Introduction

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> [T]he new world is a polycentric, multi-nodal, multi-sector, multi-level, multi-actor, multi-logic, multi-media, multi-practice place characterized by complexity, dynamism, uncertainty and ambiguity in which a wide range of actors are engaged in public value creation and do so in shifting configurations.
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> (Bryson et al. 2017: 641)

Almost all governing arrangements are polycentric, and all of us as citizens, scholars or policymakers can benefit from better understanding polycentricity. A community of authors has collaborated on this book, and on other related work,[1] to contribute towards meeting that need. *Governing Complexity* provides an updated explanation of the concept of polycentric governance, examples of it in contemporary settings involving complex natural resource systems, and critical evaluation of the utility of the concept.

PRESENT TIME AND MOTIVATION FOR THIS BOOK

Trends and transformations in social organization, economic activity, and the environment have led to the prevalence of and need for polycentric organizational structures. These trends sharpen the need to understand, characterize, and evaluate polycentricity. Examples include networked communications, globalization, and climate change. Rethinking social organization and reimagining human interaction with the environment have raised and focused attention on conceptions of complex adaptive

[1] See especially the special issue of the journal *Environmental Policy and Governance* – 28 (4) (2018) – edited by Tanya Heikkila, Sergio Villamayor-Tomás, and Dustin Garrick and with contributions from several other authors of chapters in this volume.

systems, diversity (biological and social), and resilience (Adger, Brown and Tompkins 2005). These social and economic, as well as intellectual changes, are generating a more polycentric world and growing interest in better means of comprehending it and working effectively in it.

On the governance front alone, consider the following: calls for 'global governance' to deal with interrelated phenomena that affect people everywhere and yet do not confine themselves to the boundaries of nation-states or even continents, such as climate change, migration and the global economy; the presence of both unconventional 'de facto states' asserting control over various territories and 'stateless elites' with influence that is not territorially bound (Myint 2012, 199). Non-governmental organizations and private philanthropists operate locally and globally as founders, funders, and implementers of a wide variety of initiatives, projects, and programmes. Last but far from least, our information, communication, and actions in these and all other realms are now mediated through an Internet that operates without a central authority, yet has become essential everywhere and connects people in networks from household to international levels (Axelrod and Cohen 2000, 30; Folke et al. 2005, 447).[2]

It is not enough to observe and comment upon these changes. We need ways to make sense of them – concepts and a language by which to organize and share our thoughts, theorize about causes and effects and the linkages among them, gather and analyze information about the world around us, build knowledge, and make it more nearly possible for people everywhere to cope at the very least and, far better, to develop and thrive in fruitful and sustainable relationships with each other and our environment. 'Until we have a language that is appropriate to an understanding of what it is that is constitutive of democratic societies, people cannot learn how to maintain such societies in a world of increasing complexity and interdependence' (E. Ostrom 1990, 261).

We have witnessed growing attention to polycentric governance. There has been a proliferation of recent publications discussing polycentricity, and applying and critiquing polycentric systems in various settings. A search on Google Scholar returns 1,900 articles and books mentioning 'polycentricity' or 'polycentric' published in the five-year period 1990–4, followed by 3,445 during 1995–9, and 20,298 in 2010–14. Between 6,700 and 7,600 such articles and books appeared each year in 2015, 2016, and 2017. Although 'polycentric' and 'polycentricity' have usages across many

[2] For a specific and thought-provoking application of polycentric governance to the Internet itself, see Shackelford (2014).

fields, those terms have appeared with increasing frequency in political economy, public administration, political science, urban studies, environmental studies, sociology, law, and more. In this context, we organized and created *Governing Complexity* with the intent and hope that it can play a useful role at this moment of heightened interest and relevance.

STATEMENT OF PURPOSE

There are many important prior publications about polycentricity and polycentric governance – see especially Ostrom, Tiebout, and Warren (1961), McGinnis (1999a, 1999b, 2000), E. Ostrom (2010), Aligica and Tarko (2012, 2013), Aligica (2014), Cole and McGinnis (2014), and Aligica and Sabetti (2014b). These works offer eloquent and, in some cases, empirically supported arguments in favour of polycentric governance. We strongly recommend any of these contributions to the reader who is looking for a persuasive case that polycentricity is a good idea.

