financial resources in maintaining service compliance. By structuring smart plans inclusive of topics like climate change, managers contended that cities did not exist in a bubble. Thus, MyWaterToronto enabled not only "service excellence," but allowed constituents to monitor their real-time water usage to remain climate conscious (City of Toronto n.d.c). Moreover, managers adopted language of crisis around such topics, illustrating urgency for cities to collaborate in reaction to *and* anticipation of global crises (UN 2018, 2019; City of Reykjavík 2020a; European Commission n.d.a; CCDR n.d.). Structured this way, such acknowledgments read as a move towards collective action in a global world, even as city organizations competed for titles and prestige.

City managers oriented their initiatives around a need for collaboration with public and private entities beyond city borders, seeking the best knowledge possible by maximizing networks. Such coalitions served to not only enhance the ability of a city to fund, learn, and negotiate, but to also participate in an international community focused on tackling larger global problems that symbiotically filtered back down into how a city functioned (Ilum 2022). Managers also used coalitions to amplify negotiating power beyond the political

power of the city. As Kyle (2021, pers. comm.) noted, “I think one of the fundamental failures of the United States in the technology area at the moment is a lack of a national framework around data and privacy…we should have been at the forefront of a Digital Bill of Rights…an individual city shouldn't have to be putting that framework in place.” Indeed, as Kyle (2021, pers. comm.), Timothy (2021, pers. comm.), and David (2021, pers. comm.) pointed out, individual cities were “not big enough fish” to negotiate such policies. Managers avoided spending precious city resources on negotiation by utilizing regulations already in place, such as the GDPR or CCPA.[11]

Since urban communities have diverse needs and risks, including the risk of service non-compliance, managers must directly listen to know what to deliver, and how successful delivery is. In the context of my study, managers used *innovation* to do more with less, reduce friction in service encounters, reduce the burdens of overworked city workers, make circular use of local resources to reduce worldwide waste, and refocus city workers to constituent outreach.[12] Moreover, managers engaged in knowledge sharing coalitions around domains of technology, efficiency, and sustainability to share knowledge, financial resources, amplify negotiation potential, network achievements, and garner prestige. Providing effective services to constituents influenced managers to engage in increased outreach and inclusionary efforts, especially as the internet cemented as a staple of global society.

[11] European Union’s General Data Protection Regulation, and California’s California Consumer Privacy Act.

[12] Reducing friction in service encounters, such as reducing the number of steps and increasing the convenience of access to a process like electricity billing through business process automation (BPA).

In practice, senior-level city managers focused heavily on a discourse of innovation developed by technologists. Moreover, many smart projects and case studies cited by managers pre-dated their smart city announcements (e.g., Better Reykjavík, Data-Driven Inspections for Safer Housing, Waterfront Toronto), calling into question how to verify smart city claims (City of Reykjavík n.d.a; City of San José n.d.g; City of Toronto 2018b). Managers and technologists problematized human and fiscal resources, treating digital technology innovation as a cure-all to sustain services. Managers pulled from shrinking city budgets to afford innovation investments, partnering with private industry to apply solutions like BPA to solve human resource problems, but constituents did not always bite. Time will tell whether smartness actualizes service efficiency, therefore alleviating pressures on city resources and earth's climate. Until that time, I wanted to understand why smart city managers appropriated technologists' language of innovation and technology.

Techno-messes

Social science scholars routinely categorize techno-histories as techno-myths replete with myth, fetishism, anticipation, ethnocentrism, colonialism, patriarchy, and elitism (Turner 2006; Edgerton 2007; Dourish and Bell 2011; English-Lueck 2017). Technologists tell histories that often bely historical amnesia by invoking technology as the revolutionary actor that defines historical ages—such as the accepted Steam Age versus a hypothetical Abolitionist Age (Edgerton 2007). In telling such histories, technologists favor the inventive or innovative stories that inform occupations of prestige (e.g., inventor, scientist, general) and renders invisible the role and expertise of maintenance (e.g., technician, janitor, mother) in the creation of propagandas, either intentionally or unintentionally (Turner 2006; Dafoe

2015; English-Lueck 2017). In smart cities, this practice has the effect of funneling financial resources into particular projects and human resources—often to the detriment of maintenance resources. Thus, smart cities have the effect of both preserving technologists' view of history and influencing the flow of municipal resources without regard to efficacy.

Technologists typically attribute legitimacy to the future visions of those in positions of prestige—engineers, inventors—and to be skeptical of such futures is to be against progress (Dourish and Bell 2011). Recursively, such sentiment argues engineers, inventors, and similar occupations are responsible for progress. These techno-myths function as a kind of historical amnesia, as technologies are often re-implementations or minor improvements on existing technologies, which often work side-by-side with existing "reserve" technologies (Edgerton 2007).[13] Moreover, arguments presented by technologists frequently rely heavily on tropes of the essential relationship between civilization and unmitigated technological advancement (Marx and Smith 1994; Hughes 2004; Mom 2013). In such tropes, technologists posit arbitrary political and ideological boundaries break down as humanity becomes ever more connected through technology tools—sailing, railroad, telegraph, internet. As Edgerton (2007, 206) argues, "our future-oriented rhetoric has underestimated the past, and overestimates the power of the present."

By borrowing and extending smart definitions, senior-level city managers portrayed to the public, in consolidated terms, how smartness served each city better. Smart declarations themselves contained language suited for technologist audiences, formed around language consistent with tech entrepreneurship (Wiig 2016; Sadowski and Bendor 2019). In the cities I

[13] Such as ceramic pipes funneling water through smart water meters.

studied, managers and technologists packaged city smartness into marketable definitions, particularly through words like *innovation*, *connection*, *inclusion*, and *sustainability* (City of Reykjavík 2020a; City of San José n.d.e; City of Toronto 2018a).

In framing such definitions, managers attended to the act of innovation by the management body, echoing technologists' vocabulary. But, upon close observation, I could not determine where innovation was actually occurring. Managers commissioned digital technologies (e.g., SJ311), enabled by social saturation of digital technologies (e.g., smart phones, internet), and crises (e.g., labor, budget). To complicate my confusion, my city manager participants were invoking "innovation" throughout our discussions, often tied to the process of implementing a digital process in government. Moreover, technologists' language also obscured whether digital technologies were amplifying or replacing traditional governance practices. If managers utilize BPA to digitalize *all* city services, where does that leave constituents uninterested or unable to use digital services? How might homeless citizens access such services routinely? The stateless? And how would such exclusion affect inclusion goals?

Cities function as nodes of "social capital embodied in knowledge workers"—places of cultural pluralism wherein people and ideas in constant motion influence the day-to-day (English-Lueck 2017, 24). English-Lueck (2017) characterizes such nodes by movement of knowledge workers within, and between, organizations. Kyle (2021, pers. comm.), on the topic of city culture, described a "punctuated equilibrium" between technologies and the role of culture in valuing them, illustrating his point through the invention of the aqueduct, then requiring complex negotiation of cutting through private lands to build it, fund it, and value

it. Kyle argued that technologies were transforming much faster than cultures could interpret and value them. Kyle further categorized such negotiations around "simple," "complex," and "wicked" problems, defining the latter as "problems which don't necessarily have a technical solution…or are very complicated and have values—we haven't worked them out—and they may not have a solution at all." Perhaps unknowingly channeling a technologists' perspective, Kyle remarked that "for the simple or complex problems we just need to be more like Amazon," in that when one orders a city service, the city should deliver it. As simple as that. In his illustrations, Kyle described a reality wherein culture was not only reactive to technology, but that high-tech companies provided perhaps the best examples of service systems, showing how technologists, and municipal managers who use technologists' language, (intentionally or unintentionally) narrate histories through a primacy of technology.

