

POLYCENTRICITY: CONCEPTUAL STRUCTURE AND BOUNDARIES

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The concept of polycentricity (tentatively defined as a system of many decision centers having limited and autonomous prerogatives and operating under an overarching set of rules) was first envisaged by Michael Polanyi in his book *The Logic of Liberty* (1951). From there it diffused to law studies, thanks to Lon Fuller (1978) and others (Chayes, 1976; Horowitz, 1977), to urban networks studies (Davoudi, 2002; Hague & Kirk, 2003), and, even more importantly, to governance studies, thanks to Vincent and Elinor Ostrom and the Bloomington School of institutional analysis (Aligica & Boettke, 2009).

The 2009 Nobel Prize in economics awarded to Elinor Ostrom pushed this concept to a renewed attention. Yet, although the concept has been recognized as important, and the blockchain revolution has revealed its salience in thinking and designing governance architectures, not much has been done to further clarify and elaborate it, beyond the work of the aforementioned authors. The article out of which the following section has been excerpted is an attempt to deal with this challenge.

The article overviews and elaborates the concept of polycentricity, defined as a structural feature of social systems of many decision centers having limited and autonomous prerogatives and operating under an overarching set of rules. The paper starts by introducing the concept as it was advanced by M. Polanyi and developed by Elinor and Vincent Ostrom. It continues introducing possible instances of polycentricity as well as related notions, as part of an attempt to further elaborate the concept through a concept design approach that systematically applies the logic of necessary and sufficient conditions. The article concludes by arguing that the polycentricity conceptual framework is not only a robust analytical structure for the study of complex institutional and governance related phenomena, but also a challenging method of drawing non-ad hoc analogies between different types of self-organizing complex social systems.

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Polycentricity: Conceptual Structure and Boundaries

The brief overview of potential examples of polycentrism, as well as of related notions, leaves us in the position to ask again whether and how it is possible to identify a core common element. At the end of the preceding section, we have outlined a basic conceptualization of polycentricity as it emerges from the assumption that the provided examples do indeed share a set of common features. We now wish to push the matter further. Although a variety of possible directions of development are possible, we'll use the direction outlined by the Ostromian perspective.

The fundamental dilemma in concept design regards the issue of whether one is dealing with such “core elements” or with “family resemblances” or, for that matter, with neither.

In most cases involving complex notions, such as those used to deal with in social science problems, it is difficult to define a concept in the traditional Aristotelian genus–differentia fashion. On the other hand, Wittgenstein’s “family resemblance” approach (1953), based on the idea that various empiric instances of a given concept may not all share a set of fundamental “essential” properties, offers no intrinsic criterion for establishing a concept’s border, a criterion for keeping the concept from becoming utterly vague. This is the point when the solutions offered by Gerring (2001) and Goertz’s (2007) become important. First of all, they provide a more formalized approach to the issue of family resemblances allowing researchers to map exactly how various instances of a concept morph from one to another as certain attributes change. Secondly, Gerring (2001) provided several pragmatic criteria for establishing the legitimate boundaries of a concept: resonance and relevance, parsimony, coherence and boundedness, commensurability, and operationalization.

In his work, Goertz’s (2007) develops a simple, yet powerful, framework for stirring the analysis from the more or less vague and difficult to measure attributes toward the more clear-cut indicators. A concept is defined by means of its attributes (basic features) and those attributes are further explicated by means of more detailed empiric indicators. Goertz thus proposes a three-level framework for concepts (p. 50-3). At the first level there is the *concept* we are trying to define, in our case “polycentricity”. The second level contains the *attributes* in terms of which we are defining the concept. In our case, these are the basic features of polycentricity outlined by the definition of the preceding section, features emphasized by the Bloomington school approach, namely (1) the existence of many centers for decision making, (2) the existence of a single system of rules (be they institutionally or culturally enforced), and (3) the existence of a spontaneous social order as the outcome of an evolutionary competition between different ideas, methods and ways of life. The third level contains *indicators* with the help of which we make the definition more operational and empirically powerful. The possible values of those indicators are incorporated in a general logical formula involving both conjunctions and disjunctions. (The traditional Aristotelian approach allows only the conjunction of attributes/indicators, hence its limitation.) This logical formula opens the path to an analytic, rigorous definition of the concept.

