

**Recoding the Citizen-State Relationship:  
Impact of Computational Technology on State Power**

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by

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## **Ronith Ranjan**

### *Recoding the Citizen-State Relationship: Impact of Computational Technology on State Power*

State power adapts to changes in its environment—this environment includes technological development. The modern state consolidates the use of violence, acts as a power instrument, and mediates disputes between citizens. Initially, citizens were treated like subjects without many rights until enlightenment ideals fostered a change. The printing press, a type of technology, facilitated the spread of those ideas by increasing the circulation of books. Previously, books were a luxury item, and there was a limited ability to preserve knowledge and accumulate information. Competition in the printing industry changed the culture of learning, increased scholarship, and engaged citizens in dialogue about the state. The citizen-state relationship will further change with a new development: computational technology.

How will advancements in computational technology impact the relationship between citizen and state? My thesis strives to answer this question by considering the past, present, and future. The task requires an interdisciplinary approach: an understanding of political philosophy, public policy, economics, and even literature. Technology and the state affect all aspects of human life. As a result, readers must be prepared to understand computational technology's effect on the citizen-state relationship through multiple lenses.

Chapter 2 explains how computational power serves the state's operation and expands its capacity. This chapter analyzes the tension between theories related to decentralization and centralization of state power due to computational technology. Chapter 3 focuses on the past by examining two major state projects. The differences in the implementation between smart cities and the US Census Bureau underscore beneficial and concerning uses of computational technology. Chapter 4 moves the thesis to the present, analyzing the decision-making mechanism underpinning bureaucracies and voter choice that have been disrupted by computational technology. And finally, Chapter 5 uses scientific fiction to imagine how technologies will continue to reshape the state in the future.

From this research, I conclude that computational technology has allowed the state to be more involved in citizens' lives; however, how much the state *should* be involved is a question of preference. The chapters of this thesis work together to augment the reader's analysis of changes in citizen-state relations. Others can replicate his chapter-by-chapter approach of using multiple disciplines to understand the emerging innovations that come after computational technology.

## Chapter 1: Introduction

Think about the skilled gardener who meticulously tends his garden. He carefully selects and nurtures each plant and flower. He considers how they might interact with one another, how their water consumption may differ, how the nutrients they consume must be replenished, and what fruits of his labor he might yield. In other words, he tries to create a balanced ecosystem. Every new species introduced, native or not, contributes to the shape of the garden's landscape. The gardener cultivates his garden with a sense of beauty and personal aesthetic. However, the plants and flowers also have their set of genetic plans. Not all of this landscape can be predicted from the initial planning stage. Different parts of the garden ecosystem might interact in unexpected ways. Weeds might appear and compete for water, nutrients, and space resources. The gardener will invest more energy into managing these new interactions to his liking.

In politics, the state finds itself in a similar role to the gardener. Just as the gardener introduces non-native species into the garden, so too does the state introduce computational technologies into the societal ecosystem. Much like introducing a new species can unpredictably alter the dynamics of a garden, the state investment in computational technology can improve and worsen the citizen-state relationship. Like the plants that do not get a voice in the garden's design, citizens often have no choice in the state's decisions about introducing computational technology. This thesis strives to understand how computational technology has changed the interaction between citizens and the state. Some of these changes will be intentional on the part of the state, and others may be less planned.

### ***Technology Spurs Economic Growth and Political Change***

Technology plays an important role in the economic development of a country by creating productivity improvements. Almost 90 percent of economic progress can be attributed to total factor productivity (TFP). TFP describes the portion of an organization's increased output that cannot be explained by increased capital or labor. Instead, technological advances and collected knowledge drive productivity. In particular, General Purpose Technology (GPT) creates ripple effects that profoundly influence all sectors and levels of an economy.<sup>1</sup> For example, computers have been widely adopted at every production level to improve efficiency. Large language models may be the next GPT. In one study, researchers evaluated 1,016 occupations to assess exposure to automation and found that most jobs did some tasks at risk of automation.<sup>2</sup>

While we understand the role of technology in economic growth, less well understood is how technology can bring about changes in political organization. State power adapts to changes in its environment—this environment includes technological development. The modern state consolidates the use of violence, acts as a power instrument, and mediates disputes between citizens. Initially, citizens were treated like subjects without many rights until enlightenment ideals fostered a change. The printing press, a type of technology, facilitated the spread of those ideas by increasing the circulation of books.

The printing press increased the capacity to preserve knowledge and accumulate information. This represented a fundamental break for early modern scholars who no longer needed to spend many tedious hours scribing books. Now that content could be shared in

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<sup>1</sup> Danny Quah, "Technology Dissemination and Economic Growth: Some Lessons for the New Economy," *CEP Discussion Papers*, CEP Discussion Papers, March 2002, 5, 10, <https://ideas.repec.org/p/cep/cepdps/dp0522.html>.

<sup>2</sup> Tyna Eloundou et al., "GPTs Are GPTs: An Early Look at the Labor Market Impact Potential of Large Language Models" (arXiv, August 21, 2023), <https://doi.org/10.48550/arXiv.2303.10130>.

uniform and permanent ways, dissemination of print culture could challenge prevailing norms. The competitive nature of the print industry fostered a public outlet for controversies, which would drive sales and create a scholarly conversation. Print culture brought about changes that transformed Western society at large. While the Gutenberg Revolution initially favored monopolies of knowledge, over time, it contributed to the emergence of public opinion and the spread of Enlightenment ideals.<sup>3</sup>

In this particular case, the state did not actively adopt and invest in the printing press but was still changed by the new technological environment. Now that the state is more involved in using computational technology, we can expect its effects to be more immediate and clear.

### ***Computational Technology Transforms the State's Character***

Computational technology offers an opportunity for states to reorganize how they interact with citizens and determine policies. The state now has a greater ability to peer into the lives of its citizens and expand its operation within its territory. The present-day state knows much more about its citizens than any state of the past. State projects that involve an investment in computational technology gradually increase the state's role without explicitly deriving consent from the governed about a change in operation. The main danger in this state's adoption of computational technology lies in the subtle relationships that change between citizens and the state without the awareness of those being governed.

In Chapter 2, I explain how computational power serves the state's operation and expands its capacity. Through the analysis of two works of political philosophy, this chapter

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<sup>3</sup> Shannon E. Duffy, "Duffy on Eisenstein, 'The Printing Press as an Agent of Change: Communications and Cultural Transformations in Early-Modern Europe' | H-Net," June 2000, <https://networks.h-net.org/node/6873/reviews/7366/duffy-eisenstein-printing-press-agent-change-communications-and-cultural>.

analyzes the tensions between theories related to decentralization and centralization of state power due to computational technology. I establish important definitions for keywords that are at the center of my thesis. After defining those terms, I analyze James Scott's *Seeing Like a State* to demonstrate how high modernist ambitions lead to a centralizing force in the state's use of technology. Agents of the state try to bring utopian plans into reality without regard for the plasticity and autonomy that exist in social life. Balaji Srinivasan's *The Network State* offers a contrasting view on how computational technology will upend state power by decentralizing the tools necessary to form an independent political organization. Srinivasan borrows language from the startup world to establish the feasibility of his views.

In Chapter 3, I focus on two major state projects of the past that involved using computational technology. A case study of "smart cities" reveals dreams for a more expanded role of government that can collect and analyze data continuously and constantly within the urban landscape. A case study of the US Census Bureau demonstrates how the evolution of data collection did not change the scope to which the Bureau has restricted itself. The differences in the implementation between "smart cities" and the US Census Bureau underscore beneficial and concerning uses of computational technology.

In Chapter 4, I re-evaluate the present-day incentives and calculus that underpin the decision-making mechanisms of bureaucracies and voter choice. I introduce the field of public choice and establish how public choice thinks about the state. From there, I show how some of those assumptions change with computational technology and the different behavior. Specifically, I find that the bureaucrat benefits from informational power and the voter incurs even higher opportunity costs. I conclude the chapter by considering how we can use local government to promote competition and better self-sorting.

In Chapter 5, I visit two works of science fiction that present contrasting ways of thinking about our technological future. In *Too Like the Lightning*, fast travel removes the need for the nation-state because everyone moves around freely and has chosen a different form of political organization that involves explicitly agreeing to a contract. In “The Machine Stops,” fast travel around the world has equalized all the locations. All spots on Earth are alike, and people no longer are interested in going beyond their small, individual cells.

These chapters have a temporal ordering that highlights contrasting past projects, current decision-making incentives, and future possibilities with computational technology. Each chapter is self-contained, and readers do not have to read these chapters chronologically.



## Chapter 2: Computational Power, Statecraft, and State Claims

In the 1990s, the US produced 37 percent of the world's semiconductors. In 2022, that number was 12 percent. US firms depend on chips made abroad, which made the supply chain fragile during the COVID-19 pandemic. By the end of the decade, McKinsey projects that the semiconductor industry will be worth \$1 trillion.<sup>4</sup> The Creating Helpful Incentives to Produce Semiconductors and Science Act of 2022 (CHIPS Act) aims to provide funding that supports the development and adoption of emerging technologies within the US. It aims to do so by incentivizing investment in the process of fabricating, assembling, testing, and packaging semiconductors.<sup>5</sup> By directing \$280 billion in spending over 10 years, the CHIPS Act will invigorate research, development, and commercialization of new technologies like quantum computing and AI.

Semiconductors, made of silicon, conduct electricity in such a way that fits the specific needs of electronic components. The semiconductor industry focuses on creating smaller, faster, and cheaper products that can give each chip more power. To do so, chipmakers invest heavily in research and development. In an executive report published by the President's Council of Advisors on Science and Technology (PCAST), the authors underscore the importance of US strength in semiconductor technology as essential to the

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<sup>4</sup> Justin Badlam et al., "The CHIPS and Science Act: What Is It and What Is in It? | McKinsey," October 4, 2022, <https://www.mckinsey.com/industries/public-sector/our-insights/the-chips-and-science-act-heres-whats-in-it>.  
<https://www.mckinsey.com/industries/public-sector/our-insights/the-chips-and-science-act-heres-whats-in-it>. The reader may find it interesting that one of the authors on the McKinsey article (Suhrid Gajendragadkar) is a graduate of the UVA Political & Social Thought Program

<sup>5</sup> Tim [D-OH-13 Rep. Ryan, "H.R.4346 - 117th Congress (2021-2022): Chips and Science Act," legislation, August 9, 2022, 2021-07-01, <https://www.congress.gov/bill/117th-congress/house-bill/4346>.

country's economic and national security interests, especially in the context of pushing back against China's attempt to compete in the market.<sup>6</sup>

The federal government played a major role in supporting the US semiconductor industry from the beginning. Even in the 1940s, when the new, budding industry was still trying to build a market, federal support was crucial to research, development, and adoption of semiconductor-enabled technologies.<sup>7</sup> Advocates for federal support in semiconductors point to the benefits that come from US tech leadership: job creation, economic growth, and stronger national security. But maintaining leadership in semiconductors is about more than that too. While economic benefits offer a good reason alone to support the CHIPS Act, the US seeks to build and maintain a semiconductor industry of its own because it recognizes its own dependence on computational technology to govern its territory and population. The current dependence leaves it vulnerable to other countries that control a larger market share of the semiconductors industry.

Computational power serves the operation of the state, but it also expands state capacity. Computational technologies give the state (a) greater ability to examine the lives of its citizens and (b) a stronger justification to intervene in citizen lives to counter inevitable disruptions that the state sees as a threat to its power. The rate of technological progress allows the state to extract a greater level of detail about a private citizen's life because the costs of doing so have fallen. These new technologies also create disruptions to the way work and social life are organized; the state seeks to use those disruptions as opportunities to intervene for the supposed benefit of its citizens. The relationship between citizens and the

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<sup>6</sup> Craig Mundie and Paul Otellini, "Ensuring U.S. Leadership and Innovation in Semiconductors," whitehouse.gov, January 9, 2017, <https://obamawhitehouse.archives.gov/blog/2017/01/09/ensuring-us-leadership-and-innovation-semiconductors>.

<sup>7</sup> Michaela D Platzer, John F Sargent Jr, and Karen M Sutter, "Semiconductors: U.S. Industry, Global Competition, and Federal Policy," *Global Competition*, October 26, 2020., 35

state evolves with the technology available in a period. In this thesis, I strive to develop a holistic picture of what this evolution looks like in the context of computational technologies.

I seek to understand what a good relationship with computational technologies might look like for the state based on historical examples, analysis of economic incentives, and future imaginings of technological societies. To build the framework of my argument, I want to explore two very different pieces of political work. The first, *Seeing Like A State* by James Scott, was published in 1999 and criticizes the tendency of high modernism— an unrestrained faith in science and technology—exhibited by states. The second, *The Network State* by Balaji Srinivasan, was self-published in 2022 and presents a radical re-imagining of what states can look by harnessing the power of new technologies as well as leveraging startup culture. The argument in this thesis aims to be far-ranging but cannot be comprehensive yet I remain confident that the journey will be fruitful in giving useful insights on how we should think about the past, present, and future changes with respect to computational technologies.

Before we build upon this framework for understanding how state power changes with computational technology, it will be helpful to lay out some definitions for how I use some keywords.

### ***Important Definitions***

The most challenging yet important definition will be that of a “state”. I use the word “state” to describe a particular sort of political association of a group wherein individuals agree to subject themselves to the rules established by some centralized institutions. Max Weber defines the state as a “human community that (successfully) claims the monopoly of

the legitimate use of physical force within a given territory.”<sup>8</sup> The intimacy between state and violence is an important distinction from other forms of association. Charles Tilly notes how states have been the world’s largest and most powerful organization for the past five thousand years. He defines them as “coercion-wielding organizations that are distinct from households and kinship groups and exercise clear priority in some respects over all other organizations within substantial territories.”<sup>9</sup> That priority ensures that state laws overrule any norms and rules established by organizations that reside within the state.

The state can permit other institutions or individuals the use of physical force, but the state maintains that only it can grant the ‘right’ to use violence. Robert Nozick defines states in such: “A state claims a monopoly on deciding who may use force when; it says that only it may decide who may use force and under what conditions; it reserves to itself the sole right to pass on the legitimacy and permissibility of any use of force within its boundaries; furthermore it claims the right to punish all those who violate its claimed monopoly.”<sup>10</sup> I want to emphasize the point of legitimacy here because later arguments will look at how technology changes how we consider legitimacy. Who can try to make a claim to be a state and who eventually gets recognized as a state is linked with the available technology.

The “Montevideo Convention on the Rights and Duties of States” aimed to declare a theory for statehood that could be used for international law. Signed by nineteen states, including the United States, Article 1 of the treaty established that a state required four components: a permanent population, a defined territory, a government, and the capacity to

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<sup>8</sup> Max Weber, “Politics as a Vocation,” in *From Max Weber: Essays in Sociology*, ed. Hans Gerth, Nachdr. d. Ausg. 1958 (New York: Oxford Univ. Pr, 1981), 77–128.

<sup>9</sup> Charles Tilly, *Coercion, Capital, and European States, AD 990 - 1992*, 27. pr.; rev. paperback ed, *Studies in Social Discontinuity* (Cambridge, Mass.: Blackwell, 2015), 1.

<sup>10</sup> Robert Nozick, *Anarchy, State, and Utopia* (New York: Basic Books, a member of the Perseus Books Group, 2013), 41-42.

enter into relations with other States.<sup>11</sup> The state functions as a corporation to the extent that it is separate from the people that comprise it; it holds rights, duties, power, and liabilities that cannot be reducible or definable to a natural person.<sup>12</sup> But unlike other types of corporations (nonprofit, LLCs, Universities, and even townships), the state is a supreme entity that cannot be embodied into another organization. As hinted by the Weber and Montevideo Convention definition, a person would be considered to belong to a state if they live within the borders; by merely being present within the territory, the state exercises authority over them.

Permanence separates a “state” from “government”. Whereas a state maintains authority over its territory and continues to redistribute resources, governments constantly change with each election bringing a new slate of representatives. Additionally, a state can contain many different governments. For example, a 2017 Census of Governments showed one federal government, fifty state governments, and 90,075 local governments in the United States.<sup>13</sup> Governments administer the state by having a person or group hold authority over matters of public concerns. This would include the provision of public goods (like national defense) and administration of justice.<sup>14</sup> Government is vested with the authority to make and enforce laws and decisions on behalf of the state.

Another important word to define will be power. I largely rely on Weber here. “By ‘power’ we mean very generally the chances which a man or a group of men have to realize

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<sup>11</sup> “Convention on Rights and Duties of States Adopted by the Seventh International Conference of American States,” 3802 § (1933), <https://treaties.un.org/pages/showdetails.aspx?objid=0800000280166aef>. 25

<sup>12</sup> Chandran Kukathas, “A Definition of the State,” *University of Queensland Law Journal* 33, no. 2 (January 1, 2014): 361.

<sup>13</sup> US Census Bureau, “2017 Census of Governments – Organization,” Census.gov, accessed December 22, 2023, <https://www.census.gov/data/tables/2017/econ/gus/2017-governments.html>.

<sup>14</sup> Kukathas, “A Definition of the State.”, 361.

their will in a communal activity, even against the opposition of others taking part in it.”<sup>15</sup> In any group, not all the individuals possess the same level of power—the ability to influence decisions. While governments have changed form and some states have perished and some reborn, the state has remained the most powerful organization since its creation. We are interested in power to the extent that technology changes how states will compete for power against one another and grow their own domestic influence.

The final term I will define is “computational technology.” Computational technology refers to the set of tools and systems that store, retrieve, and process data using electronic devices. It includes the hardware component, like processors and storage devices and software programs, which consist of sequences of instructions for the computer to execute. Computational technology employs quick mathematical calculations to solve difficult problems. Devices falling under this category span across a wide spectrum that include computers (laptops, smartphones, tablets, web servers, etc) and a number of fields of studies (algorithms, artificial intelligence, blockchain, etc).

These definitions serve to describe the core elements at play in this thesis. A slight deviation from them will not change the larger argument. The field of technology is relatively new and is constantly changing in categorization as emerging technologies continue to be developed.

### ***Statecraft and the Constant Legibility Project***

In *Seeing Like A State*, James Scott criticizes the tendency of high-modernism that leads to large, rigid, and incomplete state projects. These projects emerge from, as Scott sees it, the central purpose of statecraft—legibility. The state aims to make its society legible, “to

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<sup>15</sup> Max Weber, *Max Weber: Selections in Translation*, ed. W. G. Runciman, Reprinted (Cambridge: Cambridge Univ. Press, 1995), 43.

arrange the population in ways that simplified the classic state functions of taxation, conscription, and prevention of rebellion.”<sup>16</sup> The premodern state knew little about its subjects or what their wealth might look like or where they might live. The lack of a detailed map limited the extent of any possible state intervention. To combat their blindness, the state created tools and units of measurements like cadastral maps, standardized weights, permanent last names, standardized language, organized transportation, and designed cities. The process allowed states to acquire greater knowledge about their terrain and the people who lived within it. State intervention went from crude and approximate to more refined and exacting.

But this process simplified much, and state projects often captured only what interested the “observer’s eyes.” Time after time again, state officials took complex, local social practices and reduced them to a set of simplistic principles that could not fully account for the reality that inhabitants encounter. Scott provides examples ranging from scientific forestry to planned cities to Soviet collectivization to compulsory villagization in Tanzania to practices in agriculture. Scott emphasizes that simplified rules can never generate a fully functioning city, economy, or even forest because rules interfere with the informal processes that allow those systems to thrive.<sup>17</sup> In the pursuit of maximizing total “lumber”, a natural resource that can be measured, collected, and sold, the chaotic habitat of a forest is replaced by regimented rows of trees that are more easily assessed and controlled. In the process, greater efficiency and organization allow increased production but the underlying processes within nature that come from a diversity of plants becomes lost.