Shannon Mattern (2021) argues how smart city vocabulary follows technologists' definitions versus other urban knowledge. Mattern illustrates how city-as-a-computer metaphors dominated smart city rhetoric, wherein technologists constructed a top-down view of a *programmable* and *controllable* city for city managers. Katrien Pype (2017), studying the *smart city* of Kinshasa, capital of the Democratic Republic of Congo (DRC), describes how state officials ("above") and Kinois residents ("below") appropriated smart city vocabularies differently. Pype illustrates how state stakeholders used Western conceptions of *innovation* and *smart* in a political agenda to encourage growth and investment in local markets and create partnerships abroad. City residents, frequently living without basic services of water, electricity, and internet, used the same words in ways to better achieve their own goals. Thus, *smart* could mean the urban knowledge or cunning required to survive

in the city, rather than simply the digitalization of city services. For instance, when the DRC government paused internet connectivity during an election, *smart* Congolese were those who made use of the internet of neighboring countries to subvert censorship (Pype 2017).

Pype argues that *innovation* and *smartness* are "floating signifiers, filled in depending on who uses them, on the objects with which they are connected, and on their (imagined) users," used in both reactionary and anticipatory spaces (Pype 2017, 112). When I asked David how his Silicon Valley city could afford technology investments after surviving the "decade of deficits,"—the time around the DOTCOM bust and 2008 recession—he responded, "we turn over every leaf and we do a lot of innovation." To David, city innovation was a fiscal resourcefulness and diligence to active discovery and austerity—money was not going to simply turn up; he needed to find it. David's innovation, a practice in reactivity and anticipation, lacked any mention of digital technologies that enabled it.

In keeping with popular techno-myth, technologists practice anticipatory logics as a facet of techno-fetishism. Anticipation, or "divining," is an affective state of sociality—the imagining of reality as it could be, either based in reality or wholly imagined—a product of entanglements between states of anxiety, curiosity, and the need to manage uncertainty through intervention in the present (Adams, Murphy, and Clarke 2009; Dourish and Bell 2011). As English-Lueck (2017) shows, workers exhibited identities of prestige by anticipating the ebb and flow of economy and employment in the technology sector of Silicon Valley. Workers associated successful anticipation positively with particular identities—entrepreneurs, founders, scientists—filtering into techno-myths. Reykjavík city managers showed similar desire by orienting their smart city plans around a narrative of

Iceland as a geothermal pioneer (City of Reykjavík 2020a). Further, as English-Lueck illustrates, workers downplayed lack of anticipatory realization through ideas of "incubation"—the innovations did not fail, they were just waiting to take off or remained undiscovered (English-Lueck 2017). Technologists embody a sense of primacy, justified in their design of things, spaces, and telling of histories. For how could such well-educated, capable technologists be wrong?

While not all city managers invoked *innovation* in the same way, the primacy of digital technologies and top-down approaches were typical in smart city language. As David (2021, pers. comm.) illustrated, "there were very little technology investments…then the mayor came in and said, 'how can this be we're the capital of Silicon Valley and we're not leading by example.' And…the mayor started building out technical leadership to change that—a tribe of people to drive change in the organization." Senior-level city managers used technologists' language to control definitions around innovation as a top-down, Western-centric narrative. In David's illustration, San José became innovative because the mayor built out senior leadership, such as through founding the Office of Innovation (City of San José n.d.e). While innovation was both reactionary and anticipatory, technologists argue anticipatory capacity is enabled through technologies (Sadowski and Bendor 2019). City managers used digital-first processes like BPA to antiquate paper-based processes as less efficient. However, such "reserve" technologies, like paper-processes, may be worth keeping in tandem with digital services (Edgerton 2007). Naturally, I sought to understand why senior-level city managers gravitated towards concepts of technological primacy in their descriptions of smartness and innovation.

Sexy and Unsexy

> A lot of people in the field of city planning who use the word smart cities...they'll do six press releases on some 'gee whiz!' idea, and they'll walk across the press releases to their next job. (Kyle, pers. comm.)

Through my research, I identified a tension between the role of city management in delivering services as a "business-as-usual" service machine and the need for cities to appeal to workers and international coalitions for expertise and funding. Managers often weighed consideration of novel and status-quo solutions for solving city needs of human and financial resources.[14] According to Stephanie, San José was operating with 70 percent (2021) of its labor unfilled, leaving the remaining 7,300 workers like Kyle to absorb extra duties. Moreover, many existing employees were approaching retirement age in the next five years, creating more pressure on the city organization. Meanwhile, human labor was not becoming any more affordable, and salaried employees are long-term investments, complicated then by worker practices of job-hopping.[15] Companies that had garnered worldwide social prestige had the attention of workers (English-Lueck 2017). City managers could not match the financial resources offered by such high-tech employers.

Senior-level city managers contended with a disparity in what they could offer to attract the same talent as their budgets tightened. Moreover, there were only so many attractive positions a city had. As Kyle (2021, pers. comm.) illustrated, "you actually don't need or

[14] For instance, San José's "Demonstration City", and Toronto's experimentation with transportation innovation zones (TIZ) and blockchain (City of Toronto n.d.d, 2018a; City of San José n.d.e).

[15] For technology workers, the main way to earn a promotion was to apply for a higher position at another company, as older workers tended to retain their positions for longer, leaving less room for young workers to *climb the ladder*.

want everybody to be an innovator in an organization…people like me are salt and pepper in the stew, a little bit goes a long way…my God, if everybody in the organization was like me, we'd never get anything done…because what a lot of a city does is business-as-usual…and that's not a bad word at all…you want people who are as excited about showing up and doing the day-to-day maintenance work as you want people to be excited about showing up and innovating."

But why did managers adopt smart city plans if they knew this? According to Kyle, most city work was day-to-day management of services—maintenance of a status-quo. Moreover, the vast majority of what a city provides is long-term stability. The budgets managers allotted to actual innovation work were relatively small, and often first on the chopping block when managers needed to make cuts—such as during the "decade of deficits" or COVID-19 pandemic (Office of the City Manager 2021; City of Toronto 2021b). A result was a reduction in incoming city workers. As Stephanie explained, managers approached *innovation* out of necessity to meet pressures of human and other resources, looking to create programs of efficiency and automation (e.g., BPA, AI) to relieve a shrinking pool of overworked employees. For why work for an unsexy city when you could work for a sexy tech company like Microsoft (Metz 2022)?

Senior-level city managers invoked technology and innovation because it made the city a sexier place to work in a worldwide market of laborers and investors. Using smart cities to create city identity around the prestige of high-tech was a way for managers to increase attention. As Wiig (2016) explains, city management used technologists' language to sell positive images of their cities as a destination for human and financial resource investments.