There have been somewhat fewer treatments of the concept that take an analytic stance towards it – moving beyond the normative proposition that polycentric governance is automatically 'good' to examine how and how well polycentric governance arrangements and systems work . Especially in light of the current moment, there are vital analytic questions of what polycentricity is, how to identify and understand polycentric governance arrangements, and how to compare and assess them. *Governing Complexity* was conceived and designed for that purpose. Our goal is to articulate and demonstrate what polycentric governance is, how to recognize it, how to make use of it, and how to evaluate it. We wish to go beyond making a case *for* polycentricity, and engage instead in an analysis *of* polycentricity – one that addresses its perils as well as its possibilities.

Altogether, the book therefore sets out to explain and illustrate what we want to call 'thinking polycentrically'. The topics covered include what makes polycentric governance come into being, how it may perform in relation to a multitude of normative criteria, and why. Thinking polycentrically implies not accepting simple blueprints, but digging into details of institutional design and human behaviour. It means pursuing empirical work using research strategies and designs that warrant tentative recommendations, which themselves require deeper scrutiny when evaluated for diverse social-ecological contexts. In other words, thinking polycentrically accepts that multiple, contingent multi-scalar arrangements involving public, private, civil society or other actors are ubiquitous and may be suitable for particular purposes. Second, thinking

polycentrically accepts the notion that governance arrangements result from context-specific factors and have context-specific effects. Third, thinking polycentrically accepts the possibility of iterative theory development following inductive–deductive research designs and multi-method research. Fourth, thinking polycentrically implies that virtues of particular governance arrangements usually come at a cost, whose distribution is negotiated in political processes and which require study and respect by analysts. Fifth, despite its extraordinary openness for extensions and its versatility in regard to objects of research, thinking polycentrically subscribes to a relatively clear set of assumptions concerning actors, their capacities and orientations and their relation to the role of institutions.

In this work, we build upon and identify with 'the Bloomington School of Political Economy' founded by and associated with Elinor and Vincent Ostrom, and readers will find them cited and quoted throughout this book. Polycentricity was a concept that was common and fundamental to Vincent Ostrom's work on public administration and the problems of democratic government, and to Elinor Ostrom's work on collective action and the performance of institutions. In pursuing research on polycentric governance, we clearly draw upon the Ostroms' work and the conceptual tools of the Bloomington school, while also working to advance this thinking and analysis in a rapidly changing world.

By making the foundational elements of polycentricity explicit, and by illustrating the way polycentric governance changes and operates in concrete cases, we want to describe the challenges that lie ahead of institutional scholars in engaging with this research agenda. We want to make headway regarding how institutional analysis can confront the growth of research on self-organization and multi-scalar systems, in order to encourage further and even more fruitful research on polycentric governance. Thus, even as we acknowledge and honour their intellectual legacy, *Governing Complexity* is not a homage to the Ostroms. Many well-deserved tributes to them and their scholarly impact exist, including Aligica and Sabetti (2014a), Sabetti, Allen, and Sproule-Jones (2009), Sabetti and Castiglione (2017), Sproule-Jones et al. (2008), and Tarko (2017a), as well as others who did not know them. Throughout the book, we engage with the Ostroms' work but also that of many other scholars. We hope that our efforts bring renewed attention to the Ostroms' contributions, but also highlight new scholarship on polycentric governance and encourage further research and practice.

SELECTIVE REVIEW OF RECENT WORK REFERRING TO POLYCENTRIC GOVERNANCE

Polycentricity has been used either explicitly or implicitly in many prior studies. We have already highlighted that in recent years, an increasing number of scholars has used the concept of polycentric governance. However, in many cases, this implied a metaphorical use of the concept. In these kinds of publications, an introduction references polycentric governance – broadly understood as diversity of governance arrangements and multitude of actors involved – as a description of the context in which research took place (see, Abe et al. 2016). Such use of the concept is certainly legitimate; we have already noted that the concept has a multidisciplinary genealogy, but for the purposes of this book, we want to draw attention mainly to authors whose work has contributed substantially to our thinking about polycentric governance from empirical, conceptual, or methodological perspectives.