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<sup>16</sup> James C. Scott, *Seeing like a State: How Certain Schemes to Improve the Human Condition Have Failed*, Veritas paperback edition, Yale Agrarian Studies (New Haven, CT London: Yale University Press, 2020). p. 2

<sup>17</sup> Scott. p. 310

Instead, we should give greater importance to *mētis*, a Greek term that refers to the range of practical skills and intelligence one acquires from responding to a constantly changing environment. *Mētis* values the person who has gained experiences from a range of situations that are similar but never identical over scientific knowledge and standardized formulas. As Scott explains with a visual and compelling example, “if your life depended on your ship coming through rough weather, you would surely prefer a successful captain with long experience to, say, a brilliant physicist who had analyzed the natural laws of sailing but who had never actually sailed a vessel.”<sup>18</sup>

For the purposes of this thesis, Scott’s reasoning for why the state pursues legibility projects hold important implications for how computational technology changes state power. *Mētis* remains relevant to this thesis to the extent that politics tends to prize skills and experiences that come only from engaging in the activity of politics, not all of which can be taught in the classroom. But what is more relevant here is that computational technology tends to worsen the dangerous tendencies of high modernism. High modernism places a faith on the abilities of scientific and technical progress to expand production, satisfy growing human needs, and master nature.<sup>19</sup> In Scott’s words, it goes beyond the proper legitimacy of science and technology into an ideology that is uncritical and unskeptical about the possibilities of comprehensive planning and production. High modernist faith can be found on both sides of the political spectrum where state officials seek to “use state power to bring about huge, utopian changes in people’s work habits, living patterns, moral conduct, and worldview.”<sup>20</sup>

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<sup>18</sup> Scott, p. 314

<sup>19</sup> Scott, p. 4

<sup>20</sup> Scott, *Seeing like a State*, p. 5



Computational technologies more than fit the bill for the state officials with grand plans. They bring about a radical shift in state capacity to redraw the operations of government and rewrite the day-to-day lives of citizens. Where once the premodern state hardly knew the names of all its citizens, the present-day state not only has a detailed map of everyone's name and where they live, but also conducts mass surveillance on its citizens to know the minutiae of everyday life.<sup>21</sup> Where the premodern state operated with a low-level of knowledge about its citizens and territory that was sufficient to keep general order, levy taxes, and raise armies, the modern state holds greater aspirations of making the physical and human resources within the nation more productive; an inventory of the current people, incomes, and resources is a starting point for any ambition.<sup>22</sup> Without a change in constitution or law, computation power drastically increases the state's capacity, allowing it to pursue a larger number of broad goals.

By both decreasing the cost of knowing more about its citizens and giving greater confidence that enough knowledge can be created, computational technology allows the state to dream of a nation where there is greater ability to fulfill and adhere to utopian plans. Legibility acts as a prerequisite for manipulation. Large undertakings—taxing people's income and property, vaccinating a population, mobilizing labor, pursuing literacy campaigns, enlisting soldiers, catching criminals, enrolling all students in universal schooling—start with the creation of units that render the relevant variables visible. Then only can the state hope to identify, observe, record, and intervene—the greater the depth of the intervention, the greater the degree of knowledge necessary, and the more intrusive it will

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<sup>21</sup> Ewen MacAskill et al., "NSA Files Decoded: Edward Snowden's Surveillance Revelations Explained," the Guardian, November 1, 2013, <http://www.theguardian.com/world/interactive/2013/nov/01/snowden-nsa-files-surveillance-revelations-decoded>.

<sup>22</sup> Scott, *Seeing like a State*. p. 51

become.<sup>23</sup> For Scott, control and appropriation animate state and large-scale bureaucratic capitalism. Such ambitions require the ability to see and manipulate from the center rather than allow local knowledge to operate autonomously on the peripheries.<sup>24</sup>

Computational technologies participate in what is an ongoing process by which states create a sense of nationhood. “The builders of the modern nation-state do not merely describe, observe, and map; they strive to shape a people and landscape that will fit the techniques of observation.”<sup>25</sup> The pursuit of making a perfectly legible population entails registering names and addresses, documenting interactions citizens make with government, identifying the occupations of individuals, and teaching an official language. Whereas Scott calls this pursuit “largely a project of internal colonization,” I see these issues as practical necessities for creating a cohesive nation-state that can respond to external threats and internal demands. Compute power lends the state a greater capacity and ability to render a legible society that organizes itself to meet these challenges. The concerns for computational technology emerge when they lend themselves to a more transformative vision that completely rearranges society to conform to state ambitions without explicit consent from its citizens.

High modernism, with its over confidence about scientific and technical progress, gives state officials faith that they can pursue large, social engineering projects by comprehensively accounting for all the relevant factors. A determined authoritarian state acts on that faith to try to enact their utopian visions without regard for public opinion. Scott recognizes that this tends to occur when the authoritarian state uses emergency

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<sup>23</sup> Scott, p. 183

<sup>24</sup> Scott, p. 335-336

<sup>25</sup> Scott, p. 82

conditions—like war, revolution, or depression—to enact its high-modernist designs.<sup>26</sup> It tends to give rise to individuals who reject the past and hope to put their revolutionary designs into action by redirecting the anger of those who are disaffected.

Utopian aspirations in themselves are not dangerous and can act as a useful exercise to compare costs and values in determining what we should have in society. Utopian aspirations become dangerous when those who hold state power act towards those aspirations without any commitment to the rights possessed by individuals. They become especially potent when civil society cannot offer a resistance or give voice to alternative aspirations.<sup>27</sup> This in itself is not an argument against states. In Scott's own words, "The state, as I make abundantly clear, is the vexed institution that is the ground of both our freedoms and our unfreedoms. My case is that certain kinds of states, driven by utopian plans and an authoritarian disregard for the values, desires, and objections of their subjects, are indeed a mortal threat to human well-being. Short of that draconian but all too common situation, we are left to weigh judiciously the benefits of certain state interventions against their costs."<sup>28</sup> The task that is left for us to decide is how computational technologies fit into the existing relationship of state and citizen as well as how it changes that relationship.

The relationships of state and citizen begins with state officials "viewing" their society from the "center." They seek to build a synoptic view from their place of operation, usually the nation's capital. This privileged position of view exists in all institutional settings that require command and control of complex human activities; the factory floor, the barracks, and the university often mimic the information structure of the state.<sup>29</sup> Even when

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<sup>26</sup> Scott, p. 5

<sup>27</sup> Scott, p. 89

<sup>28</sup> Scott, p. 7

<sup>29</sup> Scott, p. 79

these legibility projects and utopian aspirations claim to pursue genuine egalitarianism, it is surprising “how little confidence they repose in the skills, intelligence, and experiences of ordinary people.”<sup>30</sup> Under such conditions, illegibility functions as a cloak from the outsider’s viewpoints that create political autonomy.<sup>31</sup> Just like a tourist may come to rely on local guides to navigate a city (or more likely consult online resources and maps), the state official residing in the capital would need a native to understand the local environment.

Example after example, Scott shows that the utopian goals of the modern states fail through the simplification they make. In trying to reduce the chaotic and constantly changing environment into something more structured and observable, the state supplants the multiple sources of inventions and change that naturally occur within society with a single planning authority; the state removes the plasticity and autonomy that exist in social life for something much more fixed.<sup>32</sup> “The troubling feature of high modernism derives, for the most part, from its claim to speak about the improvement of the human condition with the authority of scientific knowledge and its tendency to disallow other competing sources of judgment.”<sup>33</sup> The state’s tendency to subvert the dissimilar and opposing viewpoints from within its society undermine its utopian aspirations. It reminds me of another author who understood the cost of states pursuing utopian vision: Robert Nozick.

In *Anarchy, State, and Utopia*, Robert Nozick argues that a legitimate state is only the one that is minimally limited to the provision of security, protection of property, and enforcement of contracts. He wants each person to have the moral right to act freely insofar as it does not violate the equal rights of someone else. The coercive state cannot have goals

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<sup>30</sup> Scott. p. 346

<sup>31</sup> Scott. p. 54

<sup>32</sup> Scott. p. 82, 93

<sup>33</sup> Scott. p. 93

that go beyond the protection of individual freedom. Nozick believes that individuals who possess three traits—rationality, free will, and moral agency—deserve the dignity and moral right to form long-term plans for their own life. This ability to make decisions in accordance with some overall conception of life in mind is what gives life meaning. “A person’s shaping his life in accordance with some overall plan is his way of giving meaning to his life; only a being with the capacity to do so shape his life can have or strive for meaningful life.”<sup>34</sup> It is then the duty of the state to offer its citizens the ability to strive for a meaningful life on their terms to the extent that it does not interfere with the freedom of others.

Nozick’s argument leads to two relevant conclusions for this thesis. The first is that people who are economically well-off will desire greater political power to give themselves more entrenched economic benefits. A more powerful state which acts as a locus of power will be a coveted instrument for those seeking to improve their economic interests. The goal must then be to reduce the chances of takeover or manipulation of the state by creating a state with the minimally necessary powers because it becomes a less valuable prize and less alluring target.<sup>35</sup> The second relevant conclusion is that utopia is a framework for utopias where people are at liberty to join together voluntarily to pursue and attempt to realize their own vision of the good life.<sup>36</sup> Given a society which contains a diversity of people with different temperaments, talents, interests, intellectual abilities, aspirations, and conceptions of life, there cannot be one community that will serve as ideal for all people.<sup>37</sup>

States neglect these two Nozickian conclusions to the detriment of their citizens and the eventual failure of their projects. For the first conclusion, the project of legibility brings

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<sup>34</sup> Nozick, *Anarchy, State, and Utopia*. p. 50

<sup>35</sup> Nozick. p. 272

<sup>36</sup> Nozick. p. 312

<sup>37</sup> Nozick. p. 306, 309-310

more control to the central government who spends resources on building maps, databases, and other tools to see its population and territory. Legibility is a precondition to the pursuit of any social engineering project. Computational technology makes these existing tools and new tools more capable in their ability to see and process the environment. Control of the state becomes a more coveted prize for those with the sufficient economic means. As for the second conclusion, the subject of interest for the state is seen as abstract and possessing uniform interests. As a matter of practical necessity, the state plans for generic subjects and tries to boil down their needs into measurable units like minimum square feet of housing space or liters of clean water or units of transportation or pounds of food. “Standardized citizens were uniform in their needs and even interchangeable...for the purposes of the planning exercise, [subjects possessed] no gender, no tastes, no history, no values, no opinions or original ideas, no traditions, and no distinctive personalities to contribute to the enterprise.”<sup>38</sup> In short, the state removes all the particularities and personal attributes of the subjects it claims to act on behalf of.

I disagree with Scott on his assessments of markets. For Scott, capital markets are just as complicit as states in promoting homogenization, uniformity, and heroic simplifications because the “market necessarily reduces quality to quantity via the price mechanism and promotes standardization.”<sup>39</sup> I do not think Scott engaged deeply enough with the nature of markets and how they provide a more adaptable and responsive mechanism than state control can. When a sufficient need for a product arises, experimentation and innovation allow entrepreneurs to bring them to market and create value for others. The market does act

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<sup>38</sup> Scott, *Seeing like a State*. p. 346

<sup>39</sup> Scott. p. 8

ruthlessly in the name of efficiency, but it also creates opportunities for individuals to build and act on their knowledge of particular problems and their contexts.

Still, Scott offers useful insights for understanding how the state's project toward legibility informs their planning. It helps us see that computational technology improves their ability to make society legible as well as expands how far and deep the information they collect on individuals spans.

### ***The Network State***

In *The Network State*, Balaji Srinivasan offers a drastically contrasting view on what computational technology will do to state power. He sees a likely (and better) future in which the state gets sidelined by a new Leviathan: the Network. In his “bookapp,” an online and shareable medium with hyperlinks, Srinivasan argues that the internet and blockchain-related technologies will bring about new means of organizing people digitally first and then organizing them in the physical world second. It is an argument that centers the power of the digital world to reshape how we connect online to then organize with one another in the real world in ways that were not technologically feasible in the past.<sup>40</sup>

A quick background on Srinivasan's educational and work experience will prove helpful. Balaji Srinivasan earned his BS, MS, and PhD in Electrical Engineering from Stanford University (along with an MS in Chemical Engineering). He founded a health technology company that offers DNA screening, Counsyl, that sold for \$375 million.<sup>41</sup> He then joined as a General Partner at venture capital firm Andreessen Horowitz, started Earn.com in the cryptocurrency space, and became CTO of Coinbase when Earn.com was

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<sup>40</sup> Balaji Srinivasan, *The Network State: How To Start a New Country* (Amazon Kindle, 2022).

<sup>41</sup> Clinical OMICs Staff Writer, “Myriad to Acquire Counsyl for \$375M, Raising Presence in Women's Health,” Inside Precision Medicine, May 29, 2018, <https://www.insideprecisionmedicine.com/news-and-features/myriad-to-acquire-counsyl-for-375m-raising-presence-in-womens-health/>.

acquired.<sup>42</sup> It is an impressive background that puts him at the center of the tech industry and shows the vast experience he has accumulated in how startups work. On the surface, Srinivasan's background may lead you to think his argument suffers from techno-optimism, but Srinivasan roots his argument in historical trajectories and observations about how we have already changed the way we interact with one another.

Only coming into form in relatively recent human history, the state exists as a political association in which citizens delegate their absolute rights of violence and through which people seek to exercise power over individuals and groups. Its durability thus far may be a product of chance, and its future need not be definitive. Srinivasan paints a picture of how this political association evolves with the advent of new technologies that decentralize power away from the existing state. The book offers a trove of useful ideas and insights, but still does not resolve all the tensions and compromises that exist in making a society last.

Here is the premise: technology has changed the political landscape and we now have better ways of organizing ourselves. When we picture a nation, we think of the land first but we should really be focused on the people. Thus far, states have been physically centralized and then politically organized. But the internet changes that. People across the world can be connected online and remain geographically decentralized. This means that every person now has the capacity to start whole new communities with their single laptop, similar to how Mark Zuckerberg connected billions of people with Facebook with his laptop. "Continents, once discovered, don't tend to move on you, but the internet brings us back to the time of Pangaea—millions of nodes can disconnect and reconnect elsewhere all at once should they see fit, and new supercontinents of 100M+ connected users like TikTok can just arise out of

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<sup>42</sup> Brian Armstrong, "Welcome Balaji Srinivasan, Coinbase's New Chief Technology Officer," April 16, 2018, <https://www.coinbase.com/blog/welcome-balaji-srinivasan-coinbases-new-chief-technology-officer>.



nowhere.”<sup>43</sup> Can the concept of online communities be extended to political associations? The goal is to open up the possibility of creating new alternatives and letting people join, leave, and rejoin as they see fit. A successful network state would be one that can retain its current members and attract “immigrants” who align with their particular mission, whatever its chosen metrics may be.<sup>44</sup>

Srinivasan borrows ideas from the tech industry to theorize how we could create a new state. Similar to how a motivated group of founders can take a startup from birth to a billion dollar valuation, Srinivasan sees a path for a startup society to become a network state by building on existing computational technology. First, a group can form as an online community with aspirations of something greater. It can then organize itself to coordinate the actions of its members for the benefit of the group. It would eventually meet in-person and build trust offline. It would create a crypto economy, crowdfund physical nodes so that digital citizens can live together in the physical world, connect those physical communities digitally, and eventually, gain diplomatic recognition from pre-existing states with sufficient scale. All of this effort leads to a network state.<sup>45</sup>

According to Srinivasan, a network state offers a necessary alternative to the six traditional ways of creating a new country—election, revolution, war, micronations, seasteading, space. These paths are too crowded, too violent, too infrequent, too isolated, too unscalable, and too technically infeasible. By letting people start with a digital community, network states allow people to go “cloud first, land last.” Now, people can expand in more directions than just north, south, east, and west so that people can find others who agree with their mission regardless of where they may live. Whereas a typical state requires that millions

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<sup>43</sup> Srinivasan, *The Network State*, 242.

<sup>44</sup> Srinivasan, *The Network State*, 9-10.

<sup>45</sup> Srinivasan, 9-12.

of people live in a centralized territory, even though they may sharply diverge in political preferences, a network state allows people to come together who agree ideologically but are geographically decentralized. The other appeal of a network state is allowing people to build from a fresh start so that history does not constrain the possible.<sup>46</sup>

A startup society puts community culture first and technological innovation second. Building a community requires exploring the past for ideas on how to organize and motivate people. There are no definite laws of humanity to understand the trajectory of history. Unlike a rock flung in the air whose trajectory can be precisely mapped with physics, humans eschew objective study because they are interested in how they are portrayed and retain their own agency when interacting with one another. History, as the entire record of humanity, offers a rich source of inspiration. Srinivasan recognizes that every retelling of history is inevitably just an abridged and edited story because that is the only way to convey 5000 years of written records.<sup>47</sup>

Letting people study history and form their own startup societies turns history into an applied subject. “You are listening with intent to repeat.”<sup>48</sup> Building a new society requires looking into how countries were built in the past, what challenges they faced over time, and what might be changed to build a better society. A new startup society needs its own moral code that emerges from its founders’ own study of history; it needs a moral innovation that differentiates it from other societies.<sup>49</sup> “New countries begin with new stories.”<sup>50</sup> As a society, will you practice veganism? Will you aim to maximize life expectancy? Will you pursue

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<sup>46</sup> Srinivasan, 12-15.

<sup>47</sup> Srinivasan, 19–20, 29, 46, 159.

<sup>48</sup> Srinivasan, 200.

<sup>49</sup> Srinivasan, 27.

<sup>50</sup> Srinivasan, 93.

income distribution policies to equalize everyone? The story acts as the guiding vision for what the future state will stand for.

Srinivasan doubts the ability of legacy states to adapt to the new technological age. They are too invested in propagating their own (old, outdated) story to confront reality. He recognizes the Orwellian notion that whoever controls the past controls the future, and whoever controls the present controls the past. The winners write the history textbooks, telling the story of an inevitable triumph of the ruling establishment over its past enemies.<sup>51</sup> On this point, James Scott agrees. “After seizing state power, the victors have a powerful interest in moving the revolution out of the streets and into the museums and schoolbooks as quickly as possible, lest the people decide to repeat the experience. A schematic account highlighting the decisiveness of a handful of leaders reinforces their legitimacy; its emphasis on cohesion, uniformity, and central purpose makes it seem inevitable and therefore, it is to be hoped, permanent.”<sup>52</sup> The key point here is that all states, ranging the spectrum from China to the US, engage in this.

Both the US and China, for all their proclamations of how different they are, engage in similar political practices. “In the East it’s official government censorship, whereas in the West it’s unofficial private censorship, but that’s not a substantive difference.”<sup>53</sup> Digital history, as it exists currently, can be easily deleted and manipulated. Sufficient pressure on centralized social media companies will lead to censoring content in the name of “disinformation” or that AI has allowed realistic fakes to distort perceptions.<sup>54</sup> On this point, it is easy to agree with Srinivasan about the risks of allowing state overreach. State officials

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<sup>51</sup> Srinivasan, 22.

<sup>52</sup> Scott, *Seeing like a State*, 160.

<sup>53</sup> Srinivasan, *The Network State*, 58.