In their smart initiatives, Reykjavík managers outlined a desire for recognition and reward, writing "an application will also be made for Reykjavík to become the Green City of Europe" (City of Reykjavík 2020a, 19). City managers in San José and Toronto made similar announcements, clearly identifying value in such awards (CCDR n.d.; Government of Canada 2020; City of San José n.d.e, n.d.n; City of Toronto n.d.g). Toronto managers even have a dedicated site of such accolades (City of Toronto n.d.a).

Managers sought to increase the attractiveness of their city as a destination for innovative minds, using their cities as "testbeds" for private industry, creating successful "models" for other cities worldwide (UN 2016; European Commission n.d.a). Technologists, by perpetuating histories with technology as the antecedent, associate technology vocabularies and occupations with social prestige (Edgerton 2007; English-Lueck 2017; Dafoe 2015; Hornborg 2015). In the context of the city, prestige functioned in maintaining the city form—keeping people and knowledge moving within and between, amplified through coalitions. As city management found success in surmounting challenges of balancing local needs and global forces, they would adopt names to reflect an appraised uniqueness of the city imaginary—a "Smart City," or "Heart of Silicon Valley." Use of such labels influenced the minutia of daily life to conform to ideals of the label—we are the "Heart of Silicon Valley" and therefore must *lead* the intersection of governance and digital technology (City of San José n.d.e). According to both my participants and archival observations, managers entered coalitions to not only expand resource access, but to derive identities of prestige through reward and recognition tethered to global smart city discourse.

In 2017, Toronto city managers approached Alphabet's (parent of Google) Sidewalk Labs to propose a plan for development of Toronto's Quayside district (City of Toronto 2018b; Sidewalk Labs n.d.). Jennifer (2021, pers. comm.), one of many city consultants who worked on the project, commented, "once the proposal was accepted from Sidewalk [Labs], it was all over the news. The proposal's…extensive…impressive…big promises…beautiful…very dreamy, and reminds me of Le Corbusier in the 70s overhauling cities and saying, 'this is the way!'", going on to describe the plan as "idealistic." Jennifer went on to point out how "for a lot of government proposals [in Canada]…if you've been the partner chosen to write the proposal…you have a good chance at getting it." Jennifer posited Toronto and Canadian officials may have selected Sidewalk Labs intentionally, perhaps to generate worldwide attention around the Waterfront development and city.

I also identified a tension between how city managers structured their initiatives around digital technologies and innovation, and the role of the city organization in maintaining a service status-quo. Timothy (2021, pers. comm.), when I asked about what he thought of smart cities, replied, "I think a real smart city would be things like…smart traffic lights that simply route for both smooth traffic and saving fuel or electricity. That's an idea that's been around a long time…that's pretty easy to correct if you had a smarter system." Nick (2021, pers. comm.), given the same question, imagined a city that "separates 2-ton monsters from 150-pound people…a smart city is safe for pedestrians above all." Further, Kyle (2021, pers. comm.) said, "when you go to cities where leaders are struggling with the real issues, the last thing that they want to talk about is how the blockchain is going to solve their housing

crisis…but there is a huge role that existing off-the-shelf technologies could play in modernizing and improving…the service delivery that we do."

While city managers could have focused on using existing tech to solve simpler pain points in constituent city experiences, attention instead flowed into novel *innovation* projects like Sidewalk Toronto, autonomous vehicles, and even blockchain (City of Toronto n.d.d, 2018b; City of San José n.d.e). From above, city managers demonstrated an adoption of technologists' rhetoric of novel innovation. Consequently, managers risked constructing a myopic view of city purpose. Solving those simpler traffic light pain points is pointless if autonomous vehicles will solve it tomorrow. From below, constituents argued simpler systems with status-quo technologies could solve urban pain points like traffic lights. City managers needed to solve crises of budget, climate change, and labor. Meanwhile constituents wanted seamless and safer urban experiences. Just as other anthropologists point out, those "above" and those "below" appropriated smart city language differently (Pype 2017; Mattern 2021).

Technologists practiced prestige on-the-ground as a negotiation of identity, using technology as a tool for actualization and adherence to a central dogma, invoking innovation as an act of creating something novel.[16] But city organizations were traditionally in the business of maintenance—upkeep of the already-existing. City managers, by following technologists' language, foregrounded *innovative* roles (sexy) and backgrounded *maintenance* roles (unsexy), seeing to a maintenance of top-down, hierarchical structures of

[16] For example, media outlets and pundits celebrate Elon Musk for innovating with his Tesla electric vehicles, even though electric vehicle technology and mass production techniques are over a century old.

power—as Kyle (2021, pers. comm.) noted, managers were the "salt and pepper in the stew." So, where did that leave city maintenance workers?

Roles lacking the prestige of innovation were not the focus of smart city profiles, where ideas of innovation-enabled automation like BPA even threaten the jobs of city maintenance workers. Even though smart city profiles and managers often mentioned human-centered design, I could not find any details on how, or if, information technologies would reposition existing city workers into constituent outreach. Per smart city definitions, efficiency was the solver of crisis, enabled only through digital technologies (City of Reykjavík 2020a; City of San José n.d.e; City of Toronto 2018a). Though, as Edgerton (2007) argues, innovation is at least partly (perhaps mostly) rediscovery and reutilization rather than new. Therefore, one could think of innovation as a maintenance of past technologies, and novel innovation as a myth. But technologists' language focused on *leading* through innovation—the *sexy*—that which would generate attention and prestige for individuals *and* organizations. Managers sought relevance in services, policies, and systems of care that would service the population better than, or at least as well as, other cities to stand out globally—problematic for city organizations predicated on the delivery of subsistence services—fire, police, water, electricity, internet, roads—to its population.

As I alluded to earlier, I also identified the role of smart city planning as a means of creating controlled, designer-led, top-down processes (Pype 2017; Mattern 2021). In the context of Toronto's ill-fated partnership with Alphabet's Sidewalk Labs, Jennifer (2021, pers. comm.) illustrated a dichotomy between designers and those who used such designs, saying "you're the designer, so you get to decide and dictate versus…people kind of like

messy parks…with a swing set that's not sexy, that's not special…a garden that looks a little bit like people lived in it…a little bit of grittiness that makes space feel…alive that you'll lose if you're just looking at it from a design perspective, or a tech perspective." Within, we see how distinguishing between novel and realistic narratives of design make a difference in successful urban designs. While smart city managers proposed what Jennifer called "big ideas and big promising features…where everybody looks lovely and happy," managers like Kyle dealt with problems of constituent utilization.[17]

What Kyle and Jennifer illustrated was a tension between approaching design through innovation (top-down) versus human needs (bottom-up). City organizations, unlike companies, cannot simply plop a design into urban space and hope for the best.[18] Indeed, technologists have a particular approach to innovation that does not agree with municipal bureaucratic structuring.[19] As Kyle (2021, pers. comm.) said, "in innovation in cities, sometimes it's better to be a fast follower than the actual first-line-innovator." Unlike a private company, there is much risk managers assume when implementing new processes. Cities do not exist to generate profit, and thus cannot operate like a technology company. Managers must make sure any urban interventions help maintain municipal existence. Moreover, city smartness emerged as both a threat and an ally to inclusionary design efforts, opening the potential for city layoffs to meet austerity measures rather than focusing city worker to outreach.

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[17] As I mentioned in *Cities and Smartness* above, Kyle described how BPA app SJ311 has low user numbers.

[18] A quick look at dozens of top-down implemented smart cities like Songdo in South Korea, or Woven City in Japan shows something was missing in the planning formula.

