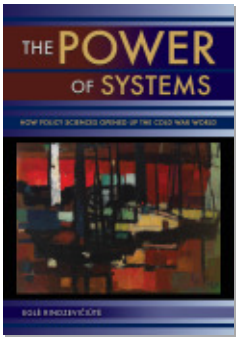
Introduction: The Rise of System-Cybernetic Governmentality



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Introduction

THE RISE OF SYSTEM-CYBERNETIC GOVERNMENTALITY

If the reader could step back in time and peer through the door of any Moscow institute of mathematics in the late 1940s or early 1950s, she would perhaps be surprised to see scholars wearing a military *kitel`*, the jacket of a Red Army officer's uniform. If she guessed that these were Soviet Cold War warriors crafting algorithms and strategies for defense against the West, she would not be entirely wrong: many of these researchers would go on to work in the fields of operations research, systems analysis, and computer science. However, this particular wardrobe choice was both symbolic and pragmatic: the uniforms were worn not only to signify military preparedness in the context of the escalating Cold War, but also because it was cold and researchers could not afford proper suits, which were enormously expensive at that time. Decorations were kept on not only out of pride, but because they left unseemly holes in the material when removed.[1] Later in the 1950s, *kitel`* jackets would be replaced by smarter dress as Soviet scholars, then better off, strove to keep pace with US professors in fashion as well as in bomb technology and computer science.[2] This shift from a *kitel`* to a suit is a sign of the ambiguous character of the Soviet technoscience that spanned military and civil applications. It also points to the ambivalence of Soviet technocracy, a mode of government that derived its authority from professional expertise. Soviet technocrats, just like US technocrats, gained authority from their military success during World War II, but they also selectively discarded this military legacy. A couple of decades later, Soviet scientists would turn into smart, suit-wearing scientific experts, able to mediate between academic research institutions, industries, and the government, and between East and West. Far from being Cold War

warriors, they harnessed the Cold War divide to channel political priority, funding, and policy, with the aim of developing new intellectual technologies, by which I refer to forms of scientific expertise dedicated to aiding policy and management decisions, enabling them to define and govern the world as a mesh of intertwined systems, and not as a Modigliani-style assemblage of territorial states.

This book is about science and power. It is a historical sociology of the forging of scientific governance across the Iron Curtain in the 1960s–1980s. The idea for this volume began when I encountered a puzzling question: how is it possible that both Soviet and US governmental elites embraced the same scientific methods of governance, gathered under the umbrella names of cybernetics, systems analysis, and, later, policy sciences, and, moreover, closely cooperated in development of these methods during the Cold War? Surely, one would think, government of communist and capitalist societies could not be amenable to the same techniques of discipline and control? But this was the case when the science of governance, cybernetics, and its sibling, the systems approach, circulated between East and West, beginning in the 1950s. As is so often the case, an apparent paradox suggests a complex mechanism at work that we do not yet understand. This book seeks to unravel and explain this paradox, introducing a more nuanced understanding of the history of scientific governance in the late twentieth century. In the opening paragraph, I use the example of the polyfunctionality of Soviet military uniforms as a metaphor to show that scientific governance and its international transfer can be guided simultaneously by different rationales. Nowhere were political symbolism and pragmatic, utilitarian rationales so tightly intertwined as in the development and international transfer of system-cybernetic sciences of government.

What is system-cybernetic governance? Cybernetics and the systems approach, which includes but is not limited to operations research (OR), systems theory, systems analysis, and, at a later stage, policy analysis, constitute a hybrid field of science and technology that emerged from innovations in mathematics and electronic engineering during World War II, to become part of the academic establishment during the late 1940s. "Cyborg," "cyberpunk," and "cybersecurity" are just a few of the terms that originated from this field, spreading widely through public discourse. But the field of system-cybernetic, computer-based science originated as a resource for both formulating and solving governmental problems. As such, system-cybernetic sciences were part and parcel of the late modern worldview (although not necessarily high modernist, as I explain later), according to which societies, economies, and nature were so highly complex that neither common sense nor sector-specific knowledge was sufficient to govern them.

We already have groundbreaking work emerging which has attempted to place cybernetics and the systems approach at the center of the scientific and governmental epistemology of the twentieth century.[3] However, most of these studies focus mainly on US and West European developments and only a few engaged with the Soviet or, indeed, transnational side of the development of these sciences.[4] One of the tasks of this book, therefore, is to introduce the transnational dimension of these extraordinary policy sciences, the uses of which stretched beyond mere utility, facilitating the building of alliances in world and institutional politics, and to discuss some of important transformative moments in the Soviet system-cybernetic governance.

The reader, accordingly, should not expect to find a comprehensive history of the systems approach in this volume. There remains to be written, for example, an exciting history of the system-cybernetic governance embracing the global South. Rather, the intellectual journey that I propose is a first step in the direction of a transnational history of system-cybernetic governance, involving encounters with a few, but highly important moments when the systems approach traveled across the Iron Curtain in the 1960s–1980s. At the center of my story is the International Institute of Applied Systems Analysis (IIASA), which was anything but an arcane academic institute. IIASA was an extraordinary creation of scientific and policy elites, an organization, the history of which not only provides a fascinating angle on East-West relations, but also reveals the late Soviet engagement with governance as an intellectual project, an aspect which tends to be neglected.

What was this institute? Nicknamed "the East-West Institute" and "East-West RAND," IIASA was initiated by Lyndon B. Johnson's administration in the mid-1960s. It was founded in 1972 by the Soviet Union and the United States, along with ten other countries from Eastern and Western blocs. Since then IIASA has been luxuriously accommodated in a baroque palace, Laxenburg Schloss, a dozen kilometers from Vienna, Austria. With a location fit to shoot an episode of a James Bond movie and the unlikely rationale of bringing the best men (they mainly were men) in East-West policy sciences to work together, IIASA might appear, on the surface, to be an extravagant quirk of Cold War diplomacy, an impression registered in fiction writing about IIASA.[5] In reality, however, IIASA scholars in policy sciences spent lengthy periods of time not so much spying on each other—the use of classified data was excluded by house rules—as developing scientific expertise for what were defined as global and universal problems: world food supplies, water, energy, transport, and the environment. To be sure, the East-West geopolitical tension lingered in the atmosphere, especially during the 1970s, but it is precisely to cope with this geopolitical tension that highly sophisticated

organizational and discursive techniques were used to frame activities at IIASA as apolitical.