<sup>54</sup> Srinivasan, 33, 41.

will always make a strong claim that to prevent something bad from happening, they need to use state force to prevent it with laws that increase their oversight. While many laws are productive and useful, it will be hard to understand the true effects of any particular legislation since politicians may not do the proper diligence nor have the proper expert knowledge. There are epistemic barriers to knowing the policy preferences of a whole nation, and these laws affect millions of citizens that have “an extremely slow customer feedback cycle and few ways to truly opt out.”<sup>55</sup>

For Srinivasan, the solution is two-fold: reopen the frontier and use technology as a check on the state. Fredrick Jackson Turner gave an influential talk in 1893 where he spoke about the significance of the Western frontier as a place of “perennial rebirth” that gave new opportunities to ambitious men. The frontier produced individualism as pioneers, settlers, and entrepreneurs used the land for their own experimentation.<sup>56</sup> The “internet frontier” reopens that space “to morally innovate without affecting those who don’t consent to the experiment.”<sup>57</sup> Technology also increases the cost of state coercion. Encryption prevents governments from scaling their coercion operations because each user holds the private key to their cryptocurrencies and it would be much harder for governments to identify all their targets, find their offline locations, send agents to extract their crypto wallets than to go to a centralized bank and seize all the targets’ assets. Furthermore, a public blockchain would create a cryptographically verified history of a community such that anyone could download the files and create their own analysis of the past without worry about distortions.<sup>58</sup>

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<sup>55</sup> Srinivasan, 41.

<sup>56</sup> Frederick J Turner, “The Significance of the Frontier in American History (1893),” American Historical Association, 1893, [https://www.historians.org/about-aha-and-membership/aha-history-and-archives/historical-archives/the-significance-of-the-frontier-in-american-history-\(1893\)](https://www.historians.org/about-aha-and-membership/aha-history-and-archives/historical-archives/the-significance-of-the-frontier-in-american-history-(1893)).

<sup>57</sup> Srinivasan, *The Network State*, 104.

<sup>58</sup> Srinivasan, 38, 52.

While I find Srinivasan's ideas insightful for thinking about technology as a way to protect the relationship between citizens and state, I remain unconvinced that startup societies are scalable. For one, the alignment of political preferences will at most be a temporary situation. When a person joins a startup society, they may agree 100 percent with the mission of the group but find themselves alienated as the organization ages. People do not remain static throughout life, and they change in unpredictable ways. Srinivasan believes that each person would be free to exit to another organization, but each organization would be incentivized to create "skin in the game" by making it difficult for individuals to leave. When a person leaves, they take with them the land they own and the wealth they have accumulated. That exit poses a threat for the organization that limits how easily they could leave. When dealing with companies in the marketplace, employees desire protection from the state that allows them to move to another organization. Creating a stable community requires deep commitments where citizens should feel an obligation to contribute and participate because there are few to no other alternatives. A decentralized network that can have people opt in and out as easily as it is to subscribe and unsubscribe leaves too much uncertainty about the relationships within the community. Connected to this issue of exit is the larger problem of how states use force.

As discussed in an earlier section of this chapter, nearly all definitions of a "state" require a monopoly on the use of legitimate force. Srinivisan thinks that startup societies can become a network state without starting with this monopoly. Consider how he answers the question of a startup society dealing with physical criminals. "The short answer is that for a long time, it doesn't—it leaves that to the surrounding legacy society, much like a centralized crypto exchange collaborates with traditional offline law enforcement."<sup>59</sup> When it becomes a

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<sup>59</sup> Srinivasan, 226.

network state and gains diplomatic recognition from a legacy sovereign, it can then claim the use of force. I am doubtful that legacy states would agree to such an arrangement, explicitly or implicitly. Without an incentive for letting the startup societies continue to exist, legacy states would be better off pushing criminals towards the startup societies as a way to offload the costs of dealing with them. But in dealing with criminals, startup societies must be careful to not overstep or convict an innocent person lest they incur the wrath of the legacy state to which the person belongs to. Yet again, Robert Nozick comes to mind when considering how a weaker and stronger party resolves disputes about guilt and punishment with regards to the violation of their citizens' rights.

I was surprised that Srinivsan never mentioned Nozick in *The Network State*. Nozick starts with the principle that individuals have rights to understand the question of what states may do. "What persons may and may not do to one another limits what they may do through the apparatus of a state, or do to establish such an apparatus."<sup>60</sup> Nozick develops his own state of nature theory where he shows that a monopoly on the use of force will emerge, as market pressures incentivize people to join mutual protection associations, without violating any individual's rights. The key point for when an association becomes a state is when it has a monopoly on force and provides services to non-clients within its area of influence. It is in the vested interest of the state to prevent other organizations from challenging their monopoly on force, even when they claim they wish to live separately and independently. Without that claim to force, no organization could make a claim to sovereignty.

From Nozick, the solution is allowing people to live in a "wide and diverse range of communities which people can enter if they are admitted, leave if they wish to, shape according to their wishes; a society in which utopian experimentation can be tried, different

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<sup>60</sup> Nozick, *Anarchy, State, and Utopia*, 27.

styles of life can be lived, and alternative visions of the good can be individually or jointly pursued.”<sup>61</sup> Nozick presents a framework for utopia where the complexity of people—with their many desires, aspirations, impulses, and talents—can coordinate their actions as they see fit. This sense of utopia fits with what Srinivasan wants to see. “Some communities will be abandoned, others will struggle along, others will split, others will flourish, gain members, and be duplicated elsewhere. Each community must win and hold the voluntary adherence of its members.”<sup>62</sup> But all of these pursuits towards community must fall under the umbrella of a singular state. A minimal state respects the dignity of each citizen and lets them experiment within its territory, but still, it never relinquishes its monopoly on force.

### ***Scott, Srinivasan, and State Power***

*Seeing Like A State* and *The Network State* offer opposing views on computational technologies' effects. The former sees computational technology as strengthening state capacity. Never before has the state known so much about who its citizens are, their spending habits, where they spend their time, and countless other facts that we leave in our digital trails. The latter sees a new set of technologies that will give rise to new legitimacy in political organizations: the startup society is trying to become a network state. This new technology will create a space away from the state's prying eyes. A private transaction between two individuals using cryptocurrencies protects them with anonymity, eliminates false transactions with mathematical confirmation, and prevents that state from easily seizing assets like they can with a centralized bank.

While these competing forces will continue to shape technology development, I lean toward Scott's use of the legibility project to analyze past, present, and future developments

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<sup>61</sup> Nozick, 307.

<sup>62</sup> Nozick, 316.

of computational technology. As it exists now, computational power serves the state's operation and expands state capacity. Startup societies ask too little of their citizens and leave the organization vulnerable without clear mechanisms for enforcement that do not rely on the power of an existing state.

The next chapter looks at historical examples that demonstrate the interest states have taken in computational technology to further state officials' goals.



### Chapter 3: Past State Projects and Computational Technology

The previous chapter demonstrated the two contrasting types of computational technologies: centralizing and decentralizing. The historical development of computational technology thus far has favored the former, strengthening the hand of the state and providing it with a more detailed picture of a citizen's daily life within its border. This chapter explores the initiatives taken in the last two decades as the current generation of computational technology has lent itself well to the centralizing tendency of the state.

#### *Smart Cities: Using Technology to Watch the City Dwellers*

Cities bring people together, with their diverse communities living and working near one another. Over half of the population worldwide resides in urban areas, and the UN projects that 70% of the world population will do so by 2050.<sup>63</sup> Populations tend to urbanize as they get richer. Currently, in high-income countries, 80 percent of the population lives in urban areas. Urban populations are linked to have higher living standards than rural areas because of greater access to electricity, improved sanitation, and better job opportunities.<sup>64</sup> The median economic growth rate for urban counties is 1.70 percent while it is 1.18 percent for rural counties. The clustering and proximity of firms and consumers drive greater productivity and reduce costs, giving urban areas an advantage over rural areas.<sup>65</sup> The young and ambitious, like college graduates, seek out cities as places they want to work in. New

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<sup>63</sup> United Nations Department of Economic and Social Affairs., “The Sustainable Development Goals Report 2023: Special Edition | DESA Publications,” July 10, 2023, <https://desapublications.un.org/publications/sustainable-development-goals-report-2023-special-edition>.

<sup>64</sup> Hannah Ritchie, Veronika Samborska, and Max Roser, “Urbanization,” *Our World in Data*, February 23, 2024, <https://ourworldindata.org/urbanization>.

<sup>65</sup> Charles S. Gascon and Brian Reinbold, “Industry Mix May Help Explain Urban-Rural Divide in Economic Growth | St. Louis Fed,” accessed March 17, 2024, <https://www.stlouisfed.org/publications/regional-economist/second-quarter-2019/urban-rural-divide-economic-growth>.

York City saw almost seven times as many job applications in 2023 as it did in 2019.<sup>66</sup> Cities offer a diverse amount of culture and entertainment. City dwellers can choose to spend their time at museums, art galleries, theater productions, late-night food, and more.

But cities face their own set of problems. With a large number of people living so densely in a relatively small space, issues like crime, traffic, pollution, and inadequate housing supply put stress on the environment. Cities provide services like parks and recreation, public transportation, emergency services, and public works. Cities, which tend to be in low-elevation coastal regions because of water access to ships, are especially vulnerable to climate change. Among cities that have 300,000 residents or more, 60 percent are at high risk of exposure to some sort of natural disaster ranging from droughts to floods to earthquakes.<sup>67</sup> City officials are looking to technology to alleviate the strain on their system.

Urban planners, tech-focused businesses, and governments put their faith in technology to revolutionize the way cities are built and managed in an all-encompassing vision: the smart city. Smart cities, broadly defined, use data- and digital-based technology to connect different parts of city infrastructure to collect, monitor, and analyze the habits and patterns of city residents. While dimensions for what constitutes a smart city vary, common characteristics include (1) a networked infrastructure to enable development, (2) an emphasis on business-led urban development, (3) the social inclusion of urban residents, and (4) a strategic focus on the natural environment.<sup>68</sup> Anthony Townsend best describes the value and appeal of smart cities in his book *Smart Cities: Big Data, Civic Hackers, and the Quest for a*

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<sup>66</sup> Handshake Insights, "Where Are College Students Going after They Graduate?," Handshake, accessed March 16, 2024, <https://joinhandshake.com/blog/employers/where-are-college-students-going-after-they-graduate/>.

<sup>67</sup> United Nations, Department of Economic and Social Affairs, Population Division, "World Urbanization Prospects The 2018 Revision," 2019, 4.

<sup>68</sup> Vito Albino, Umberto Berardi, and Rosa Maria Dangelico, "Smart Cities: Definitions, Dimensions, Performance, and Initiatives," *Journal of Urban Technology* 22, no. 1 (January 2, 2015): 13, <https://doi.org/10.1080/10630732.2014.942092>.

*New Utopia*. “Aerial photography showed us only the muscular and skeletal structure of the city. Examining smart cities’ sensors will reveal their circulatory and nervous systems. For the first time, we will see cities as a whole the way biologists see an organism—instantaneously and in excruciating detail, but also alive.”<sup>69</sup> By equipping the city's infrastructure with new technology, city planners will get a constantly updated picture of what is going on in the city.

Computational technology reduces the physical cost of gathering information on usage patterns. Embedded smart technologies enable shorter planning cycles and quicker response to volatile demand on the system. Optimistic projections show that smart city technologies can reduce fatalities by up to ten percent, improve emergency response time by up to thirty-five percent, shorten commute time by up to fifteen percent, reduce water consumption by up to thirty percent, and lower greenhouse gas emissions by fifteen percent.<sup>70</sup> Facing pressure to provide some quick solutions to city issues, city officials eagerly adopt smart city technologies to improve health and safety outcomes.

This vision for a smart city is no longer abstract. Originally started in 2008, Songdo, a city in South Korea, was an earlier contender for the future model of what a smart city should look like. RFID technology is used for crime prevention. An Automatic Number Plate Recognition system collects license plate numbers to check for wanted vehicles. CCTV uses advanced motion detection to monitor for unusual activities. The CCTV system can detect

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<sup>69</sup> Anthony M. Townsend, *Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia*, First edition (New York: W.W. Norton & Company, 2013), 72.

<sup>70</sup> Lola Woetzel et al., “Smart Cities: Digital Solutions for a More Livable Future” (McKinsey Global Institute, June 2018), 35–37, <https://www.mckinsey.com/capabilities/operations/our-insights/smart-cities-digital-solutions-for-a-more-livable-future>.

abnormal sounds, like a citizen shouting, to check the situation through video footage.<sup>71</sup> In the time since, the desire to create smart cities has spread across the globe, and the scope of ambition grows with each of these technology-focused projects.

New York City boasts the strongest smart city technology base in North America (only second globally to Singapore).<sup>72</sup> In the NYC 2050 strategic plan, Bill de Blasio, the mayor of NYC from 2014 to 2022, set out a vision for confronting the challenges facing the city. Initiative twenty-nine of the plan (out of fifty) sets out to “make forward-thinking investments in core physical infrastructure and hazard mitigation” to address the needs of the growing city.<sup>73</sup> In October of 2023, the New York City Office of Technology and Innovation launched a new program to “streamline and accelerate the process for piloting emerging technologies” that aim to tackle challenges facing New Yorkers.<sup>74</sup> One particular project aims to use unmanned aerial vehicles (UAV) to take thermal, LiDAR, and video imaging of business exteriors to improve the energy efficiency of buildings. Another project installed a dozen computer-vision sensors in four different boroughs to generate detailed reports about city street use that will inform future street redesign.<sup>75</sup> Already, the city has a large-scale Internet of Things system that monitors water usage in over 800,000 buildings, tracks 23,000

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<sup>71</sup> Sang Keon Lee et al., “International Case Studies of Smart Cities: Songdo, Republic of Korea,” *IDB Publications*, June 27, 2016, 1, 6, 9, <https://publications.iadb.org/en/international-case-studies-smart-cities-songdo-republic-korea>.

<sup>72</sup> Woetzel et al., “Smart Cities: Digital Solutions for a More Livable Future,” 10.

<sup>73</sup> Bill de Blasio et al., “OneNYC 2050: Building a Strong and Fair City,” April 2019, 47, <https://climate.cityofnewyork.us/reports/onenyc-2050/>.

<sup>74</sup> Office of Technology & Innovation, “OTI Launches NYC Smart City Testbed Program with Drones Pilot to Help Lower Greenhouse Gas Emissions in Buildings - NYC Office of Technology and Innovation - OTI,” Press release, October 11, 2023, <https://www.nyc.gov/content/oti/pages/press-releases/oti-launches-nyc-smart-city-testbed-program-drones-pilot-lower-greenhouse-buildings-gas-emissions>.

<sup>75</sup> “NYC Smart City Testbed,” accessed March 19, 2024, <https://testbed.cityofnewyork.us/>.

fleet vehicles across their city agencies, and connects over 13,000 intersections through a Traffic Safety Network.<sup>76</sup>

In some cases, the ambition for smart cities extends to the larger state. Singapore, a city-state located in southeast Asia, sets out to transform its government in the digital era by evolving into a “Smart Nation” where “people will be more empowered to live meaningful and fulfilling lives, enabled seamlessly by technology.”<sup>77</sup> The effort seeks to involve every government agency, every business, and all people in the pursuit of digital transformation that will allow for more informed policymaking and for more accessible services. Singapore exerts greater state dominance over land market and urban planning than developed nations in the West. The significant role of the state in public housing enables it to rapidly scale up innovation by embedding smart technologies throughout its buildings.<sup>78</sup> Singapore’s soft authoritarianism allows it to more readily shape its institution to adopt technology in service to the state.

Japan sees technology as not just the solution to the problems facing cities but to their whole nation. They set out a new blueprint for a super-smart society: Society 5.0. Society 5.0 is the next transformation in how the Japanese way of life will be blended between cyberspace and physical space. The previous four societies represented a transition from hunter-gatherer to agricultural to industrialized to information-based.<sup>79</sup> Society 5.0 will integrate the systems that operate throughout society to ensure happiness and comfort in all

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<sup>76</sup>Chief Technology Officer, Mayor’s Office of the (CTO), “The New York City Internet of Things Strategy,” March 4, 2021, 34–37.

<sup>77</sup> Smart Nation and Digital Government Office, “Smart Nation: The Way Forward,” November 30, 2018, 1, <https://www.smartnation.gov.sg/files/publications/smart-nation-strategy-nov2018.pdf>.

<sup>78</sup> Ezra Ho, “Smart Subjects for a Smart Nation? Governing (Smart)Mentalities in Singapore,” *Urban Studies* 54, no. 13 (October 1, 2017): 3106–8, <https://doi.org/10.1177/0042098016664305>.

<sup>79</sup> UNESCO, “Japan Pushing Ahead with Society 5.0 to Overcome Chronic Social Challenges | UNESCO,” February 21, 2019, <https://www.unesco.org/en/articles/japan-pushing-ahead-society-50-overcome-chronic-social-challenges>.

aspects of life. The system requires gathering real-time data that can be processed by sophisticated IT systems that will directly shape the actions and behaviors of Japanese citizens.<sup>80</sup>

Scientists and engineers continue to develop new smart city technology that will add more layers of network and digital information-gathering devices to the urban space. In one particular project from the MIT Senseable City Lab, experimenters created a new framework to measure street activity in real time. Over five weeks in Paris, they partnered with a state-owned public transport bus operator to install cameras that collected 226,649 real-time images and classified the different parts of the images, which showed 200,000 cars and 130,000 pedestrians.<sup>81</sup> A more ambitious project wants to change the way cities use street lights. Instead of just acting as a light source, the project envisions a new generation of street lights that could act as a group of interconnected data nodes that can sense noise pollution, monitor traffic, detect open parking, and check for suspicious behavior.<sup>82</sup> Passive infrastructure, which exists to provide utility to the residents it serves, morphs into active infrastructure that measures and monitors the conditions of the environment.

This is not the first time that technology has upended the organization of the city. Cities evolved to encourage and ease human communication. For example, the municipal adoption of the telegraph improved the delivery of fire-fighting and police services and helped address the growing needs of cities. The telegraph reshaped the organization of the city by allowing factories to move outside the urban core while centralizing the office and

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<sup>80</sup> Atsushi Deguchi et al., “What Is Society 5.0?,” in *Society 5.0: A People-Centric Super-Smart Society* (Singapore: Springer, 2020), 2–3, [https://doi.org/10.1007/978-981-15-2989-4\\_1](https://doi.org/10.1007/978-981-15-2989-4_1).

<sup>81</sup> Arianna Salazar-Miranda et al., “Smart Curbs: Measuring Street Activities in Real-Time Using Computer Vision,” *Landscape and Urban Planning* 234 (June 1, 2023): 104715, <https://doi.org/10.1016/j.landurbplan.2023.104715>.

<sup>82</sup> Ricardo Alvarez et al., “Sensing Lights: The Challenges of Transforming Street Lights into an Urban Intelligence Platform,” *Journal of Urban Technology* 29, no. 4 (October 2, 2022): 25–40, <https://doi.org/10.1080/10630732.2022.2082825>.

administrative functions closer where land value was higher and distance to local telegraph offices was closer.<sup>83</sup> While past technologies (like electric lighting, traffic signals, sewage systems, etc) reorganized city infrastructure and improved city life, smart cities may be more hype than substance, in the short term.

The term “smart cities” has been applied to a variety of contexts. Some definitions emphasize IT infrastructures, some emphasize economic developments, and yet others include entrepreneurial capital.<sup>84</sup> Proponents of smart cities use the underlying technological innovations to push their comprehensive visions to solve city issues. By portraying a cohesive package of city ideas as a “smart city,” officials may be hoping to attract more funding and enact more expansive government projects. A city that profiles itself as a “smart city” can project a forward-looking and economically competitive image to attract collaborators in their efforts to improve governmental services.<sup>85</sup> Even when smart cities do their best to focus on people and human interactions instead of the latest technology, they risk following solutions that are contradictory or will quickly become obsolete. Still, these visions indicate a desire for a more involved role in government. Government incompetence is not a strong enough safeguard.