[19] A popular axiom in Silicon Valley high-tech is "fail fast, fail often."

Among the myths of techno-oriented histories, there are the practices of the everyday. Each day designers must make decisions on how a thing should look and function. Each day workers negotiate their needs of income and job security against their current and potential employer. Each day city organizations need to deliver basic services while planning 5, 10, 50 years into the future. Every day is a balance of current needs against innumerable local and global unknowns. From my cities, a pattern of role identity emerged from city practices of network maximization, novelty of technology, and anticipation of municipal futures along innovation. Cities need human and financial resources. Sexy designs promised attention. Sexy designs were those that were innovative. Technologists established what was innovative through centuries-long narratives of fetishism and myth. City manager's attention on the innovative obscured the primacy of city maintenance roles and the role off-the-shelf solutions could have played in solving longstanding pain points in urban experiences.

For Better or Worse

Near the closing of each of my interviews with city stakeholders, I asked them to imagine their smart city ten years into the future, first imagining a plausible scenario where things go well, and a second scenario where things go not so well. I did this to engage with their imaginations of municipal futures as active producers in the smart city space. Congruent between each of my participant's responses was the notion of city governance and digital technologies converging towards extremes. Along with their vocabulary, the tones of their voices were somber. While their responses trended toward the pessimistic, there was a real sense that fusing digital technologies and city governance could literally go either way—for

better or worse. Interestingly, none of my participant's mentioned "innovation" in this context.

David (2021, pers. comm.) responded, "I gave this presentation up in Minnesota and I showed a picture of the Terminator on one end, and I showed George Jetson on the other…and I was like, it could go either way. It could be used for evil, you know, Terminator—it could go black on us—or it could go into this happy place where some machine knows that I want a pop tart at 7:01 in the morning and automatically it's waiting and then I go to my remote meeting." Engaging with tropes in popular science fiction, David imagined a future where digital technologies were either unmanageable, unanticipated forces of destruction, or they enabled seamless identification, procurement, and delivery of human needs. In both scenarios, David illustrated differing sources of agency. In one scenario, humans failed to anticipate and control the machine. In the second, the machine successfully anticipated and served the human. David showed a common anxiety shared toward generalizable AI, where humans cannot pacify a monolithic machine. David, like those wary of generalizable AI, fetishized AI as a single entity, containing not only the agency to act, but a clarity of self-preservation.

But as Timothy (2021, pers. comm.) pointed out, it was too early to make any concrete assumptions, commenting that companies and cities, "try to portray [smart cities] as a green paradise with every road turned into a park and transport for everybody…the big risk, I think, is that the protections you assume are there have to be fought again for each new media…we're at the very early stages of this…and it's kind of invisible…it doesn't *hurt* to have your data extracted from you…the less friction there is for transactions, the more

transactions get added…increasing complexity." Timothy felt that, while he could not make any definitive assumptions, he could imagine technologies reducing service encounter friction to a point where there was too much to manage. Thus, much to the contrary of smart city technologists, Timothy saw technological innovation as being potentially erosive to concepts of control. Is my Tesla running the latest operating system update so it will turn on today? Will governments add more bureaucratic duties as they become easier to run? Timothy displayed anxiety around how technologists position ubiquitous computing to digitalize *everything*, which, again, assumes much for the social interactions that would allow for such a future. Moreover, he displayed curiosity in how people would come to define and value concepts like *data*, especially as such concepts became increasingly entangled with civil rights and governance.

Jennifer (2021, pers. comm.) described her imaginations on a "spectrum," saying that at best she expected, "a community that did feel like a nice, rich, diverse community to walk around and visit, and to see different cool technologies being tested…at worst, it was potentially a prototype for evil data collection…one thing I felt like Sidewalk Labs' proposal was doing was just collecting data for data's sake." Jennifer imagined a future where surveillance capitalism has run amuck. Lack of data governance around how governments and corporations collect, hold, parse, and use data created panic and lack of trust toward city organizations. Therein, Jennifer may well have concurred with Timothy and David in how technologies may erode a sense of control—or at least channel control into the hands of the few. While Jennifer saw potentially good experiences around inclusive, diverse communities, she seemed neither optimistic nor willing to live in such a place. Having to worry about

smart lights malfunctioning—which I encounter myself when my Home Kit smart lights have weak Wi-Fi signal—and a lack of clarity around data governance, Jennifer may be giving a bit of insight into why smart cities like Sondo and Woven City are ghost towns. Perhaps people are not interested in beta-testing prototype cities with all kinds of complex digital technologies to learn about and adapt to? Moreover, perhaps people still have much to discuss about this thing technologists and city managers call *data*.

Kyle (2021, pers. comm.), as a senior-level city manager with experience from multiple municipalities, responded, "technologies are making it easier for bad actors, or corporations, or governments, to use or misuse things that you may not even know that you're giving them as data." Contrasting government powers with the service efficiencies of Amazon, Kyle added, "Amazon can't arrest you. We can. Now I don't direct the police, politically—they're a non-political unit—but they're part of the city. And they can arrest you…take away your liberty…and put you in jail…so, I take very seriously the responsibility of any data that we collect. And I think we, as a city and as a society, are lagging and lacking in the tools to understand choices that we're making around data, and the tools to best protect people's liberties and identity." Much like Timothy and Jennifer, Kyle engaged with contemporary issues around data governance. Kyle described his management role as a "responsibility" of "protecting people's liberties and identities" where larger governing bodies have failed to give guidance.

Kyle continued, "we had an opportunity to do a very significant deal with a company around smart streetlights back in 2013…and we kept asking ourselves, what's the use case? And we pulled the plug on it. For two reasons: one, we didn't feel like there was a clear use

case to support that, and two, the unintended consequences of then having that capability in every single frickin' light pole of our 67,000 light poles seemed beyond our capacity to manage for moral good." As shown, not all opportunities taken by city managers were novel. Managers like Kyle were performing due diligence in evaluating investment and return-on-investment potential in scope of "moral good," despite his personal interests in novel technologies like blockchain and cryptocurrency. If Kyle, in his managerial role, could not balance the value and management of a project "for good," he would pass on it for city investment.

Kyle did not see innovative technologies like blockchain solving real problems in cities. Meanwhile, as voiced by both Timothy and Jennifer, city managers could have been using off-the-shelf, status-quo technologies to solve urban problems, like with smart traffic lights. While managers oriented smart cities as innovative, my interlocuters imagined a smart city that celebrated the role of maintenance—to make maintenance sexy rather than follow worldwide techno-oriented trends of innovation and technology. Look for technologies that help efficiency, yes; but do not render invisible the fundamental role of maintenance work in city services. Celebrate it as we do democratic processes, which is likewise maintenance of a "fiction based on trust," as Kyle described it. City organizations maintain democratic processes through city work. Populations require services, and services enable populations.