We may now make a real step further and try to determine the logical structure of polycentricity in terms of deeper level indicators, rather than just in terms of the three basic attributes. The main output of this logical analysis is the capability to map the conceptual space of the different kinds of possible (hypothetical or real) polycentric systems. In order to accomplish this, we need to perform an initial analysis of the candidate cases for polycentricity, based on the conceptual guidelines emerging in the previous discussion. The following set of features summarizes the Bloomington school perspective on polycentricity: many centers of decision making; ordered relationships that persist in time; many legitimate rules enforcers; single system of rules; centers of power at different organizational levels; spontaneous order resulting from free entry and exit; the alignment between rules and incentives (rules are considered useful); and the public involvement in rule design (rules about changing rules, connection between rules and consequences relatively transparent). We are further elaborating the concept below in order to encompass a more general perspective.

As far as our analysis of polycentricity is concerned, we have to decide whether the candidates of polycentricity mentioned in the previous section (municipal governments and urban networks, science, representative constitutional democracy, free market, common law) should indeed be all classified as such. The only way to approach this dilemma is to start by treating the examples *as if* they truly are cases of polycentricity and see what happens. In other words to see (1) whether the resulting concept has any obviously counterintuitive or seriously objectionable consequences and (2) whether it provides us with any useful new insights about the workings of the phenomena it is meant to capture. As we shall see, the resulting concept does indeed offer intriguing insights, for instance about the conditions under which polycentric order breaks down (into either authoritarianism or violent chaos). Moreover, it allows us to better understand the manner in which spontaneous order phenomena fit within the larger framework of social order, i.e. how such phenomena interact with other social phenomena (be they polycentric or monocentric). Thus, there are solid grounds to consider that the examples are indeed different manifestations of the same general phenomenon of polycentricity. Finally, there are other potential examples, such as international law, which have not been considered, but which nonetheless seem to fit the definition of polycentricity. Thus, the resulting concept seems to have a certain amount of traction outside the original set of empiric cases used in its creation.

The first step in concept design is to map more explicitly the detailed attributes and indicators characterizing the different paradigmatic cases of the phenomenon of interest (Gerring, 2001; Goertz, 2007). This allows us to determine the necessary and sufficient conditions for polycentricity and to detail the family resemblances. In the previous sections we have already got a set of insights about what attributes are relevant and why. We are now building up on these insights. Analyzing the real-world candidate examples of polycentricity provided in the previous section according to those attributes, leads to a tentative synthetic picture of the cases.

The result of this analysis can be summed up as follows. Polycentricity has three basic features which are to be explored in more detail in the following way: (1) The *multiplicity of decision centers* is analyzed in terms of those centers ability to implement their different methods into practice (what we call the “active exercise of different opinions”), in terms of the presence of autonomous decision making layers, and in terms of the existence of a set of common/shared goals. (2) The institutional and cultural framework that provides *the overarching system of rules* defining the polycentric system is analyzed in terms of whether the jurisdiction of decision centers is territory-based or superimposing, in terms of whether the decision centers are involved in drafting the overarching rules, in terms of whether the rules are seen as useful by the decision centers (regardless of whether or not they are involved in their drafting – i.e. the alignment between rules and incentives) and in terms of the nature of the collective choice aggregating mechanism (market, consensus or majority rule). (The idea is that the general rules cover all subunits within a polycentric system. But that does not mean that the many subunits that may exist in a polycentric system all have the same rules regarding all of the many relevant action situations.) (3) Finally, the spontaneous order generated by evolutionary competition between the different decision centers’ ideas, methods and ways of doing things is analyzed in terms of whether there exists free exit, in terms of

whether the relevant information for decision making is public (available to all decision centers equally) or secret and finally, in terms of the nature of entry in the polycentric system - free, meritocratic or spontaneous. That is to say, in case of “free entry” a decision center can *decide* to enter the polycentric system and existing decision centers cannot prevent this, while in case of the “spontaneous entry” no decision is involved -- either on the part of the newcomer or of the existing decision centers --, but the entry happens naturally and more or less unavoidably).