Trying to transform “cities” into “smart cities” without a clear framework for prioritizing city issues leaves many questions unanswered. How is the city being transformed? How are city officials gaining the consensus of the communities they are changing? How does the delineation of smart initiatives that are publicly funded but privately built affect incentives of what types of technologies are built? How do you balance the

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<sup>83</sup> Joel A. Tarr, Thomas Finholt, and David Goodman, “The City and the Telegraph: Urban Telecommunications in the Pre-Telephone Era,” *Journal of Urban History* 14, no. 1 (November 1, 1987): 39, 48, <https://doi.org/10.1177/009614428701400103>.

<sup>84</sup> Albino, Berardi, and Dangelico, “Smart Cities,” 12.

<sup>85</sup> Mark Deakin and Husam Al Waer, “From Intelligent to Smart Cities,” *Intelligent Buildings International* 3, no. 3 (July 1, 2011): 134, <https://doi.org/10.1080/17508975.2011.586673>.

competing interests of environmental and social sustainability with the need to raise capital and further develop certain regions of the city? Cities need to continue evaluating the costs and benefits of the technological investments they make lest they risk obsolescence or fancy infrastructure that returns little value directly back.

Smart cities offer an unattainable panacea for city woes. The platforms that cities want to create that aggregate this information not only will lead to greater data collection and surveillance but also give cities more power to shape the lives of their citizens. It is easy to imagine how smart cities lend themselves to function creep as local governments seek to use the collected data to enact policies that influence individual decision-making in the name of public health and safety. Smart cities require accepting an entire suite of technologies and infrastructure that will remain a permanent fixture of the urban landscape.

In the long term, smart cities pose a concerning example of how state power seeks to centralize. The smart city tries to redefine and reconfigure the fundamental relations that govern how people interact with the government and their local community. City officials recognize that cities are deeply complex and built up from the small activities of citizens pursuing their own lives whose effects accumulate over time. The city official asks herself “What if we could record, preserve, analyze, and visualize that detail?”<sup>86</sup> Trying to do so undermines some of the shared understanding that makes a city full of strangers work. A shared understanding of anonymity—where individuals mind their own business and remain free to reinvent themselves as they see fit—enables city dwellers to thrive in their environment. What happens when the people in the city feel themselves measured and modeled by the city?

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<sup>86</sup> Townsend, *Smart Cities*, 70.



A criticism of “smart cities” is not an argument against the adoption of technology to improve the current services that cities already provide. For example, a city should update its IT infrastructure so that all the different agencies can communicate digitally and not rely on a paper-only method for how citizens complete forms and requests. Instead, we should be cautious of the “smart cities” that claim to offer a panacea to the challenges that come with making a city of millions of people work. These tools can easily lead to a more expansive form of government that citizens do not directly agree to by vote. Installing sensors that measure pedestrian traffic throughout the day and alter the duration of traffic lights may improve the flow and movement. But can those same sensors be used to enforce curfews or city-wide restrictions like what we saw during COVID? It might be that city dwellers may agree to the initial uses of smart city devices, but cities can easily repurpose these pieces of active infrastructure that measure and monitor real-time environmental conditions without getting prior consent from city residents.

Smart cities require a lot of participation from private sector companies to install and maintain the infrastructure and software that connects a city together. The choice a city makes will have implications for what future models and pieces of tech will be compatible with one another as often companies want to protect their proprietary systems. Furthermore, technology tends to depreciate early and quickly leaving the city with a hefty expense bill just to maintain the system. Whereas RFID cards may have made sense at one point for tracking citizen access, facial recognition technology may supplant their use in a relatively short time frame. Private companies, which tend to require less consensus to make adjustments, will always move ahead of public agencies that need to win the support of their

supervisors, who need to win the support of politicians, who need to win the support of their constituents to allocate public funding.

Cities should focus on investing in technologies that provide durable benefits that exceed their cost and systems that disseminate information useful to users rather than systems that aggregate information primarily for the benefit of city planners. Traditional cultures and villages focused on sharing information horizontally among citizens. The new urban landscape features a shift in which information is shared vertically between citizens and government. Whereas once town gossip kept individuals informed on the ongoings of their communities, the modern city shows a more unilateral form of data gathering and analyzing that lends itself easily to surveillance, paternalism, discipline, and punishment.<sup>87</sup> A website that consolidates information about city services and provides a method for contact is a relatively inexpensive way to disseminate information widely and provides an easy-to-update platform that is flexible for city needs. A transportation app that shows the geolocation of all the buses and subway cars will keep users updated on delays and help them make more informed decisions on their mode of transportation.

Cities should focus on laying the economic incentives that invite the right sort of businesses and development into the areas they want rather than trying to co-opt or develop the technology themselves. Rather than trying to create a broadband wifi system that extends throughout their urban area, cities can create developmental zones that attract cafes, restaurants, and stores that are likely to provide free wifi to their customers. Cities should invest in libraries as public spaces with wifi systems that are easier to manage on a building-by-building level rather than a whole city level. The NYC Smart City Testbed

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<sup>87</sup> Kelsey Finch and Omer Tene, "Welcome to the Metropticon: Protecting Privacy in a Hyperconnected Town," *Fordham Urban Law Journal* 41, no. 5 (March 19, 2016): 1593, <https://ir.lawnet.fordham.edu/ulj/vol41/iss5/4>.

functions best if it allows select companies to test their particular technology innovations as a solution to provide individual businesses rather than a comprehensive solution from the city. If companies can test their drones that check for building energy efficiency, they can choose to then adjust their technology as they see fit and provide a service to buildings interested in improving their energy consumption. This allows the risk and decision-making to be made by private actors so that (a) cities do not take the investing risk of installing technology that may not prove useful and (b) different actors can choose to opt in or opt out of select services.

In the market, users will have a greater number of options to choose from for their needs, and issues like privacy can be a competitive differentiator. In contrast, the smart city reduces the number of alternatives (if any exist) when it comes to essential infrastructure. There will only be one smart grid, one subway system, and one set of emergency services. Public services operate by having a captive population that cannot opt out of these information collection systems without sacrificing convenience and quality of life (not to mention the forgone benefits of their tax dollars).<sup>88</sup> The considerations are different for public services that use public dollars compared to private services that raise their own funding and find their own users.

Going forward, cities should continue to invest in the communities their residents depend on. They should spend money on fixing potholes, updating weak structures, and improving the public transportation system. But we should be cautious of city visions that claim that some suite of technological innovations will offer the solutions to city problems. We should be hesitant when city planners feel that more sensors or more measuring devices will allow them to accomplish larger projects that address citizen needs. We should question

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<sup>88</sup> Finch and Tene, 1596.

a change in the relations between citizen and state that allows a more detailed picture of our lives.

***US Census Bureau: Using Technology to Count Every Individual***

While smart cities collect and measure the minutia, there certainly exists a need to collect high-level details about a state’s citizens. To govern a population, the state needs to know (at least approximately) how many people live in its territory. The state would want to know where they live, what government resources they use, and what trends in demographic changes occur over a certain period. The founding fathers of the United States of America understood the need for that information when drafting the Constitution. Article 1 Section 2 and Amendment 14th set out language that says that “Representatives shall be apportioned among the several States according to their respective numbers, counting the whole number of persons in each State, excluding Indians not taxed.” It further states that “the actual Enumeration shall be made within three years after the first meeting of Congress of the United States, and within every subsequent term of ten years, in such manner as they shall by law direct.”<sup>89</sup> In short, the Constitution directly gives power to the federal government to count the population and decide what rules such a counting would be conducted by.

The need for some central agency to collect census data was clear. As Margo J Anderson explains in her book *The American Census*, “just as regular and periodic elections would provide smooth mechanisms for shifting political power within the nation, so too would the periodic census and reapportionment adjust the power and burdens among the people.”<sup>90</sup> A central agency would need to be in charge of such an important role because the

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<sup>89</sup> “U.S. Constitution” (1776).

<sup>90</sup> Margo J. Anderson, *The American Census: A Social History, Second Edition* (Yale University Press, 2015), 10–11, <https://doi.org/10.2307/j.ctvb1htjr>.

state governments would be too self-interested in providing an overcount of their population. The agency would be better equipped to create a standard method that guarantees equal treatment on the nuances that come with counting a population. The first census, conducted in 1790, revealed an American population of 3,929,625 people or 4.5 people per square mile.<sup>91</sup> Since then, twenty-four censuses have taken place and have revealed a dramatic change in the character of the United States as the country expanded westward and added new immigrants to its population. By 2020, the American population reached 331,449,281 or 93.8 people per square mile.<sup>92</sup>

The role of the census has changed in that period of 230 years. Initially, the census would be recreated every decade, solely for political apportionment for seats in Congress. As the frontier closed and the population shifted work from agriculture to manufacturing roles, the census created new elaborate statistics to measure the changes and document the diversification of the economy. By the late nineteenth and early twentieth century, the Census Bureau became a permanent federal agency.<sup>93</sup> In the mid-1930s, legislators passed some new welfare programs, which generated interest in the continued study of “population problems.” Lawmakers desired more information to determine which individuals and industries were the most in need of aid so that they could use the data to write legislative formulas that apportion federal funds to the right places. American federalism created a system where federal funds would be distributed to existing channels in the state and local government agencies rather than directly being distributed from the national government.<sup>94</sup>

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<sup>91</sup> Anderson, 273.

<sup>92</sup> “U.S. Census Bureau QuickFacts: United States,” accessed March 22, 2024, <https://www.census.gov/quickfacts/fact/table/US/RHI625222#RHI625222>.

<sup>93</sup> Anderson, *The American Census*, 86–87.

<sup>94</sup> Anderson, 172.

No longer did the new role of the census remain solely apportionment. The new grants-in-aid system shifted the purpose of the decennial census from one focused on allocating political representation in Congress to one about identifying the needs of Americans and classifying them for policy purposes.<sup>95</sup> In a working paper posted on its website, the Census Bureau found that 353 federal programs have used the Decennial Census Program in some way to distribute more than \$2.8 trillion in funds during the 2021 fiscal year. The data proves useful for determining eligibility, fund allocation, creating estimates, and building sampling frames. The Medical Assistance Program was the largest distributor of funds on the list, administering \$568 billion. A COVID State and Local Recovery Fund distributed \$351 billion using the census data. Other programs on the list included Wildlife Restoration and Basic Hunter Education (\$758 million), HIV Emergency Relief Project Grants (\$645 million), and a Special Milk Program for Children (\$3 million).<sup>96</sup>

As the role of the Census Bureau became more essential to making evidence-based policymaking decisions, so did the number of questions and data that the office processed grew too. The sheer amount of data slowed down the process by which the data could be aggregated, and released. The Bureau relied on a few experts who understood the math and administrative obstacles that were a part of the process. “In the days before computers, calculators, or even adding machines, compiling census data and calculating apportionment quotas was extraordinarily tedious and difficult.”<sup>97</sup> The original process required precise and accurate hand-work done by enumerators who took highly repetitive notations on condensing

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<sup>95</sup> Anderson, 175.

<sup>96</sup> Ceci Villa Ross, “Uses of Decennial Census Programs Data in Federal Funds Distribution: Fiscal Year 2021,” June 14, 2023, 12–23, <https://www.census.gov/library/working-papers/2023/dec/census-data-federal-funds.html>.

<sup>97</sup> Anderson, *The American Census*, 37.

forms that would then be checked for errors and further aggregated.<sup>98</sup> The nature of this work made the census ripe for some automated technology.

Technological innovations enabled the Census Bureau to speed up the tabulation process. In 1870, the “Seaton device,” invented by the chief clerk, helped clerks keep the tallying organized by putting the tallying sheets on roller lines. In 1890, Herman Hollerith developed an electric tabulating machine after seeing first-hand the desperate need of the census office for a better way to do tabulation than hand counting.<sup>99</sup> Inspired by the Jacquard loom that used specially coded punch cards, Hollerith's machine could tally numbers as well tally individual characteristics. By 1896, Hollerith formed the Tabulating Machine Company, which would later merge and become the Computer Tabulating Recording Company. That company would eventually change its name to the International Business Machines Corporation or IBM.<sup>100</sup> Innovations in tabulation continued to improve the speed and methods of tabulation at the Census Bureau.

The Census mission of counting and providing basic information about the resident population acted as a driving force for technological improvement in data capture. The Census Bureau would create its tabulating equipment after Hollerith's patents expired and after he refused to lower his rental fees. In the late 1940s, it would switch over to IBM's new unit record machine, Model 101, which included the latest tabulating innovations.<sup>101</sup> The punch cards themselves eventually became a bottleneck in the census processing; the 1950 census used 282 million eighty-column cards that weighed over 600 tons and were fragile to

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<sup>98</sup> Anderson, 56.

<sup>99</sup> Anderson, 103–7.

<sup>100</sup> Census History Staff US Census Bureau, “Herman Hollerith - History - U.S. Census Bureau,” accessed March 22, 2024, [https://www.census.gov/history/www/census\\_then\\_now/notable\\_alumni/herman\\_hollerith.html](https://www.census.gov/history/www/census_then_now/notable_alumni/herman_hollerith.html).

<sup>101</sup> Steven Ruggles and Diana L Magnuson, “Census Technology, Politics, and Institutional Change, 1790–2020,” *Journal of American History* 107, no. 1 (June 1, 2020): 32–35, <https://doi.org/10.1093/jahist/jaaa007>.

high humidity or mishandling.<sup>102</sup> Eventually, in 1948, the Census Bureau made a contract to get the world's first commercial computer, the Universal Automatic Computer (UNIVAC), which used magnetic tape for data storage. But the UNIVAC still used punch cards as its input, using a card-to-tape converting machine.<sup>103</sup> To fix the remaining bottleneck issue with the punch cards, the Census Bureau developed the Film Optical Sensing Device for Input to Computers (FOSDIC), which eliminated the need for punch cards. Answers on the census form could now be transferred to appropriate circles on a paper form. The forms were microfilmed and then "read " based on their position into a computer-readable magnetic tape.<sup>104</sup>

Over time, the Census Bureau further automated data capture. Each household would receive a FOSDIC form, which greatly reduced data-capture costs that existed with having enumerators going door-to-door. The FOSDIC was redesigned and computerized to become twenty-two times faster than the original FOSDIC machines used to process the 1960 census. A new system would use Optical Mark Recognition (OMR) and Optical Character Recognition (OCR). The original FOSDIC system in 1960 had been using OMR, but OCR added an automatic interpretation of open-ended handwritten census responses, reducing the need to convert that data by hand.<sup>105</sup> The Bureau continues to seek improvements to these data capture methods and seeks help from private organizations. The first online US census occurred in 2000, but the last-minute rollout and lack of advertising led to relatively few responses. The Bureau tried to introduce handheld computers that census workers could use

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<sup>102</sup> Ruggles and Magnuson, 35.

<sup>103</sup> Ruggles and Magnuson, 36–38.

<sup>104</sup> Anderson, *The American Census*, 207.

<sup>105</sup> Ruggles and Magnuson, "Census Technology, Politics, and Institutional Change, 1790–2020," 43.



for the 2010 census, but ballooning costs and poor performance led to the project being scrapped. The 2020 census was the first one with a full internet option.<sup>106</sup>

In the 2020 Census, the Bureau categorized 95.8 percent of 151.8 million addresses as “Internet First” or “Internet Choice.” This categorization identified residences as likely to have relatively easy access to the Internet. Residents were given a 12-digit ID to use for the internet response with directions on accessing the questionnaire online. If residents did not fill out the internet form, they would be given a second letter, then a postcard, and then a letter with a paper questionnaire. In May 2016, the Census Bureau signed a contract with Pegasystems Inc. to provide a commercial off-the-shelf software base. The Bureau cited benefits in safety, scalability, and risk analysis of time effort as to why they chose a third party. The Bureau set an expectation that the internet option should have the ability to handle 600,000 concurrent internet users even though this was five times the expected concurrent user load.<sup>107</sup>

Conversion to the Pega base proved difficult and the commercial software struggled with performance issues at the intended volume of users. Fortunately, the Census Bureau had been developing its in-house software: Primus. Primus was meant to serve as a backup. But on February 7, 2020, the Bureau revealed that it would be making Primus the technical platform for the Internet Self-Response in the 2020 Census. It was risky switching the software with less than a month before public roll-out. The software had not been tested in the last major precensus test that occurred in 2018. To the credit of the Bureau and its

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<sup>106</sup> Hansi Lo Wang, “Despite Cybersecurity Risks And Last-Minute Changes, The 2020 Census Goes Online,” *NPR*, March 2, 2020, sec. National, <https://www.npr.org/2020/03/02/807913222/despite-cybersecurity-risks-and-last-minute-changes-the-2020-census-goes-online>.

<sup>107</sup> National Academies of Sciences, Engineering, and Medicine, *Assessing the 2020 Census: Final Report*, ed. Teresa A. Sullivan and Daniel L. Cork (Washington, D.C.: National Academies Press, 2023), 150–52, <https://doi.org/10.17226/27150>.

development team, the last-minute rollout was a success. The Primus response platform experienced no downtime and maintained cybersecurity.<sup>108</sup>

A new project over the past two decades aims to create linked decennial data. Computational and data capture technology enables the Census Bureau to prepare and preserve raw census records. The names of respondents were not digitally captured in census processing before 2000; this project will re-process the old census data to capture additional information for genealogical research. The linked census data will serve as a public and scientific good. The data will be helpful to social scientists interested in researching various social processes in the US over the past century, including migration, immigration, family transitions, and public policy.<sup>109</sup>

Since the original census, the US Census morphed into a much larger and more expensive endeavor as the size of the population increased, the amount of information collected became more extensive, and the types of technology available changed. In 1790, the US population was almost four million; at the time, the Census Office spent 1.13 cents per individual or 34 cents in 2024 dollars.<sup>110</sup> By 2020, the US population reached 333 million, and the Bureau spent \$41.11 per individual in 2024 dollars.<sup>111</sup> Another contributing factor to the rising costs has been the decreasing response rate from initial outreach. From 1970 to 1990, the population's response rate declined from 78 percent to 65 percent. The

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<sup>108</sup> National Academies of Sciences, Engineering, and Medicine, 35, 41, 151–52, 414–15.

<sup>109</sup> Katie R. Genadek and J. Trent Alexander, “The Missing Link: Data Capture Technology and the Making of a Longitudinal U.S. Census Infrastructure,” *IEEE Annals of the History of Computing* 44, no. 4 (October 1, 2022): 1–4, <https://doi.org/10.1109/MAHC.2022.3195001>.

<sup>110</sup> Jason G. Gauthier, “Measuring America: The Decennial Censuses From 1790 to 2000,” Census.gov, September 2002, Appendix A, [https://www.census.gov/library/publications/2002/dec/pol\\_02-ma.html](https://www.census.gov/library/publications/2002/dec/pol_02-ma.html); “\$1 in 1800 → 2024 | Inflation Calculator,” accessed March 25, 2024, <https://www.officialdata.org/us/inflation/1800?amount=1>.

<sup>111</sup> U. S. Government Accountability Office, “2020 Census: A More Complete Lessons Learned Process for Cost and Schedule Would Help the Next Decennial | U.S. GAO,” accessed March 25, 2024, <https://www.gao.gov/products/gao-23-105819>; “U.S. Census Bureau QuickFacts.”