Although the original idea of the international think tank which would become IIASA was part of a US foreign policy initiative, the intellectual rationale of this institute was formulated by a particular and increasingly transnational community of systems scholars, seeking to solidify their networks and promote their epistemological agenda. These two strands, foreign diplomacy and academic politics, intertwined: there are extensive studies on how the United States assumed a leading role in developing management and policy sciences and disseminating them internationally during the 1950s and 1960s. Historians of Cold War science, such as Theodore Porter, Giuliana Gemelli, Nicolas Guilhot, Philippe Lafontaine, and Jenny Andersson, to mention just a few contributors to this quickly expanding field, detailed the spread of American methods of policy-oriented quantification in Western Europe.[6] Along with this, a particular US form of the organization of scientific expertise through think tanks was disseminated. US think tanks, according to Diane Stone, were highly diverse organizations, which espoused an entrepreneurial spirit seeking to produce policy- or management-relevant scientific expertise and dated back to the interwar period; however, the real explosion of the think-tank population took place during the 1950s and 1960s.[7] It is remarkable, though, that the first international think tank, IIASA, would be established by opposing super powers, the Soviet Union and the United States.

In this context, it is difficult to understand how the East-West Institute managed to escape the attention of Cold War historians and sociologists, and political scientists studying globalization. Also, given IIASA's diplomatic origins and scientific agenda, and its research on what was called universal and global problems, it is surprising that, so far, IIASA has been overlooked in studies of globalization, appearing only in a few, recent works.[8] True, case studies of IIASA surface occasionally in work on environmental history, because IIASA hosted many pioneering studies on global climate change, on globalization, and, more recently, on East-West cooperation under the Johnson administration.[9] But the burgeoning field of Soviet studies tended to completely overlook this case of East-West cooperation.

Perhaps it was the elite character of IIASA, a certain curtain of discretion, and the Cold War legacy of keeping its profile rather low that kept it obscure.[10] The in-house history explains that the cryptic name of IIASA was intentionally chosen to fend off unnecessary political scrutiny: posing as a technocratic, narrow, specialist, and obscure institution was thought to be a good strategy. The acronym, indeed, managed to protect the intention of IIASA's leaders to forge a discrete gate between East and West, a laboratory where a new worldview could be developed. Thus one of my goals is to argue that this institute should not be consid-

ered a mere stage for diplomatic rituals. Neither was it limited to dissemination of US science as a way of expanding US hegemony globally. In contrast, IIASA enabled the spread of system-cybernetic policy sciences through East-West *coproduction*, where the receiving end (East) was as active as the sending end (West) and the traffic was not unidirectional.[11]

I also want to use the case of IIASA to demonstrate how the new transnational, system-cybernetic governmentality was forged in the postwar period.[12] In doing this, I pursue two inter-related arguments. First, I argue that IIASA should be understood as both a cause and a symptom of the emerging system-cybernetic governmentality, where, second, I posit the importance of the Soviet contribution. Indeed, I use the IIASA case to examine the transformation of late Soviet governance. How did the systems approach rise to prominence as a policy science in the Soviet Union? How and why did the systems approach serve as a channel for international transfer? And, most importantly, what kind of social and institutional settings enabled all these processes? To answer these questions I go beyond the internalist history of science and technology to study the wider institutional context, but also to focus on trajectories of distinct personalities, whose contribution should not be reduced to their impact on the advance of science (albeit this impact was significant). Their life trajectories have much to reveal about the link between social settings and intellectual agendas, as they used their intellectual entrepreneurship and transnational sociality to navigate geopolitical undercurrents, producing new conceptual and institutional frameworks for government.[13] I thus offer a study of IIASA as host to a set of extraordinary scientific communities, a node where loosely coupled networks intersected, linking nascent global thinking with emerging policy sciences, and seeking to harness rather than exacerbate the Cold War divide by channeling the geopolitical will for competition into technoscientific and governmental innovation.[14]

The reader can choose between two ways of reading this book: the first one following East-West relations in the development of global, system-cybernetic governance; the second one focusing on the transformation and globalization of late Soviet governance. Both tracks seek to contribute to the relevant literatures on the subject, which I discuss briefly in the remaining part of this introduction.

For a System-Cybernetic Governmentality

The themes of complexity and informational and network control have been discussed among policy scientists since the 1960s, and in the late 1980s became objects of both theoretical and critical writing in the humanities and social sciences.[15] While there are several histories that explore the governmental implications of

cybernetics and feedback-based control in the United States and the Soviet Union, the transnational history of the systems approach remains to be written. Existing case studies of the systems approach tend to focus on US actors, both individuals and institutions, the most studied ones being nuclear strategists at RAND, the postwar think tank in Santa Monica, California. Such studies were part of wider liberal intellectual criticism of the US military and top-down, technocratic elite governance, established during the Cold War. However, we do not know much about the other side of the systems approach, where it served as a source of avant-garde ideas on governability. This is where the studies of systems analysis and cybernetics part, as cybernetics has been widely analyzed as a governmental technology and intellectual experiment.

Thus scholars like Robert Kline and Slava Gerovitch recognized the power of cybernetics to revolutionize traditional notions of control in the United States and the Soviet Union in their respective studies. However, few have attributed a similar power to the systems approach, although many applications of the systems approach significantly modified, if not undermined, the existing structures of state centralist power. When such arguments were proposed, they were mainly confined to the internalist literature of systems theorists. A recent breakthrough is Hunter Heyck's study of US systems thinking, which registers the transformative effect that the systems approach had on postwar social sciences in general, arguing that the systems approach could be described as a Cold War epistemology, one that not only shaped administrative practices but also significantly influenced what he called the "high modern" governmental imagination by providing new technologies, a new language, and new visions of governability, thus expanding the horizons of governmental ambitions.[16] While Heyck usefully points out the centrality of the systems approach to both modern social science in general and organizational science in particular, he does not explicate how exactly this scientific epistemology was translated into governmental practice. Furthermore, as Heyck focuses exclusively on US science, he leaves out the transnational side of the systems approach.