Conclusions

Sadowski and Bendor (2019) argue there was a logic in how technologists marketed smart city discourse to city stakeholders as a system-as-a-service (SaaS) (Söderström, Paasche, and Klauser 2014; Wiig 2016). First, technologists identified a crisis threatening

stability of the city. Second, SaaS providers showed how smart technologies promised to predict instability and centralize control through ubiquitous sensing (IoT) and autonomous data utilization. Third, SaaS providers described particular technologies and services for city managers to meet the prior promises. Finally, SaaS providers and city mangers designed a plan for implementation of such technologies and services for actualization of smartness in the city. Mattern (2021) and Pype (2017) show how technologists' narratives perpetuated through smart city adoption tended to enforce pro-Western, pro-technology, top-down hierarchical organizations in cities (Drew 2020). Furthermore, English-Lueck (2017), Dourish and Bell (2011), and Edgerton (2007) illustrate how technologists' rhetoric plays a crucial role in how people tell histories, practice identities, and form values.

In my study, I found senior-level city managers and technologists used smart city discourse to problematize city human and financial resources in meeting increasingly demanding constituent needs, corroborating earlier findings from other studies (Söderström, Paasche, and Klauser 2014; Wiig 2016; Sadowski and Bendor 2019). Thus, smart initiatives painted cities as places of increasing need and dwindling resources. Managers and technologists alike embraced smartness as a panacea to resolve such challenges, despite frequently lacking measurable outcomes. I also found that, despite some differences in articulation, city managers maintained adherence to a core logic: *smart cities* used *digital technologie*s and *data* to find actionable insights, which managers used to strategically optimize *service* design to improve *quality of life, inclusive* to health of both constituents and earth's *environment.*

In the cities I queried, managers sought to actualize smart city efficiencies primarily by enhancing constituent participation and self-service through internet connectivity. After assuring internet connectivity, managers invoked business process automation (BPA) and artificial intelligence (AI) as areas of significant investment. I found that, in practice, senior-level city managers focused heavily on a discourse of innovation developed by technologists. Moreover, I found many of the smart projects and case studies cited by managers pre-dated their smart city announcements (e.g., Better Reykjavík, Data-Driven Inspections for Safer Housing, Waterfront Toronto), calling into question how to verify smart city claims (City of Reykjavík n.d.a; City of San José n.d.g; City of Toronto 2018b).

I also found that managers embraced smart initiatives to not only attract attention for diminishing human and financial resources, but to engage in networks of knowledge sharing that amplified the limited human and financial resources of an individual city, positioning city organizations not only as reactionary, but as anticipatory. Managers also formed public-public and public-private coalitions to affect policy negotiation where nations had lagged or failed, and where cities were otherwise too small to negotiate individually. Importantly, I found managers used city smartness as a venue to enable knowledge sharing and networking through coalitions and partnerships, serving to meet needs of human labor and financial resources for continued delivery of services.

City organizations, primarily machines of maintenance, exist in a techno-world wherein the sexiness of innovation markets better to workers cities attempt to recruit, partnerships, and funding opportunities. Technologists' techno-myths help structure the definitions of innovation, also functioning as a means of simplifying complex histories around

technologies, authored by specific peoples, enforcing how worldwide audiences tell, understand, and relate through such histories. Technologists, by telling histories with technology as the antecedent, fetishize prestige around vocabularies of technology (Edgerton 2007; Dafoe 2015; Hornborg 2015; English-Lueck 2017). Technologies permeate political borders and national identities. In the cities I queried, I found city managers used smart cities to create city identities around the prestige of high-tech. Managers invoked technology and innovation because it made the city a sexier destination for a worldwide market of laborers and investors. As Edgerton (2007) and others argue, rediscovery, reinvention, imitation, and amnesia became the markers of the history of technologies the world over. Thus, questions remain in how and why managers and technologists use *innovation*.

While not all city managers invoked *innovation* in the same way, I found a primacy of digital technologies and top-down approaches were typical in smart city language. City managers, by framing smart cities around innovation, risk foregrounding top-down, technologists' narratives of control, and backgrounding local urban knowledge, maintenance primacy, and unsexy solutions to longstanding urban problems. This logic also shows how lack of actor distinction confuses the source of innovation. I found technologists' smart city discourse distorted the role and focus of city management away from what it primarily is: business-as-usual maintenance services, corroborating earlier studies (Pype 2017; Mattern 2021). Prompted to opine about plausible scenarios, my participants responded with similar imaginations of technology as either enabling of human needs or eroding a sense of control. Definitions of city smartness remained ambiguous in these cities, apparently both a process and a reachable state.

My study exposes how technologists' rhetoric played a key role in motivating smart city politics, helping to translate the language and politics of high-tech into the language of municipal governance. I show how technologists' language of innovation influenced management in city government, serving to maintain existing hierarchies of power through top-down, Western-centric techno-myths. By understanding how senior-level city managers describe and implement smart cities, and by understanding how technologists structure and sell smart cities, we can see how smart city discourse helps structure managers' municipal imaginations through a primacy of technology. Technologists have a particular discourse of innovation is not entirely compatible with how cities bureaucratically function—one, agile and fleeting, the other, essential and perpetual. Such distinction is important to communicate to scholarly audiences unfamiliar with techno-fetishisms, but familiar with urban management critiques. Moreover, my study opens paths to understanding how private interests influence municipal management through more obscured means.

In my research, city managers needed to *play* in the social world of technologists, thus such managers needed to learn how to *fit* into that world. Managers adopted technologists' language and titles, such as through the founding of city offices of innovation, information, and technology. Thus, we see how social processes, otherwise unseen, affect urban organizational cultures. Future research should be aware of how technologists problematize crises as things that only technology can solve. Future research should also evaluate how smart city managers can affect actionable, measurable projects for municipal efficiency without falling into a trap of technologists' innovation rhetoric.

CHAPTER THREE

CONCLUSIONS

Reflections

There were many smaller findings from my study that could not fit in the focused length of the article, some pertaining to my process, and others pertaining to discoveries. Moreover, I think it important to include some of my own experiences from my anthropological praxis in industry. Thus, in the next few sections, I expand upon the analysis and findings I presented in Chapter Two, including challenges I encountered, additional thoughts on findings and data collection, intellectual and broader merits of this study, and opportunities for future research.

My Experiences in Industry

I see practices of techno-fetishism in my own professional work as an anthropologist working in industry between designers and managers in autonomous vehicle (AV) design. Such smart city-adjacent work presents opportunities to see how the *innovative* ideas of engineers and computer scientists can reduce design to simplistic, sanitized products. For instance, in computer vision of autonomous vehicles, engineers portray humans as simple boxes or rectangles in a street scene. Complex algorithms written by humans that make up the AV then maps real-time avoidance behaviors to avoid such boxes. Lacking in these box models are the complex social behaviors of humankind, markers that vary widely by region. This reduction of complex, agentive social creatures to simple 3D geometry informs both actual and metaphorical practices of techno-fetishism in design and innovation.

On My Data and Process

Diversity is a concept that is notoriously difficult to engage with. What does one measure difference relative to? How does one ensure measurement does not reinforce differences? One thought I had while reading through Reykjavík's Green Plan was the absence of people of color in any of the drawings they presented. See Figure 1, below, for one such illustration (City of Reykjavík 2020a, 1). While diversity was a large part of The Green Plan's argument, its charming illustrations that complemented each section of the report were selective color, showing only shades of blue, green, and white. This makes sense in the context of the report, since blue is the color of Reykjavík's official crest, and green is the literal theme of the report, itself.