Bureau spent a substantial amount of resources doing follow-ups and making personal visits to addresses to collect the information. Still, an increased demand for small-area data propelled the Census to spend more resources on accuracy. A legal demand of “one-person, one-vote” rulings from the Supreme Court and the Voting Rights Act of 1965 put a greater need “for accurate population data, cross-classified by age and ethnicity at the small-area level, for legislative redistricting and related purposes.” The data also proves useful for state and local governments as well as private businesses trying to understand their local communities.

Even though its mission of aggregating data throughout the United States lends itself to a centralizing power, the decennial census remains a necessary and acceptable form of government data collection. With a few trillion dollars of federal funding allocation dependent on Census data, it is worthwhile to spend a few billion dollars to gather accurate information on the residents who benefit from the resource distribution. Only taken every ten years, the design of the census and protections of federal law create a strong set of safeguards for the data the census collects. Federal law, specifically Title 13 of the United States Code, prohibits the disclosure or publication of any private information that identifies an individual or business. All employees and workers with access to data collected from the Census Bureau take an oath of non-disclosure that prevents them from sharing any information “obtained for or prepared by the Census Bureau to any person or persons either during or after employment.” Penalties for unlawful disclosure can go up to a fine of \$250,000 and/or imprisonment of up to 5 years.

Some other countries, like those in Scandinavia and Asia, have a continuous population register that tracks residence continuously for the entire population and

sometimes can include information about marriages and divorces.<sup>112</sup> It seems unlikely that Americans, who live in a very mobile society, would be supportive of policies that require them to register at a government office every time they decide to move. Unlike smart cities, the lack of a continuous collection of data provides some innate protections for citizens who can rest assured that their movements are not being tracked through the census nor that the census has any specific policy interests that it pushes about the data collected.

Still, there are some concerns that the information collected from the census goes beyond the constitutional mandate. The list of questions on the census has grown over the decades. Since 1940, Congress mandated a decennial housing census along with the population census that asked for answers to an additional twenty to forty questions about their housing situation. The expansion of detail in the questions put an increased burden on the sample of households that were selected to fill out the long form. The solution was to separate the decennial instrument from a new survey instrument that could be conducted to provide ongoing demographic monitoring of society: the American Community Survey (ACS).<sup>113</sup> However, the ACS provides data that informs decisions made both by public and private actors. In one case, the San Diego government used ACS data to forecast neighborhood populations and predict future travel patterns for its 2050 regional transportation plan. In another case, Target and Kroger used ACS data to tailor their product mixes and advertising appropriately based on detailed coverage of local areas the ACS collected.<sup>114</sup> In short, ACS data enables policymakers to make more informed decisions and helps businesses compete by providing useful customer information for market research.

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<sup>112</sup> Teresa A. Sullivan, “Coming to Our Census: How Social Statistics Underpin Our Democracy (and Republic),” *Harvard Data Science Review* 2, no. 1 (January 31, 2020): 4, <https://doi.org/10.1162/99608f92.c871f9e0>.

<sup>113</sup> Anderson, *The American Census*, 251–52.

<sup>114</sup> Nicholas Eberstadt et al., “‘In Order That They Might Rest Their Arguments on Facts’: The Vital Role of Government-Collected Data,” March 2, 2017, 6–7.

Another concern with census data is how information collected for apportionment or informational purposes can be used against the residents filling out the information by the state itself. During World War I, many officials involved in local draft boards across the country wanted to use the 1910 census to provide information on names, addresses, and ages of individuals who might be avoiding the registration for military conscription. Sharing the data would violate an earlier census proclamation about committing to confidentiality. Out of a sense of urgency and patriotism, the Census Director at the time sought to reverse the proclamation to assist in a full registration given the importance of the war. Thus, personal information for several hundred young men was released to courts, draft boards, and the Justice Department.<sup>115</sup> In another example, following the surprise Japanese attack on Pearl Harbor, the census rapidly tabulated information on the Japanese American population.<sup>116</sup> The Bureau actively contributed to the war mobilization by providing technical expertise and tabulating small areas to help the army roundup, evacuate, and incarcerate the Japanese ancestry population—more than 110,000 men, women, and children.<sup>117</sup>

Since those incidents, the Bureau has taken a more serious approach to protecting the ways in which information collected during the census can be used. Still, one can imagine that in times of war or crises (like a pandemic), such protections would be weakened and data collected could be repurposed. Advances in computational technology will improve the ability of the state to understand its population. Much of the collected information will prove useful in social and economic planning. If citizens agree that the government should have a larger role, then we should expect that the government will collect more information on its population to make more informed spending decisions. If citizens see a more minimal role

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<sup>115</sup> Anderson, *The American Census*, 129.

<sup>116</sup> Anderson, 193–95.

<sup>117</sup> Anderson, 196.

for government spending, then the Census should focus on collecting basic information relevant for apportionment purposes only. Regardless, the Census should continue to strive to protect individual privacy by (a) keeping data collection processes infrequent and non-continuous and (b) reducing access to personally identifiable information even among other government agencies.

### ***Evaluating State Projects that Use Computational Technology***

Computational technology enables all parties, private and public, to collect more information. Private companies must compete with one another to win customers. In their competition against one another, privacy can be a competitive differentiator that enables users to opt in and opt out based on their preferences. Public entities that use tax dollars collected from everyone operate under a different assumption. The default assumption should be against the collection of information that cannot be justified in the name of good governance

The state has some good justification for using computational technology when it serves its basic and necessary operation. In such a case, there should be a direct connection to some already enumerated purpose enshrined in a founding document. The US Census represents a good example of using computational technology for the basic purpose of the state. The Constitution clearly describes a need to enumerate people for political apportionment. Computational technology, as applied here, creates greater efficiency and accuracy for that enumeration. Insofar as the state remains constrained its use of new tools to its core purpose, computational technology serves to update the manner and process in which it accomplishes that purpose without expanding the scope of its operation.

The state goes too far in its use of computational technology when it justifies its

implementation in a way that gives it a larger role than once accepted. Smart cities are an example of where computational technology is used as a means to centralize knowledge and control in a way that was not possible before nor has been explicitly accepted by citizens. Merely voting in politicians who vow to use technology to improve the city is not enough justification. If the installment and operation of that technology erodes the citizen-state relationship in a meaningful way, a more serious consensus is needed like a constitutional amendment that grants new powers. In the past, this larger role for the state could not have occurred with the existing technology, and that offered a strong layer of protection. That layer of protection has been diminished and soon will be completely removed.

Government incompetence acts as the final layer of protection against computational technology. The government struggles to completely implement these large state projects because these visions are relatively new and the technical expertise resides in the private sector. But this layer of protection is impermanent. The gap between a power state and its implementation will narrow as computational technology becomes more intuitive, automated, and concentrated. In the meantime, we need to assess our own opinion of what role the state should have in our lives. The more we expect from our government, the more we can expect the government to collect information on us.

## Chapter 4: New Decision-Making Incentives in the Public Sector

Economics is the study of the production, distribution, and consumption of goods. Economists research and examine the choices that individuals, businesses, and governments make when it comes to allocating their limited resources. Political science is the study of government, in theory and practice, to understand the foundations of our governing institutions and the relationships they have with their citizens. Political scientists are interested in the power relations among individuals and groups that lead to decision-making. Public choice seeks to apply the methods of economics to the study of politics.

### *A Brief Introduction to Public Choice*

An introduction to public choice will be helpful here. In the introduction to his *Public Choice III* textbook, Dennis Mueller outlines the thinking that spurred the field of public choice:

Political science has studied man's behavior in the public arena; economics has studied man in the marketplace. Political science has often assumed that the political man pursues the public interest. Economics has assumed that all men pursue their private interests, and has modeled this behavior with a logic unique among the social sciences.

But is this dichotomy valid? Could both Aristotle and Smith have been right? Could political man and economic man be one and the same? In the field of public choice, it is assumed that they are.<sup>118</sup>

By applying the rational agent model in the study of human behavior, economics assumes that there exists some logic to how humans make decisions. This approach to studying an individual's decision-making in the marketplace is also suitable for studying decisions in the public sector.

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<sup>118</sup> Dennis C. Mueller, *Public Choice III* (Cambridge ; New York: Cambridge University Press, 2003), 1.



Here is the fundamental claim of public choice: the person who makes decisions in the marketplace is the same person participating in all the different parts of the political processes in the state and that person seeks to maximize her utility. When a person enters a grocery store to make a purchase, they must choose from among an array of products at different prices and qualities to determine which will give the most personal benefit in consumption. It is the same person who enters a voting booth and must make a decision from among the candidates. It is the same person who serves as an agent of the state either as a bureaucrat or as a politician. In all these situations, despite limitations of rationality, time, and information, people generally make choices that maximize their utility towards some goal or self-interest that they hold.

Economists of the public choice school believe that political behavior can be explained with the same framework used to analyze behavior in markets. “The basic behavioral postulate of public choice, as for economics, is that man is an egoistic, rational, utility maximizer.”<sup>119</sup> A key tenet of public choice is methodological individualism. Methodological individualism posits individual actions as what explains social phenomena; to understand collective action, the frame of reference must be individuals and their decisions.<sup>120</sup> By reducing the issues of political organization to the individual making his or her choice among some alternatives, public choice allows us to analyze the logic of choice without considering the specific goals that direct his or her choice. No value judgment on their specific goals is necessary.<sup>121</sup>

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<sup>119</sup> Mueller, 1–2.

<sup>120</sup> Joseph Heath, “Methodological Individualism,” in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, Summer 2020 (Metaphysics Research Lab, Stanford University, 2020), <https://plato.stanford.edu/archives/sum2020/entries/methodological-individualism/>.

<sup>121</sup> James Buchanan and Gordon Tullock, *The Calculus of Consent: Logical Foundations of Constitutional Democracy* (Ann Arbor, MI: University of Michigan Press, 1965), vi–vii, <https://doi.org/10.3998/mpub.7687>.

The result of this system of mutual exchange in the political system is a “rules of the game” that people agree to—a constitution. The constitutional rules establish the internal dynamics of the political system. The political outcome is determined to a large extent by the established political constellations.<sup>122</sup> Individuals, with their different aims and purposes, contribute to the collective action by way of reconciling their conflicting interests. Political parties and politicians write appealing policies to win positions of power, not win positions of power to write appealing policies. This shift in thinking makes it clear that individuals are in constant competition to win enough votes.

Politicians make a living by being elected by voters. But they face the same pressures when voting in their body of elected members as voters do when voting on a candidate. The politicians may decide to spend one less hour studying the issues relevant to legislation to spend another hour meeting their constituency. In doing so, she trivially reduces the quality of legislation affecting her constituency and can materially improve her relationship with her electors.<sup>123</sup> This sort of analysis pervades all the political decisions that a legislator has to make. How should she allocate time between policy and image-making? How does she allocate resources to earn votes from the right constituencies? Which special interest group money do you take for what cause to win elections without alienating other groups? None of these cases particularly maximize public welfare.

The approach of public choice is relevant to this thesis because it offers another way to study the relationship between the state and its citizens. While I cannot provide a comprehensive view of everything in public choice in one chapter, I have selected a couple

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<sup>122</sup> The Royal Swedish Academy of Sciences, “The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 1986,” Press release, NobelPrize.org, October 16, 1986, <https://www.nobelprize.org/prizes/economic-sciences/1986/summary/>.

<sup>123</sup> Gordon Tullock, “Public Choice,” in *The New Palgrave Dictionary of Economics* (London: Palgrave Macmillan UK, 2017), 3, [https://doi.org/10.1057/978-1-349-95121-5\\_1400-2](https://doi.org/10.1057/978-1-349-95121-5_1400-2).

of key features that have been previously analyzed in public choice and consider how computational choice alters the relationship between state and citizen. The fundamental method of calculus, individuals choosing the best decisions for their interests among a list of choices, does not change. But with computational technology, the tools available do.

### ***Public Choice Reasoning for the State***

First, it will be helpful to explain how public choice thinks about the state. What I strive to provide here are a couple of economic theories for the state. As explained earlier in Chapter 2, typical political science defines the state as an entity that maintains a monopoly on legitimate force in a territory. The origins of the state, as imagined by social contract theorists in political theory, came about to combat the Hobbesian state of nature. In this political story, any form of authority would be desirable lest we fall into a situation where the lives of people were “solitary, poor, nasty, brutish, and short” because everyone would hurt one another out of a desire for self-preservation.<sup>124</sup> The justification for a state then comes from a thought experiment about what life looks like without an authority to which we submit our “rights of nature.”

In a similar but methodologically different vein, public choice takes the perspective of considering what private, individualistic activity looks like in the absence of government and why we might rationally agree to collective choice through the state. In the market, two individuals with selfish motives can mutually benefit from voluntary exchange. Imagine person A grows apples and person B raises chicken. If person A and person B decide to trade, they do so because each party believes they have something to gain from the exchange.

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<sup>124</sup> Sharon A. Lloyd and Susanne Sreedhar, “Hobbes’s Moral and Political Philosophy,” in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta and Uri Nodelman, Fall 2022 (Metaphysics Research Lab, Stanford University, 2022), <https://plato.stanford.edu/archives/fall2022/entries/hobbes-moral/>.

Both can improve their welfare by agreeing to a trade. But another option also exists: to steal from the other.

If person A decides to steal from person B, person A can claim some benefit without giving anything in return (in other words, at no cost). Of course, this comes at the cost of another individual who loses the fruits of his labor. Unlike trade, which is a positive-sum game, stealing is at best a zero-sum game and at worst a negative-sum game. If person B believes person A will steal from them, he can either steal back from A (zero-sum) or guard against person A (negative-sum). This represents a classic prisoner's dilemma situation.<sup>125</sup>

|                                     |                                     |                   |
|-------------------------------------|-------------------------------------|-------------------|
| <i>A</i> \ <i>B</i>                 | <i>Trades or<br/>does not steal</i> | <i>Steals</i>     |
| <i>Trades or<br/>does not steal</i> | 1<br><br>(13, 12)                   | 4<br><br>(10, 14) |
| <i>Steals</i>                       | 2<br><br>(15, 9)                    | 3<br><br>(11, 10) |

**Figure 1. Prisoner's dilemma in a market with no State**

Each person, playing their dominant strategy (stealing), will be worse off than if they were to cooperate. If person A and person B are cooperating by trade, person A will realize he is better off by stealing from person B because he does not have to give anything in exchange. If person A is stealing from person B, person B will realize he is better off by stealing back from person A. If both person A and person B are stealing from one another,

<sup>125</sup> Mueller, *Public Choice III*, 9–11.

then less will be produced overall as each spends time developing methods to mitigate against the stealing. The logic is symmetric when all the roles are reversed. In the long term, over many iterations, Person A and Person B are better off when they do not steal and trade when desirable.

In a two-person prisoner's dilemma, played over many iterations, cooperation may naturally occur. Each party realizes that they will be better off by signaling initial cooperation (not stealing) and continuing that for at least a few iterations. The players realize that they can benefit from cooperation rather than one person defecting because the other person would also defect in the next round. The issue arises when it becomes an n-person prisoner's dilemma where n goes from small to very large. An individual here could continuously free-ride and rely on the cooperative efforts of others over many iterations.<sup>126</sup>

In this sense, it would be rational to agree not to steal and pay for someone to act as the enforcement—a de facto state. The state plays a large role in coordination. Deciding on which side of the road to drive on, which language we all will speak, which measuring system will follow, and which rules we will follow requires coordinating on doing the same thing. There is not (necessarily) anything inherently right about the choices we make, but coordination provides a means to do other things more successfully.<sup>127</sup>

In both their economic relation and political relations, two or more individuals cooperate. The market and the state are both devices through which that cooperation is organized. Whereas in the market goods and services are exchanged, in collective action, individuals find it “mutually advantageous to join forces to accomplish certain common

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<sup>126</sup> Russell Hardin, “Economic Theories of the State,” in *Perspectives on Public Choice: A Handbook*, ed. Dennis C. Mueller (Cambridge: Cambridge University Press, 1996), 29–30, <https://doi.org/10.1017/CBO9780511664458.003>.

<sup>127</sup> Hardin, 25.

purposes.”<sup>128</sup> An important difference is the element of uncertainty between individual choice and final action. For the private decisions, the responsibility is singularly on the chooser who weighs the costs and benefits that affect him. In collective choice, the relationship between individual action and the final result is more tenuous.<sup>129</sup>

The individual is only one of many “inputs” in the collective choice. The voter will see the benefits and costs of the proposed action but cannot so easily estimate her share of the benefits and costs as she does with a comparable market choice. The individual is no longer singularly responsible for the decision she makes like she is in her private choice. “Secure in the knowledge that, regardless of his action, social or collective decisions affecting him will be made, the individual is offered a greater opportunity either to abstain altogether from making a positive choice or to choose without having considered the alternatives carefully.”<sup>130</sup> This contrasts with private action which forces the individual to exercise her freedom by making choice compulsory since no one will make choices for her. These features must be considered in how we assess the decision-making capacities of the state.

### ***The Bureaucrat Maximizes Utility: Information is Power***

From the previous section, we (roughly) understand the demand side of public choice. Citizen voters use the state as a means of mutual exchange. The voter’s preferences determine the outcomes of which politicians will get elected and which policies will be pursued. The government then acts as the institution through which those preferences are measured, aggregated, and balanced. Certainly, there exist distortions in how voters make

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<sup>128</sup> Buchanan and Tullock, *The Calculus of Consent*, 19.

<sup>129</sup> Buchanan and Tullock, 32–38.

<sup>130</sup> Buchanan and Tullock, 38.

decisions. The next section will discuss that further, but for now, we turn our attention to the supply side of public choice.

Bureaucracies supply the government outputs. As defined by William Niskanen, a public choice economist, “bureaus are nonprofit organizations which are financed, at least in part, by periodic appropriation or grant.”<sup>131</sup> In the case of government, bureaucracies are the agencies that employ non-elected government officials to implement government policy. Applying the framework of public choice, the bureaucrat is just like the rest of us. Like the citizen-voter and the politician, the bureaucrat is a selfish utility maximizer. The bureaucrat maximizes her utility by way of “salary, perquisites of the office, public reputation, power, patronage, output of the bureau, ease of making changes, and ease of managing the bureau.”<sup>132</sup> She can achieve all those goals (except the last two) by pursuing an increase in the total budget of the bureau during her tenure in office. To derive a larger budget, she needs to pursue power. Political power refers to the ability to achieve certain ends through the political process when actors have conflicting goals.<sup>133</sup>

The power of the bureaucrat stems from the asymmetric possession of information. While the economic man pursues profit and the bureaucratic man pursues power, the underlying mechanism for achieving those objectives is the same. Both profit and power exist when people who possess the courage and information to make correct decisions under uncertainty do so. “Information has value, or grants power, only in the presence of uncertainty. Uncertainty creates the potential to exercise power; information provides the capacity to do so.”<sup>134</sup> A large, complex firm or bureau requires a manager with more

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<sup>131</sup> William Niskanen, *Bureaucracy and Representative Government* (New York: Routledge, 2017), 15, <https://doi.org/10.4324/9781315081878>.

<sup>132</sup> Niskanen, 38.

<sup>133</sup> Mueller, *Public Choice III*, 359–60.

<sup>134</sup> Mueller, 360.

expertise to make correct decisions on behalf of the interests of the principals (shareholders for the private firm and taxpayers for the public bureau). The bigger an organization becomes, the harder it is to monitor its activities.