On the other hand, we do have some studies of the international impact of the systems approach on governance, particularly the ones produced by Sovietologists since the development of the field in the 1960s.[17] However, a thorough assessment of the impact of the systems approach on emerging global institutions, discourses, and practices is missing. One should not generalize from the US experience with system-cybernetic policy sciences: as a field, cybernetics and the systems approach were forged transnationally and had highly diverse impacts on local practices in different contexts. I posit this point as both empirical and theoretical: a full-fledged sociology of system-cybernetic governance that only focuses on national cases is bound to miss its target. This is not least because the very

roots of the field were international, and lay not just in military conflict and Cold War competition. In addition, if we assume that there exists a pure, objective science, which is structurally separate from (national) political power frameworks, there is a risk of misunderstanding much of what has been done in the name of system-cybernetic research.

One way to approach this complex phenomenon is to treat it as a "system-cybernetic governmentality," a particular mode of scientific governance that emerged after World War II and that led to different outcomes in different contexts. I define "system-cybernetic governmentality" as an assemblage of discourses, state and nonstate organizations, technologies, and social networks, a complex that is best understood through a combination of insights derived from the ideas of Michel Foucault and from science and technology studies. It is important to note that the study of "governmentality" involves a different analytical angle than traditional political history or sociology. Instead of focusing on formal state organizations, the governmentality perspective examines a wide range of practices of sense-making and regulation that forge governmental subjects and objects.[18]

Here a few words on this are due. Michel Foucault introduced his idea of the art of governance as a combined intellectual and technical activity, or *gouvernmentalitè*, in his lecture at the Collège de France in February 1978. The French word was translated into Anglophone discourse as "governmentality" in 1979.[19] The governmentality perspective emphasizes that government is not limited to legalistic practices and state departments, but can instead be practiced through many different interventions in the "conduct of conduct."[20] In his lectures, Foucault argued that the word "government" historically referred to rule over the population rather than "a state, a territory, or a political structure"; "to govern" meant to regulate behavior, to take care of self-regulating processes. "Being able to hold on to one's principality," observed Foucault, "is not the same as possessing the art of governing," where government is not so much about imposing law, as about disposing things "to their own suitable goals," an activity that is best described as tactical.[21]

Another important feature of the governmentality perspective is its focus on the historical variation of meanings or rationalities of governance. "Governmental rationality," however, may be a somewhat misleading term, especially in the context of the history of Cold War science, which has predominantly focused on the forging of a rational actor in line with rational choice theory, where rationality is defined as a feature of individual decision makers, set to maximize their own interests.[22] Instead, and following Foucault, I define "governmental rationality" as any systematic way of sense-making and/or articulation of a rationale of governance. Accordingly, rational choice theory can be understood as a particular governmentality, but I want to emphasize that system-cybernetic governance can

entail different governmental rationalities, ones that are not limited to rational choice.

There is also an important and serendipitous relationship between Foucauldian governmentality theory and the object of my study, the system-cybernetic governance. As Ian Hacking notes, scientific theories are not abstract constructs but products of their time, dependent on such factors as knowledge-generating devices, and social and politico-economic structures, and so is the governmentality theory.[23] Indeed, there might be more than just a parallel between Foucault's notion of governmentality, which discerns the historical development of an "art of government," involving skills and craft, and the claim of policy scientists to develop "an art of systems analysis."[24] According to McKinlay and Taylor, Foucault borrowed the term "governmentality" from Roland Barthes, who coined this intentionally awkward word in 1957 to describe the ongoing technocratization of French state government and what he understood as its depoliticization. Although Foucault might have been introduced to the term "governmentality" at Barthes's seminars in the late 1950s and early 1960s, it has to be noticed that Barthes did not use this term in his later writings.[25] At precisely this time system-cybernetic ideas were being employed to rethink managerial and political practices, and the exchange between East and West in the policy sciences began. The articulation of governance as an intellectual and policy category was isomorphic: thus, when the term "governmentality" began to circulate in the early 1980s, the notion of systems analysis as *an art of governance* was being widely promoted in management education. The system-cybernetic perspective constructed the world as a set of complex and dynamic systems, consisting of different geological, biological, and technical phenomena, which were subject to tactical regulation in the same way as population was for Foucault. Also, I want to add that the world according to cybernetics was defined as a network of human and nonhuman actors well before actor-network theory was formulated in the 1980s.

My point is not, however, that Foucault himself recycled system-cybernetic ideas in his intellectual project of rethinking the changing nature of governance in the modern state (although he might have done so), but rather that the very emergence of governmentality studies could be understood as an outcome of registering the actual changes in governance that are analyzed in this book.[26] Furthermore, I suggest that the analytical project of governmentality studies shares some basic principles with the policy sciences, in particular the systems approach: namely, they both approach governance as an activity of sense-making, which draws upon technoscience for the meanings and instruments enabling action, particularly action-at-a-distance. My study, therefore, offers a journey on a Möbius strip, where the Foucauldian governmentality perspective might be seen as a part of the system-cybernetic world of governance. The role of history here is to en-

hance our reflexivity by revealing the specific political and technical contexts that generated our current inquiry into ourselves.