The idea of “an overarching system of rules” deserves a brief elaboration and further clarification. We have already summarized in the previous section Ostroms’ analysis of the problem of the system of rules, an analysis elaborated in the context of the debate about the meaning of federalism and the nature of metropolitan governance. At this juncture, another point should be added. The idea of an “overarching system of rules” has the function of an operational criterion that allows us to clearly distinguish between the members of a polycentric system and its outsiders. “Outsiders” are those agents who are not subjected to the same system of rules, as “insiders” are. This might be the case either by design, with a clear functional role in mind (e.g. creates the possibility of impartial arbiters), or it may be the result of failure and systemic imperfections (e.g. due to outsiders’ lack of commitment and will, due to their institutional inability to integrate, or due to the inability of enforcers to integrate them). The outsider might either have some additional rights (as in the case of an arbiter) or fewer rights than the members (as in the case of an agent that fails to integrate and commit to the system of rules, which can bring various disadvantages). In a polycentric system one may be a outsider to an unit but insider to another and thus ultimately part of the overarching system.

This idea of identifying the members of a particular polycentric system based on the system of rules to which they are subjected, stems directly from the Institutional Analysis and Development (IAD) framework (Ostrom, 1990; 2005). According to the ‘institutional factors’ component of this framework, the institutional positions (or roles) could be identified by looking at how the rules-in-use regulate access and other rights to various resources and information. That not only creates certain structures of authority but at the most basic level separates insiders from outsiders. In addition to that, one of the important aspects in such an approach is to identify nested structures of authority. These nested structures correspond to the relationships between different polycentric systems that coexist and interact. Thus, when one identifies the “outsiders” of a polycentric system, especially those that act as outsiders because they have additional rights, one often identifies the connection points between different polycentric systems. For example, the judge in a commercial dispute can be seen as the connection point between two polycentric systems: the market and the juridical system. Last but not least, it is also important to mention that when we are talking about the members of a polycentric system, we are talking not so much about the flesh and blood individuals, but about institutional roles within that system (i.e. about the institutional rules consisting of a bundle of rights and obligations attached to an individual). This is noteworthy because the same individual may be acting in different circumstances and at different moments in time, as part of different polycentric systems.

Based on the catalogue of relevant attributes and indicators, we are in the position to analyze each candidate for polycentricity and see how it fares in terms of each considered characteristic. The most important outcome is to tentatively define the necessary conditions for polycentricity, i.e. those indicators that are found in all cases:

- Active exercise of diverse opinions and preferences (denoted “P₁” below): by “active exercise” we mean that the opinions (ideas or methods about how to conduct something) are actually implemented into practice by at least one decision center, rather than just being enounced by someone (i.e. existing merely as a proposal or a hypothesis).
- Incentives compatibility - Alignment between rules and incentives (P₃): the rules are considered useful by the agents subjected to them and the consequences of the rules are relatively transparent. If the alignment between rules and incentives doesn't exist, we are *not* dealing with an instance of polycentricity, even if there is a multiplicity of decision centers actively exercising their opinions and preferences (as we shall see below, this corresponds to a case of polycentricity degenerating into violent anarchy).

These two essential conditions for polycentricity are in line with the Ostromian, Bloomington school definition we have already seen in a previous section. In other words, the Bloomington school, although it focused on a rather small number of cases, stumbled upon a definition which, at least relatively, is of far greater generality than one might expect.

An interesting and important aspect of the issue is the problem of decision making levels. One could easily construe a division of the candidate cases between hierarchical and non-hierarchical cases, i.e. cases in which *prima facie* there are multiple layers of decision makers and cases in which there is an unstructured ensemble of decision makers. For this reason one could legitimately see the supposedly hierarchical polycentric systems as a bundle of two or more non-hierarchical polycentric systems. This is an area where the concept of “subsidiarity” may provide some help. Thus, we suggest that the autonomous decision making layers aspect is also part of the essential attributes of polycentricity:

- Autonomous decision making layers (P₂): the different overlapping decision centers make operational decisions autonomously from the higher level.