The differing structures and objectives between the private firm and the public bureau lead to varying levels of control over the manager. For the private firm, the investors are likely to provide a share of the savings (profits) that come from increased efficiency. However, the public bureaucrat does not have incentives to improve efficiency. Firstly, her objectives are not profit-driven as the organization provides a public good that is available for everyone to consume. Her salary is not tied to improvements in efficiency. Secondly, the bureau acts as a monopsonist by being the sole provider of a given service. While the duplicated effort may seem wasteful, the monopoly nature of the bureaus leaves them without competitive pressures that would encourage efficiency. It also denies funding to another agency that could act as an alternative source of information to gauge efficiency.<sup>135</sup>

The model for assessing how much funding a bureau will pursue relies on the perceived output of the bureau's services. Generally, we can assume that an increase in output will increase public benefit, but at a diminishing rate. The first aircraft carrier will provide more protection and benefits than the eleventh aircraft carrier will add.<sup>136</sup> The bureau also has a cost function that increases at higher output. There exists a measurement problem as to how a bureau's levels of activities are measured rather than the number of units of output. Consider the Department of Defense, which maintains the military count and weapon system. Congress will know how many soldiers, tanks, aircraft, and ships we have. Its budget is determined by the activities it maintains. Taxpayers and representatives are only interested

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<sup>135</sup> Mueller, 362–63.

<sup>136</sup> "Aircraft Carriers by Country 2024," accessed April 6, 2024, <https://worldpopulationreview.com/country-rankings/aircraft-carriers-by-country>.



in the “units of protection” as the final output. The measurement problem is inherent to many public goods and services, which creates a monitoring problem for the funding agency.<sup>137</sup>

This enables the bureaucracy to obtain budgets greater than desired by the sponsor.

Technical expertise contributes to the asymmetric possession of information and adds to the power of the bureaucrat. In *The Bureaucratic Phenomenon*, Michel Crozier looks at two case studies of French administrative organizations in public service. In one of these particular organizations, two-thirds of the workers use semi-automatic machines. People complained about being reduced to the conditions of robots for the sole benefit of the state, but for the most part supervisors and subordinates have a cordial and productive relationship. But that relationship changes when the machines sometimes break down, and the mechanics need to be called in. The maintenance men seemed to intervene frequently in the working behavior of the production workers as they felt the workers were being careless with the machines. The supervisors felt as if the maintenance men's actions jeopardized their authority over the workers.<sup>138</sup>

The maintenance workers hold pride and value their work. They tend to be protective about their jurisdiction over the machines. When it comes to characterizing the relationship between supervisors and production workers, most of the relationships can be seen as impersonal where people in command do not have much leeway. The centralization of power removes the role of personal influence on the part of the supervisors who now just assign procedural sanctions. But for the maintenance workers, the role of fixing the machines and knowing the technical expertise gives them considerable power. Because the timing and severity of machine breakdowns are unpredictable, the complete uncertainty of the

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<sup>137</sup> Mueller, *Public Choice III*, 362–63.

<sup>138</sup> Michel Crozier, *The Bureaucratic Phenomenon* (New Brunswick: Transaction Publ, 2010), 76, 93–99.

mechanical functioning gives disproportionate power to the maintenance workers. To protect that power, maintenance workers scold those who “tinker” with their machines to try to fix them and keep their trade a secret. It was noted that blueprints and maintenance directions often mysteriously disappeared.<sup>139</sup>

All of this is pertinent to understanding how advances in computational technology will further change the relationship between the state and its citizens. Voters choose the representatives who then write the policy that is implemented by the bureaucracy. The process of voters choosing representatives is already noisy and filtered. The representatives are the key decision-makers, but they too will know relatively little compared to the group of chief bureaucrats in charge of their agencies. Introducing computational technology further removes knowledge and control of the bureaucracy because even more expertise is needed to know how it all works. Without the technical expertise, it would be unlikely that the representatives would know enough about the technical underpinnings to push back against the attempts of the bureaucrat to increase their power in the face of uncertainty.

Just consider the demographics of the elected officials of the House of Congress. For the 118th Congress, the average age of Members of the House was 57.9 years and for the Senators was 64 years. While 96 percent of the Members of Congress have a college education, the majority served in professions of public services, politics, business, and law before joining. Only fifteen of the members (twelve in the House and three in the Senate) out of the 535 total members (2.8 percent) were engineers or software company executives before. In the tech hearings that have occurred in the past six years, lawmakers come off as highly uninformed and out of their depth. Between the tensions of “sensible regulation” and

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<sup>139</sup> Crozier, 103–5, 108, 153.

allowing companies to be competitive against those abroad, the lack of tech knowledge in Congress means they are dependent on other non-elected officials to determine for them.<sup>140</sup>

When it was revealed that the NSA had been collecting phone records of millions of customers daily, many Congress members expressed shock and claimed that they were unaware of these surveillance programs. Supposedly, the NSA had given twenty-two briefings in fourteen months before the leak. Members pointed out how dense and jargony the material tended to be. The process for obtaining the information requires (a) knowing the right thing to ask for and (b) going through a secure room where you cannot take your cell phone nor take notes with you outside of the room. Furthermore, the classified nature of the work means that members cannot talk to their staff about the technical content.<sup>141</sup> It is no surprise then that Congress members are rather ill-informed of the ongoings of the bureaucracies.

Hardly can we expect members of Congress, who should be representative of the whole people, to be subject matter experts on these complex issues involving deep technical details. But these features of our democratic government underscore the degree of separation that exists between those crafting policy and those implementing policy. That separation increases as uncertainty and knowledge gaps increase with computational technology. To the credit of policymakers and civic technologists, there have been efforts to bridge this gap. A nonpartisan organization called TechCongress places technology fellows in Congressional staffer roles for a one-year stint to increase government knowledge of emerging tech

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<sup>140</sup> Cecilia Kang and Adam Satariano, “As A.I. Booms, Lawmakers Struggle to Understand the Technology,” *The New York Times*, March 3, 2023, sec. Technology, <https://www.nytimes.com/2023/03/03/technology/artificial-intelligence-regulation-congress.html>.

<sup>141</sup> Ailsa Chang, “What Did Congress Really Know About NSA Tracking?,” NPR, June 11, 2013, <https://www.npr.org/sections/itsallpolitics/2013/06/11/190742087/what-did-congress-really-know-about-nsa-tracking>.

issues.<sup>142</sup> There are calls to start again the now-defunct Office of Technology Assessment (OTA) that would provide lawmakers with neutral information on science and technology issues. A fortified office could connect Congress to outside experts and research.<sup>143</sup> Still, I am dubious that the uncertainty gap could be filled enough to create a restraint on the bureaucrat maximizing her budget.

This is where computational technology will further change the dynamic of state and citizen. Elected officials are dependent on unelected officials to have any bearing on tech-related issues. If a bureaucrat comes to Congress members asking for funding to collect information related to their specific mission, it would be difficult for them to separate legitimate and appropriately scoped parameters for information collection as opposed to proposals that do not deliver enough benefits for their cost. Politicians with pet projects and interventionist tendencies will also benefit from this arrangement as they seek out the bureaucrats who collect the sort of information that will help them get elected. The more the bureaucrat will know, the more their data will be in demand, and the more they will be in demand. The information they collect using computational technology will further augment their power.

### ***Impact of Computational Technology on Voter Decisions***

Uncertainty also plays a role in how voters choose their elected officials. Uncertainty represents any lack of sure knowledge about how past, present, future, or hypothetical events may occur. In a world of certainty, every citizen would know what benefits him most, what

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<sup>142</sup> Traveis Moore, “Bringing Technology Expertise to Congress, When They Need It Most,” Knight Foundation, November 2, 2018,

<https://knightfoundation.org/articles/bringing-technology-expertise-to-congress-when-they-need-it-most/>.

<sup>143</sup> Maya Kornberg and Martha Kinsella, “Building Science and Technology Expertise in Congress” (Brennan Center for Justice, November 6, 2023),

<https://www.brennancenter.org/our-work/policy-solutions/building-science-and-technology-expertise-congress>.

the government is doing, and what the other party would do should they gain power. In such a condition, citizens can not influence another's vote because each citizen would have an unambiguous decision based on his or her political taste. Because of uncertainty, voters are willing to heed leaders who persuade them that they know the way toward the social goals that voters hold. The more uncertain a voter is about who will best represent their political preferences, the more they are willing to acquire additional information.<sup>144</sup>

The logic of voting involves several steps. First, a voter needs to gather information relevant to the important issues that matter to her. Then, she will analyze the facts, assess the alternative policies, and assess the consequences of the likely policies. After doing this assessment, she will determine the net benefits of stances on each policy. Finally, she will decide how she will vote (or even if she will vote). Every step in this process, except the final one of casting the ballot, can be delegated to someone else.<sup>145</sup>

There is a cost associated with researching, aggregating, and analyzing information on relevant issues. In a perfectly informed world where unlimited information is available to all decision-makers at zero cost, there is no cost from the consumption time it takes to make use of all the data. But in reality, the human mind is constrained in its computational power, and evaluating data takes time. "None of the information a man receives is completely costless. Merely perceiving it takes time; and if he assimilates it or thinks about it, these acts take more time."<sup>146</sup> Decisions must be made within a deadline (i.e. the next election). By transferring the costs involved in becoming informed, the voter still bears the costs indirectly but makes use of economies of scale and the expert knowledge of specialists.

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<sup>144</sup> Anthony Downs, *An Economic Theory of Democracy* (New York: Harper Collins, 1957), 77–87.

<sup>145</sup> Downs, 209.

<sup>146</sup> Downs, 222.

A voter must select from among the available data to become informed. Deciding what to select and what to reject can itself be a costly activity, so the voter can choose to transfer those costs to someone else. “Because of the division of labor, most citizens in modern democracies do not gather for themselves the information they need for political decision-making.”<sup>147</sup> Instead, citizens choose from among thousands of specialized agencies, from newspapers to TV broadcasts to social media accounts to podcasts, to help them acquire information relevant for their decision-making; naturally, the voter will select those sources that most closely resemble the tendencies of his own had he been the one doing the reporting itself.

Rational citizens, who have an opportunity cost for the time they could spend on their private activities, operate under pressure to cut down the quantity of scarce resources they use to acquire political information. Any information solely for personal enlightenment is entertainment information. Any information useful for some decision-making ends can be called non-entertainment information. The voter acquires non-entertainment information to cast a ballot. At the minimum, he must learn some information to vote, like what day the election is, who the different parties are, and what are the candidate names. He will determine for himself how much additional information to acquire such that he reaches a point where the marginal benefit from the information equals its marginal cost. These calculations that a voter makes are implicit in the rational decision-making process.<sup>148</sup>

It is not surprising that voters spend minimal time, even no time, acquiring additional political information to make a decision. Voters practice rational ignorance in which they avoid acquiring knowledge because the costs of educating oneself on an issue exceed the

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<sup>147</sup> Downs, 212.

<sup>148</sup> Downs, 215–20.

potential benefits. When the voter multiplies her party differential (the difference in expected utility between her preferred party and the next most likely party) by the chance her ballot is the deciding vote (one over the size of the voting population, assuming people vote randomly), she realizes the returns on her choice are so low. Voting is not costless, and even a small cost is enough justification to cause voters to abstain. In other words, it is irrational to be politically well-informed for the average voter because the low return from acquiring the information does not justify their cost in time and other scarce resources.<sup>149</sup>

Computational technology affects this process of information acquisition relevant to political decision-making. Its main effect is the decentralization of content mediation. Traditionally, newspapers and cable TV played a critical part in how Americans became informed. At the peak, there would be more than sixty million US daily newspapers in circulation every weekday between 1960 and 1990. In 2022, the estimated total US daily newspapers was twenty-one million on weekdays. Some of that has been supplanted by newspaper websites. The top fifty US newspapers saw a combined average of just under nine million monthly unique visitors; users would spend an average of 1.5 minutes per visit.<sup>150</sup> Cable networks have seen year-over-year declines in their audience sizes.<sup>151</sup> Now, 86 percent of Americans get news from a smartphone, computer, or tablet. Of these adults, 68 percent get news from news websites or apps. But these adults have new additional sources for their news. Among those who get their news through digital devices, 53 percent of US adults get news from social media and 22 percent from podcasts.<sup>152</sup>

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<sup>149</sup> Downs, 258–59.

<sup>150</sup> Sarah Naseer and Christopher St. Aubin, “Newspapers Fact Sheet,” *Pew Research Center’s Journalism Project* (blog), November 10, 2023, <https://www.pewresearch.org/journalism/fact-sheet/newspapers/>.

<sup>151</sup> Brad Adgate, “The Audience For Cable News Has Dropped Notably This Year,” *Forbes*, March 29, 2023, <https://www.forbes.com/sites/bradadgate/2023/03/29/the-audience-for-cable-news-has-dropped-notably-this-year/>.

<sup>152</sup> Elisa Shearer, “More than Eight-in-Ten Americans Get News from Digital Devices,” *Pew Research Center* (blog), accessed April 7, 2024,

Computational technology leads to a proliferation of information sources by decreasing the barriers to entry. For less than \$100 a year, anybody can start a blog site and host it on a server that can reach a million citizens. For \$0, anybody can start a social media account and disseminate information to millions in that way. Some people are concerned about echo chambers spurred by algorithms pushing content that users interact with. Like-minded users find others with similar tastes and create a reinforcing shared narrative with the information they consume. This clustering of like-minded peers dominates the majority of internet interactions on platforms like Twitter and Facebook.<sup>153</sup> Others worry about fake news on social media and how that influences misleading beliefs based on false information.<sup>154</sup> While both of these concerns warrant further discussion, there is a fundamental change that deserves more attention.

The fundamental calculus for a citizen on how to use her scarce resource of time changes with the proliferation stemming from computational technology. Information on political decision-making does become more widespread, accessible, and easy to digest with even more specialized “agencies” and individuals providing content catered to a specific group. But entertainment and non-political related information also increase. The increase in accounts and content creates competitive pressures. They also increase the opportunity cost of spending another minute learning about a particular political issue because users have an array of content that better suits their particular interests.

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<https://www.pewresearch.org/short-reads/2021/01/12/more-than-eight-in-ten-americans-get-news-from-digital-devices/>, <https://www.pewresearch.org/short-reads/2021/01/12/more-than-eight-in-ten-americans-get-news-from-digital-devices/Shearer>.

<sup>153</sup> Matteo Cinelli et al., “The Echo Chamber Effect on Social Media,” *Proceedings of the National Academy of Sciences* 118, no. 9 (March 2, 2021): e2023301118, <https://doi.org/10.1073/pnas.2023301118>.

<sup>154</sup> Giandomenico Di Domenico et al., “Fake News, Social Media and Marketing: A Systematic Review,” *Journal of Business Research* 124 (January 1, 2021): 329–41, <https://doi.org/10.1016/j.jbusres.2020.11.037>.



Social media makes engagement in civic and political activities easier but not as involved. In 2023, 46 percent of social media users had been politically active. However the measured activities were shallow actions. It does not take much to post a hashtag for a cause or to encourage others to take action via a post.<sup>155</sup> If everyone can do it, the impact of that type of activism diminishes. Users realize that they are better off spending time on other content. Knowing the best chicken sandwich shop in town because you watched a few food reviews will be more directly beneficial and have a greater impact on your utility than watching an equivalent amount of political content to decide on who to vote for.

In the past, newspapers and cable TV played the role of mediator. By being one of a (relatively) few providers of entertainment and non-entertainment information, they had to decide on the balance between certain types of content to determine what would get airtime and for how long. They would decide the ratio of entertainment to non-entertainment content based broadly on ratings and general population interests. The removal of that mediator upends the consumption of information. The ratio of entertainment to non-entertainment content increases as users seek out content that better interests them and has a higher expected benefit.

Computational technology changes how voters become informed and how attentive they are to the political process. By themselves, they do not warrant regulation of technology. These technologies became what they are because they better suit the preferences of users; citizens no longer are forced to watch from a handful of selections on TV when they have choices among a thousand options in their hands.

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<sup>155</sup> Samuel Bestvater et al., “Americans’ Views of and Experiences with Activism on Social Media,” *Pew Research Center: Internet, Science & Tech* (blog), June 29, 2023, <https://www.pewresearch.org/internet/2023/06/29/americans-views-of-and-experiences-with-activism-on-social-media/>.

### *Applying Public Choice to Design Better Governance*

By the standards established in the previous section, voting rates should be meager. Even if your vote is one in 150,000 rather than one in 150,000,000 for a presidential election (ignoring the electoral college and assuming the popular vote candidate wins), the impact of your vote is marginally small (basically zero) if the other voters randomly choose between two candidates. It is even smaller if the other voters are not equally likely to choose between the two main candidates. Even if someone's expected utility differs on the magnitude of hundreds of thousands of dollars between two candidates (i.e., they would be willing to pay that much money to have their candidate win if they had that power), the probability of being the deciding vote is so low that if the opportunity cost of your time spent voting were even one dollar, you would be better off not casting a ballot.

Given these expected utility calculations, it is surprising that the US voting rate is high. In the 2020 presidential election, about two-thirds of the voting-eligible population did so.<sup>156</sup> Given the power held by unelected bureaucrats and the variety of entertainment information available to voters, we should expect voters to recognize the opportunity costs of their time and not vote. But many voters continue to cast a ballot. This indicates that the voters (myself included) gain some psychological benefit from being informed and voting. Engaging in the political process affirms the sense of patriotism and connectedness that citizens value. But this can be better directed if we restructure the expenditure by the national government.

Computational technology can give elected officials a better picture of the effectiveness of bureaucrats' budget expenditures. With more powerful computational tools,

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<sup>156</sup> Pew Research Center, "Voter Turnout, 2018-2022," *Pew Research Center - U.S. Politics & Policy* (blog), July 12, 2023, <https://www.pewresearch.org/politics/2023/07/12/voter-turnout-2018-2022/>.

government accountability agencies can more accurately and granularly develop an interval view of the bureaucracies in charge of government outputs. Each financial transaction the bureau makes can be monitored, mapped, and compared against other competitive prices. Goods bought by the agencies can be better tracked. This greater knowledge of bureau activities needs to be tied with a greater ability to restructure roles and fire individuals. Putting the bureaucracy firmly under the control of the politicians brings government production closer to the voters. The voter can vote in and out the politician, not the bureaucrat.

A system of local governments will function better in a world with computational technology than a singular national government will. As defined by the US Census Bureau, there were 90,837 local governments—including county, township, municipal, and special-purpose entities—in 2022.<sup>157</sup> This diversity of local governments creates opportunities for people to choose the community that best represents their optimal bundles of taxes and public goods. Charles Tiebout hypothesized that consumer-voters would move out of communities that were ill-suited to their wants and needs into ones that better fit them. In doing so, they vote with their feet and reveal their preferences. One of the assumptions of Tiebout’s local government model requires full knowledge about the differences between the communities.<sup>158</sup> Computational technology contributes to the spread of knowledge.

With computational technology, there has been a greater dissemination of information. That spread of information can be used to strengthen competitive tendencies among the state governments and the local governments. In a survey of 1,856 general

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<sup>157</sup> Amy Smaldone and Mark L.J. Wright, “Local Governments in the U.S.: A Breakdown by Number and Type,” Federal Reserve Bank of St. Louis, March 14, 2024, <https://www.stlouisfed.org/publications/regional-economist/2024/march/local-governments-us-number-type>.

<sup>158</sup> Charles M. Tiebout, “A Pure Theory of Local Expenditures,” *Journal of Political Economy* 64, no. 5 (1956): 416–24.

purpose local governments in Michigan, eighty-one percent reported having a website, and twenty-nine percent reported having a social media presence.<sup>159</sup> Some local governments manage their open data portals to release datasets that can be used for visualization. The widespread access to community information will help residents better discover a possible new home.