Soviet Scientific Governance Revisited

When it is applied to the Soviet case, the governmentality perspective enables a genuinely innovative take on the character of late modern scientific governance. Students of Soviet governance have long designed their studies as either inquiries into ruthless, personalist rule or as studies of misconceptions and ill-qualified beliefs in scientific rationalization, planning, and management. That the Soviet elites held certain types of science and technology in high regard has been duly registered by the historians of Soviet science; yet Soviet studies rarely posed research questions from a framework other than the "use or abuse of science." Only rarely was Soviet technoscience approached like Western technoscience, as an intellectual, technical, and institutional resource for innovation and change, and when that did happen, the stories revolved around the struggle between the dominant system (the Party and bureaucracy) and resistance (the scientists).[27]

One exception is the groundbreaking study on Soviet cybernetics by Slava Gerovitch, which demonstrates that cybernetics was not just a technical science of control, its uses limited to the fields of computer technology and automation and making the existing control processes more efficient. Instead, Gerovitch shows how Soviet cybernetics shaped an entirely new way of thinking, a rich semantic resource which supplied Soviet—just like Western—intellectuals, managers, and policy makers with new terms—such as feedback, self-regulation, complexity—to describe governmental relations. And yet there is a certain pessimistic note to Gerovitch's story of Soviet cybernetics. In his study, Gerovitch traced this spillover of cybernetics into Soviet governance, particularly economic planning, as a process that saw an incremental deterioration of the intellectual potential of this theory. The problem was that Soviet ideologues adopted the cybernetic language as part of their official jargon, something that Gerovitch calls "cyberspeak," a ritualistic language that acquired a popular appeal and, consequently, rendered void the revolutionary aspect of cybernetics.[28]

Gerovitch's argument undoubtedly captures a very important side of the development of Soviet cybernetics. However, I suggest that the revolutionary potential of Soviet cybernetic governance was not entirely lost in the 1970s: indeed, it was continued under the conceptual umbrella of the systems approach. Furthermore, to fully appreciate the impact of Soviet system-cybernetic governmentality, I suggest that we should go beyond the interpretation of the "correct" and "distorted" uses of a scientific discourse of cybernetics, for the impact of cybernetics is not limited

to linguistic expression. The development of a new language, especially a scientific language, requires extensive organizational resources and, in turn, generates new practices and institutions. This is illustrated by my case of East-West coproduction of system-cybernetic governmentality: this was not just a language, a new way of speaking about old things, such as order and control, but a performative intellectual technology. Systems scholars did produce new descriptions or texts, in the form of stories, statistics, images, and maps, but texts were not their only end products. It was the new practices and institutions that counted.

It is true that early systems analysis was intended to be a utilitarian instrument, serving managers and governments, a "social technology," to put it in Karl Polanyi's terms.[29] The systems approach created an illusion of control by making previously opaque or large-scale categories, such as world population and world energy, especially their future states, visible, thus creating an impression that they could be acted upon. One example of a large-scale control application is the computer-powered "social technology" of surveillance, which was put to use by the Soviet State Security Committee (KGB) in the late 1980s.[30] However, state surveillance and control were not the sole uses of the social technology of systems analysis, which is evident in cases where systems analysis evolved into a more ambitious intellectual enterprise. Yet to appreciate this we need to adopt a particular theoretical stance toward scientific governance in general and Soviet governance in particular.

We are informed by historians and sociologists of science and technology that technoscience operates as a performative assemblage, that is, that scientific theories and instruments do not merely reflect societal and cultural norms, but actually embody and directly shape them by constituting material settings for action.[31] We also know from recent social histories of computer-based technologies that such performative assemblages generate not only new notions of governance, but also new institutions and practices.[32] I propose that the system-cybernetic sciences can be understood as an increasingly reflexive, performative, and hybrid enterprise, which was driven by multiple, sometimes inconsistent rationales and which found diverse areas of application, thus leading to different sociopolitical effects. Here the performative character of the system-cybernetic approach is of key significance: these policy sciences are not so much concerned with generating an internally consistent "truth regime," as interested in "what works," putting emphasis on analytical approaches and methods developed to enable governmental action. Another important feature of system-cybernetic governmentality, in this way, is its high tolerance of "unknowns": the aspiration for total knowledge and perfect representation was suspended; the scientific expertise fulfilled its promise as long as "it worked." The outcomes of this work, then, were diverse and, as I show in this book, not reducible to the question of the validity of knowledge.

This is an important distinction between system-cybernetic governmentality and modern positivist science or governance by numbers that fostered an excessive belief in human knowability and controllability. For instance, for the systems analyst the task of scientific governance was not to base authority on some underlying truth, or to attempt to discover and harness the laws of nature, but to construct, assemble, and mobilize links between data, technology, people, and organizations. I use the term "assembling" in a way similar to the way Bruno Latour uses it in *Reassembling the Social*, pointing to the process of putting together, intertwining, and stabilizing concepts, language, technologies, practices, and organizations that hang together, constituting a particular setting for action.[33] I prefer the term "assemblage" to Michel Foucault's term "apparatus" (in French, *appareil*), because "apparatus" suggests a greater degree of internal order and a machine-like operational mode than "assemblage," which can be haphazardly put together, and remain open and unfinished. An assemblage is always a project-in-the-making; therefore I also place a heavier emphasis on assembling as a continuing process. At the analytical level, I use this terminology as a way of placing people, organizations, material devices, and settings at one analytical level, for all of these perform important roles in forging a system-cybernetic governmentality. Approached from this perspective, system-cybernetic science can be understood as a particularly important intellectual resource which enabled East-West managers, policy makers, and politicians to forge new links among governments, industries, and societies, leading to an incremental transformation of the social and political order.

These performative and reflexive dimensions need be taken into account in order to appreciate the innovativeness of the system-cybernetic sciences in the Soviet context. Indeed, as I show in this book, some prominent practitioners of the systems approach rejected the notion of positivist science, discarded the search for the truth, and postulated instead that different data and solutions may be valid depending on the pragmatic situation, that is, on reflexive interaction among the decision makers, experts, and the context. Of course, this tolerance of the unknown was not always shared by the clients of these policy sciences: many of the governmental elites, representatives of what is called "technocracy," did dream about total or perfect control.[34] My story is thus one of incremental change, where new epistemologies and modes of action emerged and developed in certain pockets of Soviet governance, sometimes, however, spilling over into wider agendas.