Figure 1 Green Plan Illustration

To the credit of Green Plan editors, their illustrations do depict a diversity of age, sex, disability, and seemingly gender, with hair styles that do not conform to traditional gender norms. Hair in these illustrations changes colors between blue, green, and white, but skin is

always white. The report editors clearly meant to present the reader with themes of inclusivity, openness, green space, democracy, collaboration, creativity, and new development. However, for a city that wishes to encourage immigration, diversity, and inclusivity, one would hope their illustrations would include the diversity of the human phenotype to make such intentions clear, remaining mindful of what exclusionary illustrations can implicitly do.

City Transparency: Phenomenological and Methodological

Another problem I consistently identified had to do with how municipal stakeholders practiced transparency. This problem was twofold: one, dealing with phenomenological transparency problems for city stakeholders, such as service access and digital literacy; and two, methodological problems of transparency in me accessing proper city data, such as authorship and publication information. I include these reflections in Chapter Three instead of Chapter One because these sources of bias affect not only my own research, but ongoing use and design of city digital data portals by city stakeholders.

As I illustrate in Chapter Two, solving constituency digital divides is a priority for smart cities. All three cities have very strong household broadband internet adoption rates, with 99.1 percent (2019) in Iceland, 92.6 percent (2020) in San José, and 98 percent (2021) in Toronto (NSII 2019; United States Census Bureau 2020; City of Toronto 2021a).[20] Both San José and Toronto reported lack of internet connection mostly in those below the poverty line, particularly with ethnic minorities. Seemingly missing, however, were qualitative findings of how people were accessing the internet. Were people using desktop computers? Mobile

[20] No data were available for Reykjavík at the city-level.

phones? Tablets? The size of the device's display surely affects design approach for online content.

I also found a lack of assistive technology features in general across all city websites. Where are the assistive technologies for reading open datasets? I found data portals to be mostly friendly to English readers, though I do have concerns for non-English speakers who wish to access data in diverse cities like San José and Toronto. Recall, though, that San José does make use of NLP for non-English speakers—the city's problem was getting people to use the service. Iceland's portals were typically good for English use, but I did have to extensively use translators for datapoints and reports, as officials (unsurprisingly) typically published them in Icelandic.

Managers in smart cities create online forums like Better Reykjavík as a solution for enabling online democratic discourse, where constituents can read, comment, propose solutions, and vote on said solutions, to better reach the attention of city managers (City of Reykjavík n.d.a). Likewise, management in each of these cities established open data portals to publish reports and raw datasets as a public-facing act of transparency (City of San José n.d.c; City of Toronto 2018c). What I found lacking, though, was a means of making such information digestible and therefore imminently usable to constituents. I also could not find whether cities engaged in digital literacy measurements for constituents.

While cities published some datasets in pre-interpreted formats, like some census data, much published data was not so. I found many data were in a raw state, and therefore difficult to operationalize in my own archival discoveries because it was not pre-interpreted, requiring me to perform a great deal of parsing and analysis. Because I used the same data

portals constituents use, this problem could, and likely does persist for them. Difficulty in data digestion can lead to misinterpretations, harming the "moral good" of transparency cities hope to achieve through these open data initiatives. While I do not have direct stakeholder feedback on this particular topic, I find it logical to suggest shortage of city human and financial resource limits transparency efforts. Constituents still need to be able to access these data portals, and they need to be able to read and make use of data from them.

Now, this is where phenomenological transparency ties to methodological problems. If I am having problems with digital literacy, it stands to reason others are, too. Each of these cities has innumerable reports and census resources tracking indicators in all aspects of urban life. That is to say, the historical datasets compiled and archived by cities are truly massive. However, such information exists in archival formats not useful to automated systems such as machine learning and AI algorithms. Such format disparity invites resistance to automated learning from historical datasets, indeed as the human resources needed to clean and train such algorithms is great (Rothstein 2017; Noble 2018). So, too, is the amount of effort needed to make use of such data without AI. Already functioning with a deficit of human resources, cities would need additional human resources to implement such automated systems. But cities also need automated systems to fill the deficit in human resources. As I illustrated in Chapter Two, this fact of labor in cities caused city managers to focus city innovation investment on future-focused ventures—it is easier to install IoT sensors and collect new data rather than clean old data.

On the more methodological side, I noticed during my data collection that Icelandic statistics often lacked city-specific data, lumping all together into national datasets. Because

the population is so homogenous, and foreign population so small, perhaps it just does not make sense for government officials to track detailed statistics on Reykjavík alone? It is also very possible that the language barrier prevented me from being able to access and parse these data properly. While English is a language taught in Icelandic schools, and most Icelandic citizens speak and understand it, Icelandic officials tend to publish documentation in Icelandic—though newer Icelandic government websites feature work-in-progress English translations.

I frequently made use of Google Translate to translate government-published documents from Icelandic to English, which did serve most of my needs, but the Google translation system is imperfect, and there were many errors in translation.[21] For instance, when I was researching the Icelandic bus app *Strætó*, Google Translate translated a passage of interest to say, "Cash: It will continue to be possible to pay with cash in the capital area and the countryside. It is not possible to give back in the capital area" (City of Reykjavík n.d.d). Thankfully, this particular Icelandic website featured a native English translation that I could switch to, since the *Strætó* app is also geared for tourists. The correct translation came to be, "Cash: It will continue to be possible to pay in cash until Strætó announces otherwise. Drivers cannot give change in the capital area" (City of Reykjavík n.d.d). An important distinction to make, especially given federal studies show older generations of people worldwide resist adoption of technology-mediated payments in favor of tried-and-true methods, like cash (Federal Reserve 2012). Eliminating the ability for dispersion of change

[21] Google Translate for documents is available at: https://translate.google.com/?sl=is&tl=en&op=docs

means customers must use exact cash amounts, creating a pain point in an otherwise familiar exchange process. Similar studies found digital skills correlated with age, showing younger adults (<50 years old) to have much more digital acuity than older adults (>50 years old) (City of Toronto 2021a; City of San José n.d.o).

Additionally, Google Translate does not work on scanned PDFs or scanned PDFs that have had optical character recognition (OCR) run to process the text images into searchable words. This presented me with issues when looking at things like City of Reykjavík's job listings, as I wanted to get a sense of what trends new city positions might tell me in my measure of smart city efficacy (City of Reykjavík n.d.f). Thus, such documents remained unavailable to me. This is likely going to be a problem for cities, like Reykjavík, that actively encourage immigration and diversity. Potential citizens may find the social and economic landscape prohibitive to navigate.

COVID-19 Reflections

When I began my research in early 2020, cities worldwide were struggling. As my participants explained to me, cities saw massive unemployment overnight due to stay-at-home orders, slashed budgets, pushed timelines, and higher costs to aid struggling constituents and pandemic response efforts. As I explained in Chapter Two, the pandemic also opened opportunities for smart cities to shine. While the pandemic forced city leaders to cut many programs, leaders in San José and Toronto also accelerated expansion of programs like free Wi-Fi hotspots to support remote work and education needs. Wi-Fi hotspot programs were one result of these cities' earlier digital divide initiatives.

The pandemic also had effects on city demographics, with many prior residents in Silicon Valley opting to leave its cities and buy houses elsewhere, mainly due to remote work opportunities and high cost of living (Institute for Regional Studies 2022). My participants in San José mentioned how a slight decrease in population also reduced strain on city services and helped ease rising rent costs. It will be interesting to see how, if at all, this decrease in population affects smart city trajectory.