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<sup>159</sup> Debra Horner, Thomas Ivacko, and Om Shah, “Internet Presence among Michigan Local Governments: Websites, Online Services, and Experience with Virtual Meetings” (The Center for Local, State, and Urban Policy, May 2022), <https://closup.umich.edu/michigan-public-policy-survey/100/internet-presence-among-michigan-local-governments-websites-online-services>.

## Chapter 5: Technological Imaginings of the Future State

Science fiction literature provides a rich field for thinking about the technologies we can build and the new worlds we want to create. Past science fiction works have predicted earbuds, video chatting, tasers, tablets, and more.<sup>160</sup> While these accurate predictions are impressive, they are only part of the purpose of science fiction literature. After all, you will get a few correct predictions with enough short stories and novels in publication. Rather than judging science fiction works by whether they come true, we should instead use science fiction to think through possible futures and test new ideas of how we could live together (or apart). Without dealing directly with past technological and societal projects' attempts, successes, and failures, writing about the future provides a laboratory to discuss implausible ideas.

### *Science Fiction as a Medium for Public Discussion*

Science fiction opens the discussion about our technological futures for those who do not possess deep technical knowledge. Democratic societies need a way to engage the public on the pertinent questions about what our future should look like. Even though technical knowledge and rationality are essential in the scientific lab for discovery and invention, a broader public consensus is necessary for applying those changes in society. American adults are worried about the impact of tech as it stands today. In a survey, 79 percent of Americans shared worries about the use of technology for government surveillance, and 78 percent expressed concern about excess dependence on technology for critical infrastructure.<sup>161</sup> Only a few people with the necessary knowledge will understand technology's specific and

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<sup>160</sup> Charlotte Ahlin, "12 Sci-Fi Books That Actually Predicted The Future," Bustle, May 24, 2016, <https://www.bustle.com/articles/161593-12-sci-fi-books-that-actually-predicted-the-future>.

<sup>161</sup> Taylor Orth, "What Concerns Americans about the Future of the U.S. Tech Industry? | YouGov," February 2, 2023, <https://today.yougov.com/technology/articles/45142-wconcerns-americans-about-future-us-tech-industry>.

detailed development through government and technical reports. However, science fiction access can achieve a more significant percentage of the public by creating stories that depict a thoughtful representation of the world we may get. What will be the enduring realities of human existence? How will meaning and identity change if humans develop a more extraordinary ability to improve their biological constraints? What are the fundamental moral dilemmas that individuals and communities will face with new and emerging technologies?<sup>162</sup>

Imagining an alternative future enables inventors and innovators to discover breakthroughs and design new tools. Science fiction writers recognize that their works have and can inspire or dishearten those working to build the tools of the future. Big tech companies, like Apple and Google, sponsor lecture series and “design fiction”—speculative pieces aimed at exploring possible futures—to model new ideas and discuss potential market products. Science fiction author Eileen Gunn wrote, “Science fiction, at its best, engenders the sort of flexible thinking that not only inspires us but compels us to consider the myriad potential consequences of our actions.”<sup>163</sup> The spectrum of science fiction ideas that depict utopian to dystopian narratives forces us to probe how we think about the future from our present view.

The selection of science fiction short stories and novels for exploration in this chapter was sporadic and unsystematic. I relied on suggestions from Professor Ross Cameron, online lists of classic science fiction books, and suggestions from OpenAI’s ChatGPT and Anthropic’s Claude. I aggregated their suggestions, surveyed their broad themes using

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<sup>162</sup> Clark A Miller and Ira Bennett, “Thinking Longer Term about Technology: Is There Value in Science Fiction-Inspired Approaches to Constructing Futures?,” *Science and Public Policy* 35, no. 8 (October 1, 2008): 599–600, <https://doi.org/10.3152/030234208X370666>.

<sup>163</sup> Eileen Gunn, “How America’s Leading Science Fiction Authors Are Shaping Your Future,” *Smithsonian Magazine*, May 2014, <https://www.smithsonianmag.com/arts-culture/how-americas-leading-science-fiction-authors-are-shaping-your-future-180951169/>.

Wikipedia, and narrowed them down to capture differing perspectives on how computational technology will reorganize the state's power.

In this chapter, I explore science fiction works that use technology in the broad sense and do not restrict myself to “computational technology.” For one, I found no works exploring alternative political realities mediated directly by computational technology. Additionally, computational technology will be part of this century's advancing and emerging technologies. Other technologies will contribute to reorganizing state power as we know it. This chapter contains many spoilers from the stories. I have always believed that if a good book is worth reading, it will still be worth reading after you know its plot.

### ***Too Like the Lightning: Fast Travel Upending the State***

Imagine a world without nation-states or genders. People have complete mobility and fast travel. Just like you might become a member and have certain obligations to a club, people can join in and exit from giant nations that are not geographically restricted. No longer are people limited by a traditional nuclear family. Instead, anyone can live with friends and romantic partners in a bash’—a basic unit of social organization with lots of flexibility in its hierarchy. These statements describe the Terra Ignota world created by Ada Palmer in *Too Like the Lightning*. In this first part of a four-part series, we experience this new world and see events threatening the world order. In this first part, the narrative occurs between March 23, 2454, and March 27, 2454. The book is weird and hard to parse, but the ideas are interesting, thought-provoking, and relevant for understanding how state power can change under the right technology.

Palmer introduces the reader to a flawed utopia, but one open to debate about what sacrifices and tradeoffs are necessary to create a utopia. The typical person works twenty

hours a week, lives on average 150 years, holds a significant amount of political self-determination, and resides in a world that has been at peace for 300 years. But achieving such prosperity requires censorship, severe religious restrictions, silencing of gender, and underlying tensions of political strife.<sup>164</sup> Ada Palmer, a historian and professor at the University of Chicago, takes influence from the Renaissance to ask questions about the role of science, religion, and the nature of our future.<sup>165</sup> However strange the world of Terra Ignota feels, we must remember that those three hundred years ago would find our world and norms, like clothing, just as odd.

Palmer does not want us to think of this society as perfect. For one, the narrator of the story is Mycroft Canner, a mass murderer spending the rest of his life as an indentured servant in the servicer program. The Servicer Program determines which criminals are not dangerous anymore and allows them to serve the public good.<sup>166</sup> Lifelong community services instead of prison or the death penalty may seem better in some ways. But servicers are slaves of the state and are “let loose to wander, without home or property, to serve at the command of any citizen who needed labor.”<sup>167</sup> They only earn food or rest after a day's work and live ambitionless lives. As this applies to Canner, servicers can work past the typical 20 hours a week and take anti-sleep pills to work even more. Maybe a world without capital punishment and limited imprisonment is better. But we should not forget that this is not a world without the possibility of violence.

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<sup>164</sup> Ada Palmer, “Perhaps the Stars Essay Roundup plus AMA Best-of: Religion & Utopia in Terra Ignota – Ex Urbe,” November 26, 2021,

<https://www.exurbe.com/perhaps-the-stars-essay-roundup-plus-ama-best-of-religion-utopia-in-terra-ignota/>.

<sup>165</sup> “Ada Palmer | Department of History,” accessed March 30, 2024,

<https://history.uchicago.edu/directory/Ada-Palmer>.

<sup>166</sup> Ada Palmer, *Too like the Lightning*, First edition, Terra Ignota, Book 1 (New York: TOR, 2016), 251.

<sup>167</sup> Palmer, 28.



Globalization brings about a change in how people organize themselves politically. Specifically, super-fast travel enabled people to sleep, work, and eat in different places daily. *Mukta*, the name for the first vehicle, circled the globe in four-point-two hours in the year 2073, bringing any location on Earth within commuting range and setting the start of the end for the geographic nation.<sup>168</sup> You can now wake up with a view of the Patagonia Mountains in Argentina, eat a beignet in New Orleans, work in New York City, take a spa break in Reykjavik, and meet with a client in New Delhi—all in a day. Flying cars allow people to travel safely at over 1000 km/hr.<sup>169</sup> The Six-Hive Transit System (the Utopian Hive has a separate system) will enable individuals to hire a car from anywhere on the Earth cheaply and instantly. *Mukta* led to an intermixed world where it would be absurd to feel attached to the particular town you were born in.

In 2130, Hives replaced nations. Taking naming inspiration from bees, who harvest the fruits of nature and process them with their talents into honey, the Hive acts as a modern union. In the Hive, “members [are] united, not by any accident of birth, but by shared culture, philosophy, and, most of all, by choice.”<sup>170</sup> In a Renunciation Day speech (the parallel of American Independence Day), Chairman Thomas Carlyle, the founder of the first Hive, argues that explicit consent, over tacit consent, is necessary. “No nation, whatever its power, can be called great when it imposes tyranny upon its citizens—worse, upon people it claims as its citizens, not because they have enjoyed the fruits of its soil, or benefitted from its protections, but because by chance their grandparents were born within that blotch of color on a map it calls it own.”<sup>171</sup> Carlyle insists that the answer to “what is a people?” must be

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<sup>168</sup> Palmer, 43.

<sup>169</sup> Palmer, 61.

<sup>170</sup> Palmer, 43.

<sup>171</sup> Palmer, 104–5.

based on “common bond, not of blood or geography, but of friendship and trust” where the government exists to protect that common bond with laws that ensure those rights. That bond can unite friends who live and work in different countries. The Hive exists as an organization to protect your family and property, even when members do not live close to one another.<sup>172</sup>

Each Hive can be freely created, joined, and exited. There are seven major Hives, each valuing something different. The Humanists concern themselves with human excellence, especially through competition and celebrity, such that members work to be the best in some way. Valuing cooperation and kindness, the Cousins run the schools and hospitals, care for the orphans, and ensure prisons are humane. The Masons put importance on strength, authority, and power. The Gordian Hive explores the hidden depths of the brain to maximize human productivity, intelligence, and originality. Over time, the European Union evolved into a Hive for those who care deeply about national heritage, and it served as the forefather of all Hives. The Mitsubishi is the only Hive to put value on something outside humanity and instead on land and nature.<sup>173</sup> They see land as the best route to power and own most of the land on Earth. Perhaps the Utopians are the most appealing to science fiction readers—including me. The Utopians may be the smallest Hive (and most mysterious) but have the greatest ambition with their sights set on the future. Utopians work on space exploration, terraforming Mars, managing their capital on the Moon, extending human life, and eventually disarming death into impotence.<sup>174</sup> By allowing people to join after they take an Adult Competency Exam and leave whenever they feel like, Hives are naturally checked by the ability of the people to self-sort.<sup>175</sup>

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<sup>172</sup> Palmer, 105.

<sup>173</sup> Palmer, 223.

<sup>174</sup> Palmer, 154, 161.

<sup>175</sup> Ada Palmer, “Writing the Science Fiction Future of Global Politics,” *Reactor*, November 2, 2021, <https://reactormag.com/writing-the-science-fiction-future-of-global-politics/>.

Different from the ones we are familiar with today, Hives employ contrasting government systems from one another. Consider Mitsubishi's shareholder democracy. Every member of the Hive gets one vote. Those who own an apartment receive an additional two votes. A house: five more. A factory: twenty. A forest: thirty.<sup>176</sup> The European Union continues as a parliament. The Masons practice non-hereditary absolute monarchy. Gordian uses a corporate board. The Cousins have the most straightforward system with their suggestion box.<sup>177</sup> The Humanists implement a flexible constitutional democracy where voters determine how much power candidates on the ballot get by their popularity. The government will have a more robust executive/dictatorial system if one candidate gets many votes. In contrast, the Hive will be a republic if members spread their votes over many candidates. The Utopians exhibit the most difficult-to-imagine system. Their system functions as an organized anarchy of networks of teams called Constellations, which themselves can be deceiving and unpredictably formed.<sup>178</sup>

Palmer's Hives parallel Srinivasan's Network States. While decentralized, computational technology brings about the fall of the nation-state in the network state, fast transportation upends the nation-state in the world of Hives. The emergence of Hives feels realistic. If the internet enabled people to choose to spend time with those who they want anywhere in the world online, fast travel certainly makes that feasible in the physical world. In a more physically connected world, restriction by arbitrary country lines acts more as a barrier than benefit. Legacy countries would be incentivized to accept the passports of newly formed Hive because the movement of people into their country for work or play would increase economic growth and their tax revenues. Even better, Hives take responsibility by

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<sup>176</sup> Palmer, *Too like the Lightning*, 225.

<sup>177</sup> Palmer, 282.

<sup>178</sup> Palmer, 149.

compensating for the damages and crimes of their members regardless of where they are located. This would alleviate some of the burden on public goods within a country's territory.

At first, larger nations, like America, would be hesitant because they would be interested in protecting their existing power, but smaller nations would lead the transition. Most countries are relatively small and benefit greatly from mobile groups moving in and out of their territory (i.e., tourists). Taking that one step further, countries would slowly reduce their government services in place of the services that Hives give to their members. This would allow them to be competitive against other small countries vying to have Hive members live and work in their space because visiting members would shoulder a smaller tax burden. The diversity of governments among the Hives will further improve how members self-sort so that they can choose to join Hives with varying levels of the strictness of laws and varying amounts of governmental services.

The tenuous and uncertain part of Palmer's world lies in how these conflicting Hive values and government structures interact in the real world. A Hive member would be subject to different rules and regulations based on whose private property they visited and to which Hive that property belongs. In theory, individual cities and areas will have specific geographic restrictions, and the Hive would pay a fine on your behalf should you break local law. The Hive would then have its agreed-upon punishment it deems appropriate for you.<sup>179</sup> Anytime an individual leaves the Six-Hive Transit System, a voice recording tells her where she landed and reminds her to adhere to the special regulations that apply to that area; the car even offers a list of local rules that may differ from the individual's customary law code.<sup>180</sup> In practice, I am skeptical that this Hive system has enough procedures to navigate the inherent

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<sup>179</sup> Ada Palmer, "From Ada's AMA: Terra Ignota, Bash'es & Hives – Ex Urbe," February 15, 2018, <https://www.exurbe.com/from-adas-ama-terra-ignota-bashes-hives/>.

<sup>180</sup> Palmer, *Too like the Lightning*, 76.

tension of managing various jurisdictions and conflicting norms. As far as I could find, Palmer never specifies how geographic areas will pass specific laws and regulations. Would each bash have one vote? Does each person have one vote? Is it all decided by committee or a single powerful mayor? How do culture clashes in public places get managed?

The Universal Free Alliance exists to maintain the balance among the seven Hives. Built within a year and recreated in the image of ancient Rome, Romanova functions as the capital of the new world of Hives where most of the governing bodies of the entire Hive system reside. Each Hive maintains its capital city somewhere else in the world, but Romanova serves as an administrative hub. Romanova handles Hive registration, Hive switching, complex legal cases involving multiple Hives, and the rights of minors. There exists a Senate with representatives from all Hives to act as advisors.<sup>181</sup> Still, it is hard to imagine a system working smoothly without obvious distinctions in jurisdiction that inherently exist when nations have specified geographic borders. Notwithstanding these unclear mechanisms for dealing with the inherent tension between Hives, Palmer's world presents an opportunity for improved political self-determinism.

Among their options for political self-determination, individuals not only have a choice among the seven major different Hives (and the many, smaller, less relevant ones), but they also have a choice to not join one. "Great institutions—Hive, strat, nation, kingdom, guild—all are built of consensus, willed into reality by we who love, obey, protect, and fear."<sup>182</sup> If a Hive is built on consensus, there needs to exist an alternative for the individual who agrees with none but herself. That alternative is to be Hiveless. Romanova provides three sets of carefully crafted neutral laws that grant Hiveless people more autonomy: a

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<sup>181</sup> Palmer, 72–73; Palmer, "Writing the Science Fiction Future of Global Politics."

<sup>182</sup> Palmer, *Too like the Lightning*, 229.

restrictive White Law, a moderate Gray Law, and a minimal Black Law. All people are restricted by the Seven Universal Laws, which prohibit the torturing of children, mass destruction, extensive damage to nature, and other related crimes. But beyond that, Blacklaws may do as they please within their territories of anarchy, including murdering other Blacklaws.<sup>183</sup>

If the social contract theorists are right, states derive their legitimacy over the individual through explicit or tacit consent and surrender some freedoms to an authority in exchange for protection. But tacit consent is not as strong as explicit consent because a lack of alternatives and high costs of exits leave people stuck in their birth state. As Robert Nozick wrote, “tacit consent isn’t worth the paper it’s not written on.”<sup>184</sup> In Palmer’s world, the individual now has a real alternative by simply declaring herself into one of the categories of Hiveless. Hiveless individuals take pride in having to not answer to any authority beyond the minimal Universal laws. A black sash on the individual acts like a poison label declaring “here stands a Blacklaw” who “face[s] the Earth with no protection but his own strength.”<sup>185</sup> The Blacklaw would rather “invite their fellows to prey on them like lions than accept a law that deprives them of any freedom, even murder.”<sup>186</sup> While this may seem strange, given that they are prohibited from interfering with those who seek the protection of a Hive, it does seem fair to allow these individuals their freedom among themselves.

In many ways, the Hive and Hiveless system seem like a more fitting political set-up for the appropriately advanced technology. But the book also forces us to confront a couple

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<sup>183</sup> Palmer, “Writing the Science Fiction Future of Global Politics,” 234.

<sup>184</sup> Nozick, *Anarchy, State, and Utopia*, 287.

<sup>185</sup> Palmer, *Too like the Lightning*, 89, 92–93.

<sup>186</sup> Palmer, 234.

uncomfortable possibilities. One concerning issue is that the Hive system allows all the heads of states to be a part of a secret bash together. They meet at a brothel multiple times a week. Madame D’Arouet (the head of the bash) and J.E.D.D. Mason (her son and “God of Another Universe”) exert great influence over the world’s powers.<sup>187</sup> Without specified geographical borders and with a super fast transit system, the leaders are able to escape from their daily duties and escape from the gaze of their citizens to conspire together. The world powers are related or married to one another, and it is clear that they have some interest as a bash that go beyond (and possibly in conflict with) the well-being of their Hives. They eagerly seek the advice of unelected J.E.D.D Mason and share unofficial power with him.

Furthermore, readers will likely find some aspects of Blacklaws disturbing. Without any Hive to intervene against exploitation or set paternalistic ground rules for the protection of its member, Hiveless members can enter any contract they wish. In the story, we meet Gibraltar Chagatai, a Blacklaw Hiveless, who serves as the housekeeper for J.E.D.D. Mason. Chagati was a smuggler and thug before she became an acclaimed cook and successful author of recipe books. At a certain point earlier in her life, she messed up a job and owed her enemies “more money than [her] life was worth.”<sup>188</sup> Tribune Mason offered to pay off her enemies in exchange for lifetime room and board if she would become his chef and housekeeper.<sup>189</sup> If at any point she wants to leave, her contract specifies that she would have to pay the full money of the original debt back. Without bankruptcy law to act as protection, such a contract is legitimate and enforceable. Members in Palmer’s world need to accept that people’s choices among the Blacklaws must be accepted regardless of one’s own preference. They would have no ground or claim to intervene on behalf of another person.

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<sup>187</sup> Palmer, 320–38.

<sup>188</sup> Palmer, 234.

<sup>189</sup> Palmer, 235.

Moreover, language is policed in this society. On the first page of the book, we are told that this narrative has been published with the permission of several different committees including “The Five-Hive Committee on Dangerous Literature” and “The Romanova Seven-Hive Council Stability Committee”. The narrator, Mycroft Canner, must get the consent of all “free and unfree living persons” portrayed in the book. Without the protection of free speech and with such explicit censorship, we are left to think about what parts of the story have been left out or altered. Not only is language policed in its content, but people’s knowledge of different languages is controlled via cultural norms. While in present-day society we feel pride in knowing multiple languages and talking to people in their native language, translating another Hive’s language is a taboo, and Mycroft Canner feels guilt when he eavesdrops unwillingly on conversation among Hive members chatting in their private tongues.<sup>190</sup> Given that Hives compete with one another to retain members, it seems odd how universal censorship and norms surrounding language learning are.