East-West Coproduction of Global Governance

The importance of Cold War competition as a source for extensions of militarized notions of behavior, reason, and order into civil governance, where such notions were deemed inadequate at best and often damaging, has been widely studied by urban, economic, and intellectual historians.[35] However, there were also some productive and innovative aspects of East-West competition and cooperation.[36] I show that East-West cooperation had some important outcomes in the development of global governance as an intellectual and socio-technical project. There was a particular transnational community of policy scientists emerging during, and partially because of, the Cold War. Historians have revealed that Cold War policy scientists, in particular those based in the United States, benefited from the divide, because the struggle between the great powers involved massive investment in the military-industrial complex. In turn, many branches of policy sciences were regarded as an extension of Cold War competition.[37] New institutional spaces emerged that could best be described as transnational organizations, that is, organizations whose constituents were not sovereign governments, but lower-level organizations. Importantly, the agenda of these transnational organizations was increasingly set independently from national interests.[38]

Furthermore, if the development of system-cybernetic governmentality is approached as a transnational process of coproduction, this has some important implications for the debate on the relation between liberal and authoritarian governance within governmentality studies. Let me dwell on this for a moment. Governmentality scholars have long analyzed "soft power" mechanisms in liberal democratic contexts, but their interest has also extended to colonial and postcolonial studies, and has begun to be applied to authoritarian regimes.[39] On the one hand, beginning in the 1990s, governmentality studies registered the problem-oriented, calculation-based, decentered character of advanced modern governance, debating whether they were witnessing the emergence of a distinct, neoliberal statecraft. On the other hand, in 1999 Mitchell Dean wrote that governmentality was equally applicable to the study of (neo)liberal and authoritarian regimes, noting that certain governmental techniques can be shared by liberal democratic and illiberal states. Dean extended his observation to identify authoritarian components that are inherent to liberal governmentality—for instance, in the procedures used to govern welfare dependent subjects.[40]

But the relationship between liberal and authoritarian governmentalities is more complex than a classification into liberal and authoritarian modes of government. In this book I show that some key technoscientific approaches enabling *liberal*, limited governance at a distance, its conceptual framework, techniques,

and institutions, were *coproduced* through direct interaction between the liberal West and authoritarian East. I use the term "coproduction" to refer to the programs of cooperation between East-West scientists and policy makers, but also to the dynamics of a simultaneous forging of natural and social orders.[41] As Sheila Jasanoff has put it,

> scientific knowledge . . . is not a transcendent mirror of reality. It both embeds and is embedded in social practices, identities, norms, conventions, discourses, instruments and institutions—in short, in all the building blocks of what we term the *social.* The same can be said even more forcefully of technology.[42]

Thus defined, coproduction is not so much a theory as a perspective that helps us to avoid omissions, which tend to occur in a singular focus on "just science" or "just politics," something which is particularly important when we approach science in dictatorships. Importantly, Jasanoff points out the ability of technoscience not only to serve, but also to subvert or transform the governmental authority of the state.[43] I show that system-cybernetic governmental techniques were adopted by the authoritarian Soviet regime because they appeared to promise *more* control, yet, in contrast to the expectations of Soviet administrators, the system-cybernetic approach transformed the very character of control.

This happened in the following way. The system-cybernetic approach was framed to suit the requirements of East-West transfer, accordingly, being depoliticized, declared a universal, value-free technology of governance. However, this political maneuver was but a superficial one: the very point of the system-cybernetic approach was to underscore a new, postpositivist notion of the human and nonhuman systems, which were intertwined and the understanding of which required global and long-term analysis. Although it was deemed to be a value-free technology, the system-cybernetic approach ultimately required a new politics, where scientific expertise and intellectual technologies played an increasingly important role.

Governmentality studies have been long engaged in analyzing the "governmentalization of the state," which in principle signifies the reorientation of the modern state away from the political struggle for sovereignty to the art of the governance of the population. Part of this process involved the (liberal) state devolving authority to other agencies and individuals through the encouragement of self-regulation and strategies of responsibilization. This process maps in a curious way onto an authoritarian regime, such as the Soviet Union, where the introduction of system-cybernetic policy sciences, as an institutionalized sphere of scientific expertise, testified to a certain governmentalization. I suggest approaching the role of technoscience in the governmentalization of the Soviet regime through Bruno

Latour's concept of hybridization and purification as a dialectical, simultaneously ongoing process. According to Latour, there are ongoing processes of political purification, defining certain activities as nonpolitical, which contrast with the opposite efforts to politicize them.[44] I detail the ways in which systems analysis was carefully depoliticized as an art of governance, but the story does not stop here. As noted by Thomas Gieryn, any claim to "real science" in fact constantly produces counterclaims, such as pseudoscience, lay knowledge, and politics. This process, explains Gieryn, can be understood as a form of boundary work, separating science and nonscience, politics and nonpolitics. This kind of boundary work was of fundamental importance in the development of system-cybernetic governance across the Iron Curtain. Importantly, this boundary work—just like my example of the use of *kitel`* jackets described earlier in this chapter—served both symbolic and pragmatic functions.[45] The development of the system-cybernetic governmentality relied on the intertwining of purification, hybridization, and boundary work.

In this respect, my study of East-West co-production of the systems approach confronts some of the key questions asked by the humanities and social sciences: namely, whether societies are becoming prisoners of their own tools of control by building and relying on formal methods of governance. Nikolas Rose has argued that freedom is a disciplining construction. According to Rose, freedom is not the mere absence of control, but rather a particular distribution of techniques and mechanisms of regulation and control.[46] There is, therefore, a complex dynamic between freedom and control, and it would be premature to dispose of the technocracy debate as a simple issue of delegation, as well as to discard the management and policy sciences as tools of subjugation in the hands of elites, be they communist or neoliberal.

This dynamic becomes particularly clear in the context of the Soviet Union, where the system-cybernetic sciences of control often had a strong liberalizing effect. With their roots in quantitative methods and computer technology, system-cybernetic sciences constituted an alternative to the personalist rule of the Communist Party, which operated on the basis not only of formalized and bureaucratic planning, but also on the distribution of personal favors and penalties. According to Theodore Porter, the production of impersonal numbers served as an important source of credibility in democratic systems. Whereas Porter bases his argument on the French, British, and US cases, Loren Graham proposes a similar argument, writing that numbers played a comparable role in the Soviet Union, but not exactly as one would presume. Although Soviet statistics were subject to notorious manipulation, quantification and technoscientific rationalism also constituted a space for reform. The growing institutional power of scientific governance had a corrosive effect on the largely irrational Stalinist system.[47] Graham, to be sure,

argues that the outcomes of the rationalization of Soviet governance were severely limited because the Soviets were preoccupied with what he called "technological fixes," that is, solutions that were solely technical and disregarded economic and social issues.[48]