We cannot cover comprehensively anything near to all of the relevant publications that have appeared in recent years, given the incredible dynamism of the field and the remarkable versatility of the concept and its theorization. Indeed, several contributions to the literature that do not even mention the term polycentric governance in their manuscripts would also need to be included in such a review. This includes work that focuses on institutions and that engages in iterative, inductive–deductive theory development, with strong reference to the alluded assumptions underlying the work of the Bloomington School of Political Economy. Additional work on the study of public and political economy, industrial organization and environmental, behavioural, and New Institutional Economics would need to be included as well. Therefore, in what follows we selectively review what we considered to be some of the most instructive recent contributions that have referred explicitly to polycentric governance, its understanding or research.

First, an important part of the literature tends to perceive polycentric governance as a solution to a multitude of governance failures and challenges. Claims are made about the positive role of polycentric governance for adaptive management, resilience and robustness (Anderies, Janssen, and E. Ostrom 2004; Garmestani and Benson 2013; Gupta et al. 2010; Pahl-Wostl 2015), or its capacities to keep opportunistic behaviour in check (Nagendra and Ostrom 2012). Elinor Ostrom became more explicit about the virtues of polycentric governance when she discussed climate change mitigation. She stated that polycentric governance 'tend[s] to enhance innovation, learning, adaptation, trustworthiness, levels of cooperation of

participants and the achievement of more effective, equitable, and sustainable outcomes at multiple scales. . .' (E. Ostrom 2010, 511; see also Rayner and Jordan 2013; Sovacool 2011). It helps to overcome opportunistic behaviour, enhances face-to-face communication, and matching of ecosystem, institutional, and social scales. Spreng and colleagues develop similarly normative work on polycentric climate change insurance (Spreng, Sovacool and Spreng 2016).

Second, we have learned from recent work on polycentric governance that has brought the concept into new empirical fields and more scales of analysis. Consonant with the origins of Bloomington School work on polycentricity, research on water governance has remained productive and prominent (cf. Garrick 2015; Koontz 2004; Marshall 2005; Schlager and Blomquist 2008; Thiel 2012). Most remarkable in this regard is work on analysing the determinants of successful coordination in polycentric governance (Knieper and Pahl-Wostl 2016), on collaborative governance (Koontz 2004; Lubell and McCoy 2010), on the role of transaction costs in water governance (Challen 2000; Garrick et al. 2013), on institutional change and performance of polycentric water governance (Baldwin et al. 2016; Boelens, Hoogesteger, and Baud 2015; Kerr 2007b; McCord et al. 2016; Newig, Schulz, and Jager 2016; Thiel 2014; Woodhouse and Muller 2017), and the comprehensive review of water governance provided by Pahl-Wostl (2015). Also prominent among these recent contributions were the works of Boelens and colleagues (Boelens, Hoogesteger and Baud 2015) and da Silveira and Richards (2013), who have raised questions about the way polycentric governance is embedded, and Buytaert and colleagues (2016) who specifically address the polycentric organization of monitoring activities in water management. From this review, it emerges that many decades of work on polycentric water governance naturally lead us to an increasingly differentiated understanding of processes and factors relating to polycentric governance, something we would like to promote in other fields.

The early Bloomington School work on polycentricity focused also on metropolitan governance, although this topic has received less attention in recent decades compared with the amount of attention to water resources (for exceptions, see Giffinger and Suitner 2014; Oakerson and Parks 2011; Parks and Oakerson 2000). Another traditional field of application on which insightful work is carried out addresses forestry, where similar advances can be observed (Andersson and E. Ostrom 2008; Nagendra and E. Ostrom 2012).