The issue of hierarchy in polycentricity is definitely more complex than this (see for instance the problem of overlapping and nestedness in Sproule-Jones 1993). However, even if debatable, the lack of steep and intrusive hierarchies coupled with “subsidiarity” rings closer to the truth than potential alternatives. But one should recognize the ambiguities and complexities involved, especially as an intriguing point about polycentric systems is the fact that rule enforcers are in many cases outsiders (a different type of agent) and thus a polycentric (sub)system depends either on the functioning of another system or on recognized mutual interest.

Once the core area has been tentatively outlined, we move now to the differences between the various instances of polycentricity. A tentative list such as the following offers a good way to advance the argument by highlighting non-necessary conditions and thus mapping the varieties of polycentricity: First, related to *decision centers and how they work*: (A₁)

Common/shared goals and (A₂) Individual goals. To that one should add the P₁ and P₂ conditions: (P₁) Active exercise of diverse opinions and preferences and (P₂) Autonomous decision making layers. Second, related to *the characteristics of the institutional/cultural framework (the overarching system of rules)*: (B₁) Territorial jurisdiction of decision centers or (B₂) Non-territorial jurisdiction of decision centers. (C₁) Agents directly involved in rule design or (C₂) Rules designed by outsider. (D₁) Consensus or (D₂) Individual decisions or (D₃) Majority rule. To that one should add the P₃ condition: (P₃) Incentives compatibility - alignment between rules and incentives. Last but not least, *related to the spontaneous order process – how the evolutionary competition works, and how information flows in the process*: (E₁) Free entry or (E₂) Merit-based entry or (E₃) Spontaneous entry. (F₁) Free exit or (F₂) Constrained exit. (G₁) Public information or (G₂) Private information. We have now the elements needed to articulate a possible logical structure of polycentricity (fig. 1).

In other words, if one takes as parameters the features used in our tentative analysis, the logical structure derived from the paradigmatic cases considered, allows for 288 different possible types of polycentric systems (there are 288 possible combinations of the basic indicators permitted by the above logical formula). Needless to say, as in any formal typology, some of those exist while others have a purely conceptual and hypothetical nature.