While agreeing with Graham's thesis that post-Stalinist technoscience corroded the Soviet bureaucratic Party centralism, this study shows that there were attempts to go beyond technical fixes in Soviet technoscience, namely through the policy sciences. Economic and social issues were assessed in the systems approach that gained prominence in the Soviet Union from the early 1970s and which was developed as an international field par excellence, thus undermining not only the departmentalist mentality, but also the Iron Curtain itself. As Soviet scientific governance was entrenched in East-West transfer, it helped to disperse the authority and power to heterogeneous actors, enabling their mobility and stimulating institutional reform.[49]

We can now begin to understand the revolutionary effect of Soviet systems analysis as a policy science, which emerged in the symbiotic relationship between technoscience and state governance. The East-West policy scientists, active between the 1950s and the late 1980s, were acutely conscious that they were forging more than just an instrument for policy decisions. As I show, East-West policy scientists intentionally coproduced governmental techniques and the world for which these techniques were intended, the world which governmentality scholars have been attempting to grasp. That these scientists resorted to different discursive strategies for the depoliticization of both science and governance, was, in many cases, a strategic move enabling them to work toward a change in political values.

In this book I show that the purification of systems analysis as a governmental technique was also a politically driven project, which was embedded in a Cold War diplomatic agenda at the crucial moment of its development as a discipline, the 1960s. This moment had a lasting, complex legacy. The systems approach was intentionally and carefully construed as a universal, nonpolitical science of governance in different ways, so that a number of political, pragmatic objectives could be achieved. Once purified, the systems approach generated new forms of politics by articulating new problems and serving as a basis for new power networks. As I show, the choice of direction or configuration depended on specific contexts, but in any case the depoliticization of systems analysis was an expression of transnational pragmatism.

System-Cybernetic Governance: High-Modern or Nonmodern Technocracy?

In this section, I discuss whether the currently popular notion of high modernist governance or, more specifically, high modernist technocracy can be applied to system-cybernetic governmentality. In doing this, I want to reintroduce a somewhat forgotten debate on Soviet technocracy, a debate that, from the 1960s through the 1980s, provided explanations of how the Soviet system could change but which was to a large extent abandoned after 1990.[50] We need, I suggest, to reengage with debates on Soviet and post-Soviet technocracy, for the debate on technocracy is not just a formal question as to who has the power to decide, unelected experts or elected politicians.[51] Space does not allow me to walk the reader through a full consideration of the century-long debate on technocracy; I will only touch on key moments in the debate on modern technocracy and its Soviet version, which should help the reader to appreciate the complexity of system-cybernetic expertise that does not map easily onto the traditional divide between democracy and technocracy.

According to the classic definition coined by the prominent French political philosopher Jean Meynaud, later used by Frank Fischer, technocracy is "a system of governance in which technically trained experts rule by virtue of their specialized knowledge and position in dominant political and economic institutions."[52] In his influential treatise on postwar technocracy, Fischer, however, argues that not all forms of scientific expertise-based governmental systems seek to replace political decision-making with technical decision-making. In line with Fischer, I stress that it is important to look at how the concrete, particular relations between technoscience, governance, and the political were negotiated in different contexts and times, for this would reveal the field of scientific expertise as a more complex phenomenon, which is not limited to political power grabbing.[53]

The history of technocracy as a term and as a phenomenon was embedded in East-West exchange from the very beginning. The very term "technocracy" emerged in the United States in the 1920s, with the pioneering work of Thorstein Veblen, who argued that engineers should participate in the management process because they were equipped with knowledge and know-how, enabling them to make what they thought were better, more rational economic decisions.

The idea that engineers should be involved in planning also surfaced in the Soviet Union at around the same time, when an expert consortium was appointed to govern the first national planning agency, the State Commission for the Electrification of Russia (GOELRO). While the political legitimacy of Western technocracy was fluctuating, especially after the war, its fate in the Soviet Union was truly torn between extremes. Historians showed that the relationship between

technoscientific experts and the Communist Party of the Soviet Union oscillated violently between the Party's almost naïve belief in the ability of science to solve any issue, and paranoid control. In his study on the failed attempt to create a Soviet technocracy, Graham detailed how the Bolshevik Nikolai Bukharin rallied a like-minded circle of "manager-engineers," where the extraordinary engineer Peter Palchinskii played an important role. Called "an Industrial Party" by the secret police, this network was purged by Stalin in 1928.[54] Similarly, whereas Russian scientific management emerged as a vigorous intellectual movement following the Communist revolution, it was suppressed by Stalin only to be rehabilitated during de-Stalinization in the late 1950s in order to embrace the coming of system-cybernetic governance.[55]

But was there ever a late Soviet technocracy? After Stalin's death in 1953 the belief in scientific expertise for policy-making revived, but the institutional reform allowing the flow of scientific expertise into governance was slow.[56] One of the many efforts to institutionally reform the communist government by integrating scientific expertise came from Mikhail Lavrent'ev, who was a mathematician and vice president of the Soviet Academy of Sciences. In the 1960s Lavrent'ev suggested integrating expert panels into all planning areas in the Soviet Union.[57] The period of Brezhnev's stagnation was also seen as one of consolidation of Soviet technocracy. However, there was a strong organizational filter installed that prevented Soviet specialists from becoming technocrats, thus reserving the central decision-making power to the Party—a direct institutional link that would allow Soviet scientists to communicate their advice to the central organs was never established, thus all recommendations were filtered through appropriate sections at the branch ministries and the Central Committee.[58] Even under Gorbachev, when scientists were for the first time invited to the governmental roundtable for discussions on policy, they were questioned rather than asked to provide their own points of view. In turn, although many members of the Politburo had a technical education, they had almost no professional experience in their fields, having pursued an administrative and political career. Considering these aspects, I would tend to agree with Graham's suggestion that Soviet technocracy never really existed.[59]

In this context, should we not be tempted to write a history of Soviet system-cybernetic governance as yet another example of a failed technocracy? Tempting as it is, this plot, I suggest, would misdirect our attention from the productive and global impact of Soviet system-cybernetic governmentality. The struggle for Soviet governance was not a zero-sum game. For instance, in addition to the Politburo, which gathered the top commanders of Soviet ministries and the Party, and the Central Committee, and to which Soviet system-cybernetic governmentality was only loosely coupled, there were other spheres of spatial and institutional

influence. From the mid-1960s one such space, particularly oriented to policy sciences, was established, patronized, and supervised by Prime Minister Aleksei Kosygin and his son-in-law, the vice chairman of the State Committee for Science and Technology (GKNT), Dzhermen Gvishiani. To be sure, the space for Soviet system-cybernetic governance was limited, but it was more diverse and productive than it has been thought so far.