Among the universal traits of Hives exists an abolition of religion as we understand it today. The creation of the Hive followed after the destructive Church War. Society banned religious houses, meetings, and proselytizing. The laws are so stringent that even three people in a room talking about religion is considered a Church meeting and subject to harsh penalties from Romanova. Instead, “sensayers” (coming from the word “sensei”) replace the priest to act as a sort of religious therapist and philosopher who presents answers from all faiths equally. “With this new creature [of sensayer] as his guide, let each man pick through the fruits of all theologies and anti-theologies, and make from them his own system, to test, improve, and lean on all the years of his long life.”<sup>191</sup> In practice, the role of the sensayer

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<sup>190</sup> Palmer, 40–41.

<sup>191</sup> Palmer, 18.



seems too potent. We learn that the head of the sensayers holds her own opaque agenda that entangles herself with the world leaders. The lack of transparency and freedom of religion restricts people's ability to seek counsel and advice beyond their personal sensayer. These sensayers are manipulable by their supervisors in the hierarchy, and it is unclear if there is a strong sensayer-client confidentiality policy.

On the note of privacy, the universal surveillance of all members in Hives is normalized. Every individual is given a tracker earpiece that can detect sudden jumps in heart rate or adrenaline. The tracker will automatically call for help, unless you let the tracker know that everything is good. These trackers can also be used to transmit signals that allow someone else far away to listen in without any other party knowing. While trackers help reduce the number of crimes and murders, it comes at the cost of Hives knowing the location of their members at all times. The select few who have the knowledge to turn off trackers or who are allowed to turn off trackers in secret areas have an advantage of privacy that is unavailable to most.

While not directly relevant to this thesis, I want to mention the issue of set-sets in Terra Ignota. From an early stage of life, certain children undergo a training process that involves surgical removal of their traditional senses and rigorous education. They lose the ability to walk, are connected to virtual-reality interfaces, and can only communicate with text via their trackers. For this exchange, they gain fluency with datasets and can process information in ways normal members cannot. Their computational ability makes them foundational to the modern society in Terra Ignota.<sup>192</sup> Beyond the ethics of what it means for a society to depend on a few people's sacrifice and suffering, there is a question of what it means to be human if you have sufficient power to control each level of your development in

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<sup>192</sup> Palmer, 56–63.

the way a set-set does.<sup>193</sup> Their story reminds me of Cletus Jefferson from Joe Haldeman science fiction short story *None So Blind*. Cletus sacrifices his eyes to free up space from his visual cortex to become much smarter.<sup>194</sup> The world adjusts and accomodates his chosen blindness. In a world with such advanced technology, human identity comes under question when people have such an ability to “upgrade” their bodies that distort traditional notions of humanity. But that question remains to be explored in another thesis.

Palmer’s *Too Like the Lightning* leaves us to consider the tradeoffs necessary to make utopia work. With the book’s abrupt end and three more books in the series, there are still plenty of questions to ponder about this world. Fast travel birthed a world where the majority no longer exists in any ethnic sense. Majority vanishes without Church and Nation as people no longer see themselves as “us” versus “them” in any definite and pre-determined sense. Instead, people can choose which political organizations to join and who they live with in ways they never have before. In some ways, this presents new opportunities for a more collaborative spirit that eliminates war. In other ways, censorship, constant surveillance, and restriction on religion limit the ways people can unite.<sup>195</sup> As a character in the book warns towards the end, war, revolution, and blood have not been made impossible. Violence has not died from society, but has become subdued— likely temporarily.<sup>196</sup>

Though different in the technology it employs, *Terra Ignota* portrays a state transformed by new technological advances. Rather than a revolutionary overthrow of the existing state, the technology enables a gradual shift in the character of the political organization. A similar transition can occur with computational technology. The internet

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<sup>193</sup> Palmer, 383.

<sup>194</sup> Joe Haldeman, “None So Blind, Joe Haldeman | The Short Story Project,” The Short Story Project, October 8, 2021, <https://shortstoryproject.com/stories/none-so-blind/>.

<sup>195</sup> Palmer, *Too like the Lightning*, 293.

<sup>196</sup> Palmer, 357, 418.

allows people to connect across borders, and countries want to encourage those interested in doing business to come to their territories. Over time, it would be conceivable to see more porous borders.

***The Machine Stops: Dangers of an All-Providing State***

If *Too Like the Lightning* sees a future where fast cars create mobility and allow anyone to travel everywhere, E.M. Forster’s 1909 “The Machine Stops” tells a story where airships that can travel the world render the need to travel the world unnecessary. The sixty-page short story conceives of a world where each person lives underground in a “small room, hexagonal in shape, like the cell of a bee.”<sup>197</sup> They live alone and are all provided with one-size-fits-all, identical furniture. Residents rarely (if ever) leave their rooms. “The Machine” provides for all they want so that people can live in constant comfort and without pain.

The story follows two main characters: Vashti, a pale older lady who wishes to stay in her room at all times, and Kuno, a younger boy eager to see the outside world. Vashti is technically Kuno’s mother, but only in the biological sense. Like all the “mothers” in this story, Vashti only gave birth to Kuno; afterward, the Machine removed him to a public nursery where she only visited him once. He would visit her a few times until the Machine assigned him a room on the opposite side of the Earth.<sup>198</sup> The Machine offers people the ability to talk to one another over a round blue plate where they can see each other’s faces.<sup>199</sup> This “blue plate” functions much like FaceTime or Zoom does. In the book’s first half, we

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<sup>197</sup> E. M. Forster, “The Machine Stops,” in *Fairy Tales for Computers*, First Edition (Eakin Press, 1969), 1.

<sup>198</sup> Forster, 13.

<sup>199</sup> Forster, 3.

see Kuno implore Vashti to visit him because he has something important to tell her that he does not want to say through the Machine.

Vashti hesitates to visit, though. She feels the blue plate system for calling was sufficient, but Kuno insists that his essential thing must be in person. Vashti eventually relents and agrees to take the journey from the southern hemisphere, where she lives, to the northern hemisphere, where her son lives. She takes a system of airships that takes two days to complete this journey. By the standards of 1909, this speed of travel for the ordinary person would have been breakneck; the record for circumnavigation in 1913 was 36 days.<sup>200</sup> Only six years earlier had the Wright brothers made their first flight, lasting 12 seconds over and traveling 36 meters.<sup>201</sup> In the story, the airship system is robust and impressive. The system operates regardless of the weather. “Night and day, wind and storm, tide and earthquake, impeded man no longer. He had harnessed Leviathan. All the old literature with its praise of nature, and its fear of nature, rang false as the prattle of a child.”<sup>202</sup> Civilization has conquered nature and, in doing so, had changed the way it sees itself.

Civilization no longer sees itself as part of the world but is removed from it. Fast travel defeats itself. “Few traveled in these days, for, thanks to the advance of science, the earth was exactly alike all over.”<sup>203</sup> From the perspective of those living underground, the surface of the Earth is filled with only dust and mud with no signs of life on it. People connect with one another from their rooms instead of in person. “The clumsy system of public gathering had been long since abandoned.”<sup>204</sup> Within each room exists an array of

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<sup>200</sup> “A RUN AROUND THE WORLD.” *The New York Times*, August 8, 1913, sec. Archives, <https://www.nytimes.com/1913/08/08/archives/a-run-around-the-world.html>.

<sup>201</sup> “1903 Wright Flyer | National Air and Space Museum,” accessed April 4, 2024, [https://airandspace.si.edu/collection-objects/1903-wright-flyer/nasm\\_A19610048000](https://airandspace.si.edu/collection-objects/1903-wright-flyer/nasm_A19610048000).

<sup>202</sup> Forster, “The Machine Stops,” 15.

<sup>203</sup> Forster, 14.

<sup>204</sup> Forster, 8.

buttons and switches for all their needs—food, music, clothing, hot bath, bed, and communication. The room allows them to stay in touch with the world.<sup>205</sup>

In contrast to Vashti's desire to stay in her room, Kuno feels cloistered. He yearns to visit the Earth's surface against his mother's advice. And he does eventually visit. Typically, you need a permit to visit, but Kuno finds a way on his own. He realizes there are likely remnants of abandoned ventilation shafts from when the city was built deep beneath. He discovers one of them in a railroad tunnel on the topmost level of the city. When he does reach the surface, Kuno speaks of the splendor of the sun shining on his body among the marbled clouds. He recounts the hills that he saw that seemed to beg his name. After spending the day at the surface, Kuno is discovered by the Machine and dragged back underneath by a long white worm (presumably a grabbing tube or cable).<sup>206</sup>

Kuno completed the journey because he maintained a higher level of physical strength than typical. In this society, the Machine considers muscularity a weakness. Infants at birth who showed promise of undue strength were killed because athletes who lived in this society could never be happy in the state of life that the Machine provides. That athletic individual would have desired mountains to trek, rivers to swim, and forests to explore as a way to measure her ability —none of which would be available. “Man must be adapted to his surroundings, must he not?”<sup>207</sup> Instead of trying to create technologies that complement and add to man's qualities, man's qualities are culled to fit with the existing technological landscape. Furthermore, the Committee controls who gets to pass on their genetic line. Kuno requested to be a father, but the request was denied because he was not the type that the

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<sup>205</sup> Forster, 6–7.

<sup>206</sup> Forster, 31–40.

<sup>207</sup> Forster, 27.

Machine wanted to continue. “On atavism the Machine can have no mercy.”<sup>208</sup> A society with a clear directional path “forward” technologically cannot allow those who disagree or disobey to hold the group back.

The Central Committee, who manages the Machine, finds it offensive that someone would have found their way out to the surface without permission. The Committee threatens Kuno with Homelessness, which means exposing the victim to the outside air and killing them.<sup>209</sup> The Machine decides to ban respirators, which prevents humans from visiting the earth's surface. Though a few lecturers complain, most people quickly and quietly accept the new development. The norms and values had shifted drastically. Where once people sought movements with their bodies, all unrest is seen as originating from the soul and as something to quell. Where once technology was used to bring people to new places and to see new things, technology now is meant to bring things to people. Where once people sought a change of air, the room now changes the air for you!<sup>210</sup>

Residents like Vashti pride themselves on living in a world of “ideas” rather than the physical one. They spend their time with people talking to one another. They give lectures to one another about ideas that they have. These lectures would be the equivalent of doing a livestream or Zoom call where hundreds of “friends” listen in. More importantly, people are told to “beware of first-hand ideas” because they are nothing but the “physical impression produced by love and fear.” Instead, they seek out second-hand ideas or, better yet, tenth-hand ideas. The further removed from direct observation, the better.<sup>211</sup>

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<sup>208</sup> Forster, 34.

<sup>209</sup> Forster, 25–26.

<sup>210</sup> Forster, 12, 14, 44–45.

<sup>211</sup> Forster, 8–9, 44–46.

To a large extent, “The Machine Stops” is a modernized story of Plato’s Allegory of the Cave. Recall that in the allegory, a group of people are held captive in a dark cave and can only see shadows cast on a wall of objects before a fire. One day, one of the prisoners escapes and climbs out of the cave to see the real world with the natural objects as they are. When he returns to tell his fellow captives of his knowledge from the real world and that the shadows they see in the cave are false, the other prisoners think that the liberated one has gone crazy and kill him.<sup>212</sup> Similarly, Vashti cannot accept Kuno's insights without first being exposed to the surface of the Earth. Without that direct experience to act as a defense, others can distort their experiences to fit their goals.

This blind faith in authority and a decreased ability to reason by oneself leads the residents to reestablish a religion that celebrates the Machine. Residents speak reverently of the Book of the Machine, a manual that provides instructions for operating the buttons in the room. They describe the sense of peace and joy they feel when touching the manual. Oh, how great the Machine is which feeds, clothes, and houses the residents. Even though the Machine was a creation of man and the Central Committee is in charge of its development, people’s dependency on the Machine is whole.<sup>213</sup>

The last part of the short story focuses on how the Machine gradually breaks down. At first, people do not make much of some of the anomalies. Slowly, the number of complaints filed to the Central Committee grows. The Committee tries to refer to its documentation and experts but has failed. The system has become too large and is poorly

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<sup>212</sup> Dr Laura D’Olimpio, “The Allegory of the Cave - Plato Explained by The Ethics Centre,” *THE ETHICS CENTRE* (blog), March 17, 2019, <https://ethics.org.au/ethics-explainer-platos-cave/>.

<sup>213</sup> Forster, “The Machine Stops,” 47–49.

understood as a whole. People grow to accept the small things that break down and do not get repaired. Eventually, the whole system shuts down, and all the residents die.<sup>214</sup>

Unlike the typical dystopian story trope, no particular machine or AI develops a mind and will of its own. Instead, more realistically, the system and its sub-parts fail because they become too big and centralized, creating a single point of failure. Civilization is too dependent on one system and is not knowledgeable about how it works. The all-controlling state, the Central Committee, has taken on the role of providing for all its citizens' needs. While this is great for the comfort and leisure of the residents with no jobs, it makes for a fragile society unable to help itself in its time of need. The Central Committee decides what types of technology are invested into and how they are regulated for use; this leaves the society without alternative systems that could act as a layer of protection should one particular mode fail.<sup>215</sup>

Many aspects of the world probably feel familiar from the COVID pandemic. Individuals are isolated in their cells. All communications take place over “online” messages and video interfaces. Public gatherings and touch have been abandoned. After spending so much time indoors, people lose their sense of space. In other areas, the story does come off as unlikely and dramatic. Given how vital sunshine is for well-being, there would need to be some exposure to the outside in any realistic dystopia.<sup>216</sup> Nonetheless, the story is a powerful imagination highlighting the dangers of a state that consolidates power with technology to provide welfare for everyone because it ultimately creates citizens who cannot produce nor rely on themselves.

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<sup>214</sup> Forster, 49–50, 58.

<sup>215</sup> Forster, 19.

<sup>216</sup> Paul Frysh, “Sunlight and Your Health,” WebMD, accessed April 4, 2024, <https://www.webmd.com/a-to-z-guides/ss/slideshow-sunlight-health-effects>.



When we think of advancing technology, we only directly understand the individual differences and improvements it makes. Computational technology increases the reach of the world to our home. Food delivery apps, grocery delivery apps, Amazon delivery services, and limitless entertainment content partially replace what used to be the place of gathering—restaurants, grocery stores, super stores, and movie theaters. The changes on a societal level are mainly invisible to us. Americans spend 90 percent of their time indoors, and I am not sure we would know that the number is so high. When these changes are at the individual level, there are still opportunities to try alternative ways of resisting those trends. It becomes significantly more challenging when the number of alternatives decreases because of state intervention and investment.

### ***Technology Changes the State Gradually***

These two science fiction works show how technology can gradually and unexpectedly alter the state.

In *Too Like the Lightning*, technology removes the role of geographic nations in favor of a more decentralized political organization. At first, the technology embeds itself into the pre-existing political arrangement. Fast travel increases travel across borders by different ethnic groups from other countries. The states compete with one another to attract global citizens who prefer an itinerant lifestyle. Eventually, this technology amplifies the decentralizing force of economic organization. As states compete with one another for these global citizens, their economic role strengthens, but their power to tie people geographically weakens. The exit costs of leaving the state are no longer so high.

In “The Machine Stops,” technology strengthens the centralizing role of the state. Citizens grow to expect more from the central committee. The machine is responsible for

providing all the needs of its citizens. The cultural norms, like a more immobile lifestyle and a preference for second-hand ideas, stem from technology, reducing the need for direct experience. It is essential to recognize that the society felt like a utopia from the citizens' perspective. They were given for all their needs and did not have a typical job. But it left them vulnerable and dependent on a singular source.

It is hard to predict how technology will change how we see one another and interact with the state. But science fiction can help ensure we ask the right questions and consider the possibilities.

## Chapter 6: Conclusion

The societal ecosystem has changed with the introduction and adoption of computational technology. In some ways, it has strengthened the citizen-state relationship. In other ways, it has diminished the connection between citizens and government. Yet, there are some ways in which the effect of computational technology on this relationship will remain uncertain. Like the gardener who introduces a new species to the landscape, the state's adoption of computational technology generates disruptions in the balance of the larger society ecosystem. As those disruptions become more apparent, we should continue to examine them. The previous chapters have explored these changes in state and citizen relationships with an interdisciplinary approach. The collective insights from these four chapters give us several lenses through which we should evaluate the effectiveness and value of state projects that involve computational technology. A similar approach can be applied to other studies of advancing technology.

Chapter 2 shows how computational power serves the operation of the state and expands state capacity. Through *Seeing Like a State*, James Scott explains how the past states have created tools and units of measurement to track their citizens and understand their territory. Whereas the premodern state knew little about its subjects, the modern state has captured greater detail of the ongoing within the state at a lower cost than was initially possible. Computational technology represents an extension of those projects that need to know about so that they can control more. From *The Network State*, Balaji Srinivasan offers hope that the current development within computational technology, namely blockchain and the internet, can bring a more decentralized way of organizing people across existing state borders. The digital world will reshape the physical and political organization of the world.

Maintaining a cohesive culture of people instead of land becomes the focus. In the analysis, we found that computational power currently favors the former.

In Chapter 3, the “smart cities” case study and the US Census Bureau case study give us insight into what makes for a justified tech-involved state project. With the research and planning shared by planners, I highlighted the dangers of smart cities, which use constant and continuous data collection from active infrastructure. City planners can repurpose active infrastructure without consent from citizens. Despite the potential efficiency gains, smart cities deserve caution; citizens should push back against the centralizing tendency and scope creep that pervade visions for smart cities. In contrast, the US Census Bureau derives its justification from specific language in the Constitution. The Bureau invests in computational technology to improve its numeracy and accuracy to fulfill that constitutional duty. Still, we must ensure that the Bureau stays constrained to its original purpose.

Chapter 4 introduced public choice thinking as an analysis tool to study the disruptions of computational technology. Specifically, we looked at the bureaucrat's increased power and the typical voter's decreased interest. Both deal with uncertainty in different ways and seek to maximize their utility. As computational technology increases the informational power of the bureaucrat, we should look at ways that politicians can measure the impact of bureaucracies and gain greater control over their operations to keep their outputs in line with voter preferences. In light of the proliferation of content, voters will spend even less time engaging with political content, given the low expected utility of their votes. By emphasizing local expenditure over national expenditure, we can direct citizen enthusiasm towards a more effective and productive means of achieving change.

Chapter 5 draws upon science fiction literature to consider the technological future we want to build. I analyze two books in which fast travel changes the nature of society. In *Too Like the Lightning*, fast travel renders the need for nation-states obsolete and gives new ways for political and social organization. It is a world that is inspiring for the amount of self-political determination it offers to its citizens. Still, it is concerning because of how much collusion and censorship occur. In “The Machine Stops,” fast travel reduces the world's diversity, creates a more immobile population, and concentrates power in a central state. Even though citizens have all their needs provided for, society finds itself vulnerable and dependent on a machine that becomes inscrutable as it becomes more complex.

The future impact of computational technology on the citizen-state relationship remains uncertain. The insights from this interdisciplinary thesis provide a framework for evaluating the merits and risks of state projects involving such technology. As the state introduces new tools to the societal ecosystem, we must stay vigilant about how it will change the various interactions between citizens and the state.

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