The pandemic also helped smart city initiatives by allowing larger appetites for data and health tracking. As I touched on in Chapter Two, Kyle illustrated how managers in San José used big data to address pandemic challenges,

> During the pandemic, we were able to learn a lot…by listening to people…watching what they did…and some big data solutions…we had the Shelter in Place Order…there was an eviction moratorium in place…almost everybody was paying their rent…[constituents] basically said, 'look, I'm poor now, but there's nothing worse I can imagine than being homeless in Silicon Valley….I don't trust government is going to…keep the landlord from kicking me out.' So…they didn't have money for electricity…food…we decided to keep our feeding program at a super high level…we realized that was the essential safety net…because people were diverting their money for rent, and they literally didn't have money for food…we were able to do 110 million meals over the course of the pandemic [as of late 2021]…and at one point…a very large school district…was planning to shut down their meals over the holidays because their staff was tired, and I went to them and presented this data to them, and then basically said, 'if you shut down the 20,000 people who are collecting meals won't have food.'… And they said, 'we didn't know that.' And then they ramped up their operations and kept feeding over the holiday. (Kyle, pers. comm.)

As Kyle described, in addition to pandemic initiatives measuring COVID-19 health performance for the Shelter in Place, San José city managers also used large datasets and health data to define necessary social safety nets. Managers used big data sets to learn about where they needed to focus qualitative outreach, which managers then used to inform

programming and budgeting. The necessary health tracking that went along with the pandemic allowed outreach like this to occur more naturally—two birds with one stone.

Of course, the pandemic also took its toll on my ability to perform interviews with city employees. As I mentioned in Chapter One, I had a great deal of difficulty getting responses from any city employees. With the pandemic came crushing pressure on city employees already strained by a general lack of human resources in cities. So, recruitment became impossible in the early months. Despite trying repeatedly, I received no responses. It was only near the end of 2020 that I started to receive a few responses. Not limited to sampling constraints, the pandemic also doled out time constrains for my study. Such a lapse in response forced me to take a heavier dip into archival sources, but also limited what I could say about my participants.

Merits and Limitations

Intellectual

I show how technologists' language of innovation influenced managers in city government, serving to maintain existing hierarchies of power through top-down, Western-centric techno-myths. Such results ran contrary to manager's promises of human-centered design. I also show how anthropological theories around techno-fetishism are helpful in thinking about urban organizational cultures, showing how social processes, otherwise unseen, affected said organizational cultures. I also found that, despite some differences in articulation, city managers maintained adherence to a core logic: *smart cities* used *digital technologie*s and *data* to find actionable insights, which managers used to strategically optimize *service* design to improve *quality of life*, *inclusive* to health of both constituents and

earth's *environment.* This logic also shows how lack of actor distinction confuses the source of innovation. My findings verify earlier studies of smart cities and technologists' rhetoric, showing that scholarship must remain attentive to evaluating their ongoing effects on public institutions.

Broader Applications

In applied anthropology, we seek to make an impact beyond academic gratification into empowerment of our stakeholders in some manner. As Lamphere (2004) argues, such an anthropology ought to: 1) increase collaboration and partnership with communities; 2) expand public outreach; and 3) concrete efforts to influence policy in domains where we have expertise. For instance, I found many of the smart projects and case studies cited by managers pre-dated their smart city announcements (e.g., Better Reykjavík, Data-Driven Inspections for Safer Housing, Waterfront Toronto), calling into question how to verify smart city claims (City of Reykjavík n.d.a; City of San José n.d.g; City of Toronto 2018b).

By understanding how senior-level city managers describe and implement smart cities, and by understanding how technologists' structure and sell smart cities, we can see how smart city discourse helps structure managers' municipal imaginations through a primacy of technology. Technologists have a particular discourse of innovation that is not entirely compatible with how cities bureaucratically function—one, agile and fleeting, the other, essential and perpetual. Such distinction is important to communicate to scholarly audiences unfamiliar with techno-fetishisms, but familiar with urban management critiques. Moreover, my study opens paths to understanding how private interests influence municipal management through more obscured means.

Cities will always be unsexy from a technological perspective because they need to be slow, predictable, and permanent. Likewise, cities do not sell commodities or services for profit. City managers needed to *play* in the social world of technologists, thus such managers needed to learn how to *fit* into that world. Managers adopted technologists' language and titles, such as through the founding of city offices of innovation, information, and technology. Thus, we see how social processes, otherwise unseen, affect urban organizational cultures.

Limitations

In my data collection, I often found discrepancies between how various governmental entities reported their data—such as formatting, units, and methods. This was particularly true for population and energy statistics. Finding and comparing diversity statistics related to age, ethnicity, and other markers of diversity proved difficult, requiring at least some qualitative interpretation on my part. Looking for simple age-population pyramids for San José and Reykjavík proved fruitless, as their census-statistics systems are not set up to display such information at the city level. I found much frustration in trying to get population numbers from these two cities to talk with the much more nicely presented Toronto and Canadian statistics (Statistics Canada 2021; City of Toronto 2022). Looking for data on San José would routinely point me to a census "quick statistics" summary page, which contained only partial data in broad groupings (United State Census Bureau 2020). These limitations caused me to make some generalizations in the absence of more nuanced data.

For example, Iceland does a detailed job on reporting statistics on the country immigrants come from, and I was able to deduce diversity numbers from such data. But it is imperfect, as

a person immigrating from China could easily be “White,” and a person immigrating from Ethiopia could easily be “Asian.” Iceland also reports numbers on population ages and other diversity metrics of interest, but it required me to process such data on my own into usable brackets, an extra step solvable by better interfacing, as mentioned above. I found a lack of simplicity in both the interfacing of such data via the web, and the ability to organize it to be digestible for my needs. For instance, I also had to make use of Censusquery.org as a solution to make U.S. city-level census data useable for my study, which adds a layer of third-party interpretation, and therefore doubt, to some of my numbers.

I also ran into walls when trying to determine authorship and publication information for online reports, notices, and other data sources. Moreover, I also ran into more dead links and expired webpages than I cared to track. This non-permanence of websites and lack of transparency of authorship are ongoing problems for online material. As we expect from other primary sources, perhaps each website ought to clearly list author(s) and a date of publishing. Moreover, perhaps cities ought to archive and maintain all websites and documents thereafter with digital object identifiers. In doing research on first-world governments, I should not have to use Waybackmachine to look up dead links. If authors change content of already-published websites, perhaps a statement should reflect the content changed and action date. These all added to a lack of transparency and difficulty in measuring smart city efficacy in my study. These also made it difficult to determine who was doing what, and on what timeline. Overall, these add a layer of interpretation, and therefore doubt to my archival findings.

This problem of actor distinction also presented itself in a different way. Participants and archival documentation both tended to reference *innovation* in a passive manner to refer to unspecific acts. For instance, how did San José reel in its budget while improving services? Well, according to my participants and archival documents, the city innovated. How would Reykjavík achieve green city status? They would innovate. Often frustratingly unclear to me was the who, what, when, and where of innovation. Passive reference made determining how innovation occurs, what it means, and who can do it confusing, requiring interpretation in my analyses. Moreover, it is customary to refer to an organizational body as performing an action—for example, *the City of Toronto innovated*. This caused me much difficulty when determining not only what, but who my findings spoke to.