Therefore, I seek to widen the debate on Soviet technocracy by re-embedding the Soviet case in the global history of policy and management sciences.[60] The intellectual and institutional process of the depoliticization of governance, or making "policy without politics," has its own history, predominantly within studies of transnational organizations, such as the European Union.[61] Research on Soviet technocracy, therefore, should focus on the links between the production of formal knowledge, informal social relations, and decision processes as a matter of elaborate discursive construction, where parallels that can be drawn between the Soviet bureaucracy and any large Western bureaucratic system are not metaphoric but real, resulting from intentional learning.[62] Through my cases of system-cybernetic scientific expertise I show that new types of knowledge may prompt institutional innovation, leading to erosion of the existing power structures. However, the outcomes tend to be context-specific and it is difficult to generalize.[63] Thus, in some cases, system-cybernetic ideas would reinforce centralist, top-down and/or deeply illiberal steering, whereas in other cases the same ideas could be mobilized to open up existing governmental institutions for greater transparency, data exchange, and horizontal governance underscoring self-regulation. This leads me to caution the reader not to read too much internal coherence into East-West system-cybernetic governance, as this was an internally heterogeneous and evolving phenomenon.

Considering this, I am skeptical about using the term "high modern" to describe system-cybernetic governmentality. High modernist ideology, which, according to James Scott, was a feature of Leninist-Stalinist rule, is characterized by

> the self-confidence about scientific and technological progress, the expansion of production, the growing satisfaction of human needs, the mastery of nature (including human nature), and, above all, the rational design of social order commensurate with the scientific understanding of natural laws.[64]

Adding that this belief is not a feature of scientific practice, but typical of what he called "bureaucratic intelligentsia, technicians, planners and engineers," Scott argues that it was in combination with authoritarian regimes that the high-modernist ideology led to fatal consequences in large-scale projects.[65] Scientific expertise, wrote Scott, made the world and society legible and thus amenable to

control and social engineering; high modernist ideology underpinned the desire to control and the authoritarian state system provided the determination to act. In those cases where civil society was absent, there was nobody who could avert a high modernist Armageddon.[66] Scott draws heavily on secondary studies of prewar Soviet governance, particularly the ones of scientific management and the phenomenon of technocracy. He also refers to Richard Stite's notion of "administrative utopianism" as a feature of modern Russian governance.[67]

In contrast, I propose that the systems-cybernetic approach constituted a completely different resource for scientific governance, which was nonmodern in Bruno Latour's words rather than high modern. Although self-declared to be value free and universal, systems-cybernetic governmentality introduced an epistemology that underscored uncertainty, informality, and reflexivity, and forged new organizations and actorial identities, the outcomes of which were much more ambivalent than Scott's account of the authoritarian expert governance might lead us to think. First, the systems approach was coproduced by scholars from liberal and illiberal states. Second, the effects of Soviet system-cybernetic governmentality were ambiguous and could not be reduced to a colonizing project where scientific expertise is used to increase top-down control. Making economy, society, and nature legible required enormous resources, both financial and organizational, but also social and cultural. Although the desire which underpinned early Soviet interest in and support for the system-cybernetic sciences in the 1950s–1960s might have been a "high modernist," control-seeking one, the actual development of system-cybernetic governmentality significantly transformed the very understanding of control by introducing a new epistemology of risk and uncertainty. Furthermore, the outcomes of system-cybernetic governmentality were not limited to the implementation of centrally set policies in the Soviet Union. This becomes evident, I argue, when the system-cybernetic approach as a type of statecraft is understood not as a linear process, where inputs (desire and determination to act) lead to outputs (implementation of policies plus side effects), but as a *throughput*: a process in which new vocabularies, practices, networks, and organizations emerge. The thesis of high modernism, therefore, does not exhaust postwar system-cybernetic governmentality.

A Note on Method

This book draws on an extensive study of archival materials from the Archive of the Russian Academy of Sciences (ARAN), the Russian State Archive of the Economy (RGAE), and the IIASA archives. Part of my argument concerns informal practices and organizational culture, elements that were not always reflected in

the archival documents. To capture them, I drew on memoir literature, but also on specially conducted, semistructured interviews with ex-Soviet and Western scientists, research politicians, and administrators who were involved in IIASA and East-West cooperation. In all, I interviewed thirty-five individuals, conducting the majority of interviews face to face, but a few interlocutors were reached by phone or Skype. The majority of the interviews were digitally recorded and transcribed, although in some cases, when I felt that my interlocutor might feel restricted by the record, I took notes by hand. Throughout the text my informants are anonymized, which may appear unusual in the context of contemporary history. However, I am convinced that historians, just like sociologists and anthropologists, need to consider the ethical implications of their interview materials, for an author is not in control of possible uses of the text. This is particularly pertinent with regard to the history of Soviet and Russian governance and science and technology: many of my interlocutors, who were active between the 1960s and 1980s, are still alive and professionally active, and some of those who have passed away have relatives who work in similar fields.