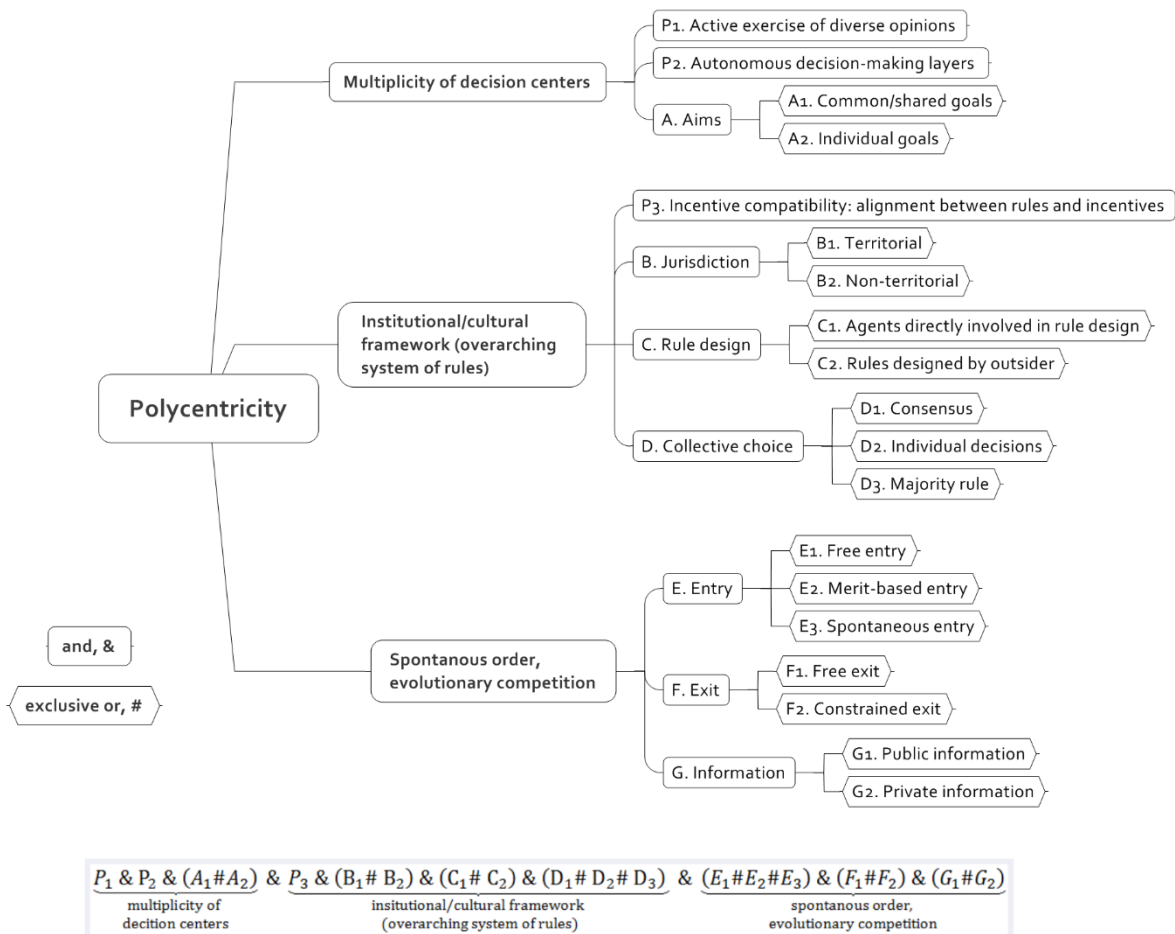


Fig. 1. Logical structure of polycentricity

One of the most interesting implications of this analysis is that one could explore not only the nature and structure of polycentric systems, but also their pathologies and breakdown. If one accepts our approach, there are nine fundamental ways in which polycentricity may break-down:

- Multiplicity of decision centers break-down:
 - non-P₁: active exercise of diverse opinions eliminated
 - non-P₂: the system becomes hierarchical
 - non-(A₁ # A₂): the activity becomes considered meaningless (the goals disappear, the polycentric system disappears because it no longer serves a function)
- Overarching system of rules break-down:
 - non-P₃: rules no longer considered useful by agents
 - non-(B₁ # B₂): agreement about territoriality disappears (decision centers fight over territorial authority)
 - non-(C₁ # C₂): no agreement about rule design (rules are no longer considered legitimate and their enforcement becomes difficult to impossible)
 - non-(D₁ # D₂ # D₃): the rule of law breaks down - power-based decisions (authority rule)
- Spontaneous order break-down:
 - non-(E₁ # E₂ # E₃): no entry (monopoly)
 - non-(F₁ # F₂): the constituency of the system is unclear (some decision centers accept X as part of the system while others do not)
 - non-(G₁ # G₂): no available information relevant to decision making (random decisions, relation between consequences and rules unclear, spontaneous order turns into drift)

The break-down of polycentricity may give way either to a monocentric system (authoritarian or not), or to chaotic violent anarchy. It is clear that certain versions of polycentricity are closer to these break-down conditions than others. In the light of our approach it looks like the following attributes make the polycentric system more vulnerable: A₁, B₁, C₂, D₃, E₂, F₂, G₂. These particular attributes are closest to the corresponding break-down condition described above; e.g. if rules are designed by outsider (C₂) it is more likely that they will be seen as illegitimate, or majority rule (D₃) is closer to a power-based decision than consensus or individual decisions, or a system based on shared goals (A₁) can lose meaning (if the sense of common purpose is lost) easier than one which is based on individual goals. Needless to say, this may also prove an important insight for the field of positive anarchy studies, as peaceful anarchy may come about from violent anarchy via the same attributes. For example peaceful anarchy may appear as interacting agents develop a sense that certain rules are mutually useful (Leeson, 2005; 2009).