There was also a lack of conformity between websites operated by national and municipal governments of the same parent state. Websites differed in their layouts between large desktop screens and smaller mobile phones screens. Some pages had social network sharing buttons for Facebook and Twitter, but others did not. Moreover, if governments are digital-first, what does that mean for those who cannot, or will not, embrace digital processes so easily—specifically, the older populations and vulnerable/disabled populations? This is a prime area for additional research and ongoing city-constituent outreach. This is also a reason to retain "reserve" technologies, like paper processes (Edgerton 2007).

Future Research

Sadowski and Bendor (2019) argue there was a logic in how technologists marketed smart city discourse to city stakeholders as a system-as-a-service (SaaS), focusing on city crises and the salvation of smart city tech (Söderström, Paasche, and Klauser 2014; Wiig

2016). Mattern (2021) and Pype (2017) show how technologists' narratives perpetuated through smart city adoption tended to enforce pro-Western, pro-technology, top-down hierarchical organizations in cities (Drew 2020). Furthermore, English-Lueck (2017), Dourish and Bell (2011), and Edgerton (2007) illustrate how technologists' rhetoric plays a crucial role in how people tell histories, practice identities, and form values. Thus, I identified gaps in the anthropological and urban planning literatures I could contribute to. First, I anthropologically studied the smart city phenomenon. Second, contained in the second chapter of this thesis, I authored an article informing urban planners of techno-fetishism—a discourse anthropologists are well-entrenched in and can offer to urban planners.

In the cities I queried, managers sought to actualize smart city efficiencies primarily by enhancing constituent participation and self-service through internet connectivity. After assuring internet connectivity, managers invoked business process automation (BPA) and artificial intelligence (AI) as areas of significant investment. I found that, in practice, senior-level city managers focused heavily on a discourse of innovation developed by technologists. Moreover, I found many of the smart projects and case studies cited by managers pre-dated their smart city announcements (e.g., Better Reykjavík, Data-Driven Inspections for Safer Housing, Waterfront Toronto), calling into question how to verify smart city claims (City of Reykjavík n.d.a; City of San José n.d.g; City of Toronto 2018b). This is one area that would benefit from more study. By understanding actors and definitions better, we can more accurately describe smart cities and what they (and stakeholders) do.

I also found that managers embraced smart initiatives to not only attract attention for diminishing human and financial resources, but to engage in networks of knowledge sharing that amplified the limited human and financial resources of an individual city, positioning city organizations not only as reactionary, but as anticipatory. Managers also formed public-public and public-private coalitions to affect policy negotiation where nations had lagged or failed, and where cities were otherwise too small to negotiate individually. Importantly, I found managers used city smartness as a venue to enable knowledge sharing and networking through coalitions and partnerships, serving to meet city human and financial resource needs for continued delivery of services. This is another area where future research can focus. Understanding what informs the creation and maintenance of smart city coalition networks—why some last, why some fail—is important to understanding smart cities.

While not all city managers invoked *innovation* in the same way, I found a primacy of digital technologies and top-down approaches were typical in smart city language. City managers, by framing smart cities around innovation, risk foregrounding top-down, technologists' narratives of control, and backgrounding local urban knowledge, maintenance primacy, and unsexy solutions to longstanding urban problems. I found technologists' smart city discourse distorted the role and focus of city management away from what it primarily is: business-as-usual maintenance services, corroborating earlier studies (Pype 2017; Mattern 2021). Prompted to opine about plausible scenarios, my participants responded with similar imaginations of technology as either enabling of human needs or eroding a sense of control. Definitions of city smartness remained ambiguous in these cities, apparently both a process and a reachable state.

One thing I did not have the time or scope to investigate was a sort of cyclical nature of innovation-versus-maintenance-bound narratives in history-adjacent disciplines. As Jackson (2014) and Russell and Vinsel (2018) argue, scholars (theoreticians, historians) frequently push back on innovation-centric histories, referencing the absence but importance of maintenance in said histories. Future research ought to consider this ongoing discourse.

City organizations, primarily machines of maintenance, exist in a techno-world wherein the sexiness of innovation markets better to workers cities attempt to recruit, partnerships, and funding opportunities. Technologists' techno-myths help structure the definitions of innovation, also functioning as a means of simplifying complex histories around technologies, authored by specific peoples, enforcing how worldwide audiences tell, understand, and relate through such histories. Technologists, by telling histories with technology as the antecedent, fetishize prestige around vocabularies of technology (Edgerton 2007; Dafoe 2015; Hornborg 2015; English-Lueck 2017). Technologies permeate political borders and national identities. In the cities I queried, I found city managers used smart cities to create city identities around the prestige of high-tech. Managers invoked technology and innovation because it made the city a sexier destination for a worldwide market of laborers and investors. As Edgerton (2007) and others argue, rediscovery, reinvention, imitation, and amnesia became the markers of the history of technologies the world over. Thus, questions remain in how and why managers and technologists use *innovation*.

My study exposes how technologists' rhetoric played a key role in motivating smart city politics, helping to translate the language and politics of high-tech into the language of municipal governance. I show how technologists' language of innovation influenced

management in city government, serving to maintain existing hierarchies of power through top-down, Western-centric, techno-myths. By understanding how senior-level city managers describe and implement smart cities, and by understanding how technologists' structure and sell smart cities, we can see how smart city discourse helps structure managers' municipal imaginations through a primacy of technology. Technologists have a particular discourse of innovation is not entirely compatible with how cities bureaucratically function—one, agile and fleeting, the other, essential and perpetual. Such distinction is important to communicate to scholarly audiences unfamiliar with techno-fetishisms, but familiar with urban management critiques. Moreover, my study opens paths to understanding how private interests influence municipal management through more obscured means. Future research ought to pay close attention to case studies city stakeholders cite, perhaps even chronicling and analyzing such case studies.

Future research could also consider looking at how services and budgets change over time given time for smart cities to mature. For instance, with a dramatic increase in IoT sensors and internet infrastructure, how are municipal digital security needs affected? Do IT security costs eclipse the efficiency gains smart systems promised? Tangential to this would be measurements of financial and human resources—did smartness do anything? Indeed, future studies could also look at what smart city technologies are in place, and what reserve technologies are sticking around and why.

Future research could also look at services themselves, reviewing friction (number of steps) in service encounters; constituency satisfaction, efficiency gains or losses, and marginalized populations—are older constituents having difficulty? Studies could also

include looking at digital UI design for simplicity, transparency, digestibility, and usability by constituents. Certainly, a large area of interest will continue to be data governance and literacy around such programs.

City managers needed to *play* in the social world of technologists, thus such managers needed to learn how to *fit* into that world. Managers adopted technologists' language and titles, such as through the founding of city offices of innovation, information, and technology. Thus, we see how social processes, otherwise unseen, affect urban organizational cultures. Future research should be aware of how technologists problematize crises as things that only technology can solve. Future research should also evaluate how smart city managers can affect actionable, measurable projects for municipal efficiency without falling into a trap of technologists' innovation rhetoric.

City problems are both internal and external in the smart cities I looked at, focusing around internal human and financial resources and external climate and market factors. Thus, it became clear to me that my findings spoke not only to management of internal city talent and monies, but also longer-term strategic visions that plan around city service longevity. Therefore, I felt my findings spoke mostly to senior-level city managers, as they engage both in management of internal resources, and affecting short- and long-term strategic visions.

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