It has been habitual for historians of Soviet science to name their informants. Most likely the majority of these Western histories were disregarded by Soviet intelligence-gathering agencies; for instance, in his memoir Loren Graham recalled a Moscow meeting with Lysenko, a notorious Soviet scientist who banned genetics and whom Graham criticized in his books. Lysenko, to Graham's surprise, was not particularly upset by his treatment.[68] However, even in the Soviet era when Western literature was reserved to special collections, not available to wider audiences, some local actors were concerned about their representation in the West. For instance, I was told by an ex-Soviet scholar that he and his colleagues were seriously distraught by Richard Vidmer's article on Soviet management, where Vidmer praised those management theorists as Westernizers, naming them as his interlocutors.[69] These scholars indeed gave their views to Vidmer, but they did not expect to be named in his study, being apprehensive about the possible political consequences. In this particular case, nothing happened. Yet in the current context of the tightening of free speech in contemporary Russia and growing tension between Russia and liberal democracies it makes good sense to protect interviewees' identities. Furthermore, there are good reasons to conceal the identities of Western scholars, administrators, and research politicians whom I interviewed, because many of them are professionally active in fields with extremely high stakes, such as, for instance, energy or climate change. Although my study focuses on the historical period of the 1950s–1980s, it discusses some projects that are still relevant in the present, not least IIASA itself, which remains an important international think tank. Thus, my interpretations might reflect

back on my interlocutors in ways that are beyond my control. For these reasons, I have chosen to completely anonymize my interlocutors.

The Organization of the Book

To argue that technoscience and politics intertwine is not to suggest that there is always a symmetry of power in this relationship, as the coproduction approach might suggest. It is particularly clear in the cases of institutional innovation that at some times political processes can prevail, while at other times scientists can steer the process according to their own interests. It is quite true that many scientific practices can have anticipated and unanticipated political effects, however, as I argue in this book, it is important not to overlook the role of individual actors in the process of the politicization and depoliticization of science. This is particularly evident in the case of the Soviet Union, where a personal change in the power structure was necessary to make way for system-cybernetic sciences.

In chapter 1, I outline the rearrangement of the Soviet power system after the death of Stalin in 1953 and, in particular, after the ousting of Nikita Khrushchev in 1964, when Aleksei Kosygin ascended to the top of the government as prime minister of the Soviet Union. This change of political and administrative elites coincided with the onset of a new discourse on the scientific-technical revolution, which was introduced in the Soviet Union in the mid-1950s and gained prominence in the 1960s, leading to the new notion of a postindustrial Soviet society. The theory of the scientific-technical revolution also posited a universal path of development, where the same technologies of governance—both hard, such as computer hardware, and soft, such as management and policy science—could be applied in communist and capitalist societies. Recent scholarship has revised the Brezhnev era as one that cannot be reduced to "stagnation"; in line with this, I show how Kosygin, bringing to power some of his close affiliates, began opening up the Soviet Union to Western trade and technology transfer and, in doing that, supported the transfer of US policy sciences. The talks on IIASA were initiated during the meeting of Lyndon Johnson and Kosygin at Glassboro in 1967, leading to the negotiations about the establishment of an international, East-West think tank. Chapter 2 traces the organizational process behind the establishment of IIASA, showing how otherwise quite different US and Soviet rationales were negotiated and combined. Johnson's administration sought to build a bridge to the East, this foreign policy orientation forming part of wider US efforts to influence Europe, both East and West, where the transfer of governmental techniques, such as management and policy sciences, played an important

role in the 1960s. The Soviets sought to acquire advanced Western technology, particularly computer technology, and linked the systems approach and policy sciences strongly with the computer field.

In chapters 3 and 4 I detail the development of the transnational community of systems analysis. The Soviet government supported the adoption of the US approach to systems analysis in the hope of improving control over industrial and social planning and production. This governmental line was used as an opportunity for a particular set of scholars to forge a transnational network of systems science, the implementation of which drew on carefully devised techniques in building a particular organizational culture at IIASA. This transnational formation of the field of systems analysis was also performative and, in chapter 4, I detail the concrete managerial tactics that performed political neutrality in IIASA's everyday life.

In chapters 5, 6, and 7 I focus on specific case studies of systems analysis, global and regional computer-based modeling.[70] I argue that computer-based modeling was a particularly important area of application for systems analysis, because computer-based modeling involved the development of both hardware and software technologies and creative ideas for their application. Furthermore, computer-based modeling required the construction of a particular social setting. Finally, computer-based modeling was invested with political symbolism in both East and West. All these features made computer-based modeling a highly influential assemblage, which laid the foundations for a new, transnational governmentality. Some of the most innovative and, indeed, revolutionary ideas regarding governance were articulated in the application of the systems approach to the study of the environment, and unsurprisingly so, for as Loren Graham and Paul Josephson note, the Soviet government somewhat tolerated civil and professional movements in defense of the natural environment.[71] Yet the methodology of systems analysis posited the links between the environment, the economy, and society, opening up a new space for socioeconomic and, eventually, political criticism in the Soviet Union. In chapter 5, I outline the beginning of global modeling in the Soviet Union, which followed the pioneering report *The Limits to Growth* (1972), commissioned by the Club of Rome.

In chapter 6 I go on to analyze in depth the Soviet contribution to a prominent study on the environmental consequences of nuclear war, which led to the formulation of the hypothesis of nuclear winter. Carried out by US and Soviet scientists in 1983, this nuclear winter study not only had an impact on nuclear strategy and disarmament, but also powerfully introduced the focus on global problems to the Soviet government, which for the first time included global issues in its governmental program in the Party Congress in 1985. Moreover, the nuclear winter study underpinned some highly original ideas on the character of

governance and the role of scientific expertise, espoused by the Russian mathematician and academician Nikita Moiseev, who drew on Vladimir Vernadskii's theory of the biosphere/noosphere to develop his own, distinct thinking, which had many parallels with the Gaia hypothesis of James Lovelock and Paul Crutzen's idea of the "Anthropocene."

Computer-based modeling was not only an experimental area of the application of the systems approach: the impact of computer-based modeling extended beyond its scientific results by providing an institutional framework for building horizontal alliances across the Iron Curtain. In chapter 7 I focus on the production of a regional, European model of transboundary pollution, which was produced at IIASA, 1983–1985, in order to illustrate the performative effect of this project. Just like the modeling efforts discussed in chapters 5 and 6, the acid rain model demonstrates the importance of informal practices in the production of an influential expertise. In this trio of chapters I argue that the performativity of computer modeling was transformative, because the scientific methodology required the Soviet Union to open up to the West, allowing ideas, data, technical equipment, and, most importantly, people, to move across the Iron Curtain. As a result of this, new governmental assemblages that involved new governmental objects, data, and expertise emerged. While meeting short-term political objectives, in the long term these assemblages contributed to making the East-West division redundant.