Recently, work on polycentric governance inspired by the Bloomington perspective has addressed new fields. Work on environmental issues at the global or regional scales is noteworthy, e.g. research on marine and marine

protected area governance (Ban et al. 2011; Galaz et al. 2012; Gruby and Basurto 2014; Kerber and Heide 2017). A large field of application for empirical scrutiny of the concept and theory of polycentric governance has emerged in regard to climate change. Some of this work praises the benefits of polycentric governance and laments climate change governance as we can observe it (Cole 2015). Others take a more analytical stance (Abbott 2012; Dorsch and Flachsland 2017; Jordan and Huitema 2014). The extension of research on polycentric governance to this field nicely shows the versatility and inspirational, but also empirical value that this perspective holds.

Most remarkable in this context is the recently published edited volume by Jordan and colleagues (Jordan et al. 2018). It examines whether climate governance is polycentric, or becoming more polycentric, how it has been operating and what its implications have been. In an insightful first chapter, the authors derive a set of propositions about polycentric governance that they examine throughout the book. Similar to the understandings conveyed in *Governing Complexity*, they show great sensitivity to the descriptive, explanatory and normative dimensions of writings on polycentric governance. There can be no doubt that this application of polycentricity thinking is ground-breaking, not only in relation to our understanding of climate change, but also in relation to our understanding of polycentric governance in general, across multiple scales including the global. Nonetheless, a more stringent identification of the object of research may help going beyond this book in building our understanding and theory of polycentric governance. Further, much needs to be resolved, particularly with regard to assessing the performance of polycentric governance, as Jordan and colleagues also indicate, and we further elaborate.

Of comparable significance with the work of Jordan and colleagues is the simultaneous appearance of a special issue of the journal *Environmental Policy and Governance* devoted to empirical analyses of polycentric governance arrangements. The contributions to that issue make advancements in analytic approaches, methodological techniques, and empirical applications in the study of polycentric governance. Readers will note a considerable degree of overlap with this book, not only in the roster of contributors but in the emphasis on careful and empirically grounded consideration of the development, configuration, and effects of polycentric governance arrangements across a variety of settings.

We found additional fields of application, some of which very well illustrate fruitfulness of the concept. For example, Marshall and colleagues address co-management of invasive species (Marshall et al. 2016), Salter and Tarko address the banking sector from a polycentric governance

perspective (Salter and Tarko 2017) and Liebermann addresses infectious disease governance (Lieberman 2011).

Third, understanding of polycentric governance has been deepened through recent development of a set of frameworks, many of which we also mention and discuss throughout this book. Some focus on the conceptualization of interdependence of collective actors (Feiock 2013; Lubell 2013; Lubell, Henry, and McCoy 2010; McGinnis 2011b; Thiel and Moser 2018). Others address the role that polycentric governance can play in social-ecological systems governance (Biggs, Schlüter, and Schoon 2015; Folke et al. 2005), or what conditions promote polycentric governance (DeCaro et al. 2017; Koontz et al. 2015). Further, some studies have zeroed in on particular relations within polycentric governance arrangements. For example, Andersson and Ostrom (2008) analyzed vertical interlinkages between actors through the attributes of frequency of interaction between local resource users and local governments, financial transfers between central and local governments, and upward political pressure for explaining commitments by local actors to invest in the governance of natural resources. Heikkila and colleagues (2011) address the role of specific types of cross-scale or cross-level linkages between two or more actors in transboundary river management. Marshall (2009) couches his analysis of conservation within the notion of polycentricity when he analyzes relations between communities of farmers and public agencies at lower levels. Basurto (2013) studies how multi-level institutional linkages (for example employment, membership, or different kinds of partnership) affect processes of local institutional change while Galaz and colleagues (2012) (see also Vousden 2016) specifically conceptualize polycentric governance in the international realm.