The implications of an analysis along the lines defined above could go even further. Proposed reforms of existing polycentric systems often involve changing the value of one

of the six non-necessary attributes. For example critics of the free market system often argue that in case of certain goods or services (such as education or healthcare) the D attribute should be changed from D_2 to D_3 (i.e. individual decision should be replaced by majority rule). Similarly, in regard to other issues, such as banking, libertarians argue that the existing D_3 attribute should be changed to D_2 (i.e. interest rates determined by the Central Bank should be freed and left entirely at the decision of individual banks). Or, advocates of market regulations, such as licensing, propose that the E_1 attribute of the market should be changed to E_2 (i.e. that free entry should be replaced by merit-based entry). As yet another example, advocates of human rights propose that the B_1 attribute of international law should be changed to B_2 in regard to certain instances (i.e. that certain rights should be territory independent). Finally, it is interesting to point out that there has been a historic transition of the juridical system from C_1 to C_2 , transition that marked the separation between the juridical power and the legislative and executive powers (i.e. ideally, the rules that constrain the executive power are no longer designed by the executive power itself), and the separation between constitutional rules and common law. Similarly, it is usually considered undesirable when firms and corporations get involved, mainly via lobbying, in the design of market regulations, i.e. the C_2 attribute of the market (agents not involved in rule design) is considered desirable and, historically, the transition from mercantilism to modern capitalism may be seen as being in a sense a transition from C_1 to C_2 . However, in case of democracy, the transition from C_2 to C_1 was of crucial importance (citizens are no longer completely separated from the process of rule design) and C_1 can be considered the essential attribute of a democratic system. To sum up, the framework provided by a conceptualization and analysis on the lines introduced above has the potential to illuminate an entire set of issues related not only to the way we understand polycentric systems but also to the design and policy change in social systems in general.

Conclusions

The concept of polycentricity, as developed and defined in the Polanyi-Ostrom tradition and as elaborated above, is not only useful as an analytical framework but also for making analogies between different complex systems. At the same time it could open up the possibility of very challenging and interesting analytical and normative speculations based on the comparative analysis of different forms of polycentric arrangements and governance systems.

The point is that a polycentricity framework on the lines defined above provides, at minimum, an analytical structure for the study of certain social phenomena. However, our point is that there is more into it: it provides a method for drawing *non-ad-hoc analogies* between different forms of self-organizing complex social systems as well as a means to challenge and bolster our institutional imagination. These analogical insights have to be tested and *if* many of them turn out to be correct, *than* the concept of polycentricity is indeed useful in additional ways. In the light of the previous work by the Ostroms' and others, it seems very likely that it can generate interesting new lines of inquiry as well as shed new light on existing debates.

In the end, if our approach is correct, one could identify not one but many multifaceted forms of polycentricity. The stake of this whole approach is to provide a way of discovering

how to improve the functioning of different configurations and complex social systems by means of drawing analogies between them. Different complex systems have weak and strong points. The challenge is how to bring the strong points from one area into another in order to counter the weak points.

The classic approaches so far have usually drawn upon analogies with markets; e.g. Ostrom's idea of market-like inter-organizational arrangements or of public entrepreneurship brings market-like attributes to public administration, or Hayek's emphasis of common law and Weingast's idea of market-preserving federalism bring market-like attributes to the evolution of legal systems. On the other hand, most advocates of market regulation propose to make the market more like democracy. Unfortunately most of these arguments lack any supporting overall conceptual framework. At minimum one needs a more systematic approach to how analogies between complex systems should or can be made. Polycentricity can be utilized as a conceptual framework not only for drawing inspiration from the market, but also from democracy or any other complex system incorporating the simultaneous functioning of multiple centers of governance and decision making with different interests, perspectives and values.

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