Fourth, beyond these empirical and conceptual contributions, a number of scholars have specifically advanced methods for the analysis of polycentric governance. The benchmark overview of the tools available and way to combine them has no doubt been provided by Poteete et al. (2010). A particular advance that makes explicit reference to the analysis of polycentric governance is social network analysis. It has been applied to polycentric governance in different fields and related to the way types of relations and configurations shape governance processes (Berardo and Scholz 2010; Smaldino and Lubell 2011) – see also Chapter 11. The use of exponential random graphic methods for network analysis has been an important contribution as well (see especially Berardo and Lubell 2016). Chaffin and colleagues (2016) have developed another method for identifying and assessing adaptive governance networks of organizations, which

they call institutional Social Network Analysis. Heikkila and Weible (2018) review the application of semi-automated methods to the study of polycentric governance. Standing out in relation to these new tools of analysis of polycentric systems are methods that connect what we call social-problem characteristics and institutions in the form of legal rules or relations connecting actors. The corresponding approach, Social-Ecological Network Analysis (SENA) is a way to analyze the spatial fit of institutions (Folke et al. 2007) and has provided impressive illustrations of relational dimensions of social-ecological systems governance (Sayles and Baggio 2017).

Among others, these recent contributions have inspired and informed the work on polycentric governance by the authors in this book. Throughout *Governing Complexity,* we aim to deepen, apply, and extend the understanding of polycentric governance that others have pioneered and developed.

NATURAL RESOURCES – ESPECIALLY WATER – AS A SETTING FOR ANALYSING POLYCENTRIC GOVERNANCE

We noted that a great deal of prior work on polycentric governance has employed the concept in relation to the governance and management of water resources. This book follows that pattern. To illustrate the analysis of polycentric governance in actual settings, we have chosen to ground our analysis and arguments in examples and findings concerning natural resource management, most often with water resource examples. In addition to the fact that many of our authors have experience in water-resources research, our reliance on water and other natural resource examples derives from our sense as editors that having some commonalities among the cases presented in the book is beneficial to the reader. As should be clear from the prior discussion, however, the concept of polycentric governance is not limited to this context and can be applied in myriad other ways.

Studies of natural resource governance have been important to the development and application of theorizing about polycentric governance. Research on natural resources and the environment – including common-pool resources – from the 1960s brought further awareness of the importance of scale and cross-scale linkages (Berkes 2006). Attention to the diversity of scales of common-pool resources highlights the mismatch between those resources and most established jurisdictions for public decision-making. Thus the matter of scale directly ties to the question of governance – how collective decisions are made regarding the use and

protection of resources, and how should they be made, when resource boundaries typically do not align with traditional jurisdictional boundaries.

Furthermore, current thinking about natural resource management emphasizes adaptive management. In practice, adaptive management often requires co-management, which 'relies on the collaboration of a diverse set of stakeholders, operating at different levels, often through networks from local users to municipalities, to regional and national organizations, and also to international bodies' (Folke C. et al. 2005, 448). Through this focus, we are to a certain extent putting to the test the broader observation made by Tun Myint (2012: 219):

> The theory of polycentricity has robust power to explaining transforming phenomena of world politics, especially in the area of environmental governance where a state-centric approach alone will not provide solutions to problems associated with human-environment interactions. In environmental governance, we are dealing with multiple actors and their sources of power, legitimacy and influence in addition to the dynamics of ecosystems.

Natural resource governance, involving multiple decision-centres engaged in adaptive co-management, brings the concept of polycentricity squarely into relevance.

PREVIEW

Polycentricity is a phenomenon to be identified and studied in the social world, but it is also a way of thinking about the social world – an analytical lens through which situations involving multiple organizations may be perceived and understood. Part I addresses polycentricity as a concept that people use to identify and understand phenomena and as a lens for viewing the social world; this part grounds the idea of polycentric governance in terms of its intellectual development, its central features and underlying concepts, and how it may be understood and evaluated. Our approach to understanding polycentric governance is based upon institutional analysis, with an emphasis on how people develop and use institutional arrangements to try to order their interactions with one another and address social problems. Throughout Part I, the authors focus on how and why people create multiple decision-centres – a defining characteristic of polycentric governance – and how those centres interact and evolve in relation to the social-problem context and other aspects of the broader institutional environment.

In Chapter 1, Mark Stephan, Graham Marshall, and Michael McGinnis review early uses of the idea of polycentricity by Polanyi (1951) and Ostrom,