

# Global Governance as a Complex Adaptive System



**Karin Geiselhart**

*University of Canberra and Australian National University, Australia*

## INTRODUCTION

The recent advent of Internet technologies has greatly intensified existing globalization processes. The development of full multimedia international communications has the potential to democratize information flows. Citizens can communicate with each other and with governments to create and document public and private accountabilities beyond jurisdictional borders. Ironically, it is also now possible to achieve intensive and intrusive surveillance of individuals and organisations, virtually untraceable criminal exchanges of data, and even forms of cyberwarfare. These possibilities are all part of the global information commons. Like physical common spaces, beneficial and nefarious elements coexist. A working definition of the global information commons is the set of all information systems critical to managing global resources and governance, and the set of protocols for their exchange. While both cumbersome and broad, this definition of the global information commons helps to ground it as a concept that can be modelled and managed. It responds to Dahl's query about the possibility of a third transformation of democracy beyond the nation-state.

This article considers key issues for the emerging global information commons. These relate to the role of new technologies in possible forms of global governance. Global governance is here considered to be the emerging mechanisms for managing trans-national issues and resources. These can be particular to a specific issue or resource, such as the fisheries, or may be more formal, such as the European Union. Governance can be seen as a management function, much as the "governors" on early steam trains.

First, the author presents an overview of technology as socially determined, followed by a sketch of how global governance may be seen as a complex adaptive system. This includes an analysis of how models might embed democratic structures. Finally, examples of sub-systems of the global information commons demonstrate the range of actors and rules such a system would need to consider.

This theoretical perspective builds on empirical work in the physical, biological, and social sciences and emphasizes the value of modelling governance at all scales. This approach is seen as fruitful for identifying and

monitoring dynamic patterns. It provides useful insights for managing the global information commons. In human systems, the rules of interaction and information exchange are determined by the values of the actors (Theys, 1998). Modelling can help to articulate these values. In complex human systems, the direction of change can be as important as absolute measures.

## BACKGROUND

The relationship between technology and society has long been a topic for analysis, recently stimulated by the rise of the information age. Several writers are particularly relevant for considering the role of information technology in systems of governance. Beniger (1986) showed the importance of information in all forms of evolution and control. This concept has become popularized through the study of the genetic code as a program for biological processes. Feenberg (1991) provided a critical theory of technology, and revealed how the democratising potential of information technology makes it a site for an ongoing power struggles. Sclove (1995) considered the need to embed democratic assumptions in technology design. Zuboff's (1988) concept of "informating" provides an essential learning element, which has connections to complexity theory and the developmental role of democracy and policy. A more complete review of the social determination of technology design in democratic systems of governance is provided in Geiselhart (1999). Current efforts to articulate a direction for the global information commons can be seen in the processes of the World Summit on the Information Society (<http://www.itu.int/wsis/>). The WSIS is in many ways a microcosm of the wider issues involving information technology and global governance.

## GLOBAL GOVERNANCE AS A COMPLEX ADAPTIVE SYSTEM

With accelerating pace over the past 20 years, awareness has grown in first the physical, and lately the social

sciences of a new and powerful way of modelling many kinds of systemic behaviour. Some have taken this metaphorically (Zolo, 1992) while others have made serious efforts at mathematical modelling (Biggs, 2001; Stocker, Green, & Newth, 2001). The author suggests this would be a fruitful perspective for examining emerging forms of global governance. Complexity theory is showing that understanding and some form of control is possible without total determinism and predictability. These revelations suit modern, information driven governments, which are often caught up in changes that outpace their ability to adapt. Many institutions, including the administrative arms of representative government were developed for a simpler, less interdependent age. Physical systems, such as climate, are also undergoing rapid transformation. There is heightened recognition of the need to find new ways of harnessing citizen knowledge and consent to achieve rapid learning and flexible response.

The section argues that in addition to aiding in understanding and possibly prediction, modelling global governance could suggest methods for integration across scales.

Traditional Newtonian concepts influenced linear, hierarchical views of social structure and management, and are now yielding to the paradigm shift associated with complexity (Becker & Slaton, 2000). Recent work on simulating social models and the spread of ideas shows that while ideas spread from one-on-one exchanges, it is the collective and cumulative interactions that lead to major shifts in perception or values (Stocker et al.). An essential observation of these systems is that a simple set of rules can generate very complex behaviours at many scales.

An “attractor” is a pattern generated by a complex adaptive system (CAS). It can form a range of behavioural loops that may be static, repeating, or non-repeating. Social structures as well as biological events can form fractal patterns, which repeat at different levels. Thus, the incidence of industrial strikes has been found to follow a power law similar to the way fires spread in a forest (Biggs, 2001). These can be the ever different but similar patterns of bureaucratic procedures or the endless reshuffling of international accreditation. Work on government (Kiel, 1996) and on organisations (Theys, 1998) suggests that in human systems the rules of interaction are driven by the values of the actors. This implies democratic values produce different patterns of governance. These interconnections are now made more obvious through digital communications. The endless data of global networks could be as useful for monitoring democratic process as for catching terrorists. Garreau (2001) describes collective global bird monitoring in terms very similar to a CAS.

The key insight for the global information commons is that patterns of authority are shifting away from monolithic nation states and towards more diverse, fractured,

and trans-national sub-systems. One popular view of the changing model of governance is Rosenau's (1997) proposal that “spheres of authority” are arising as alternatives or complements to sovereign states. Rosenau describes a sphere of authority (SOA) as “emergent authority relationships.”

Ernest (2001) discusses spheres of authority in some detail. He notes that “Spheres of authority may be temporal or enduring, local or global. What makes them unique is their ability to provide social goods and protections that states are either incapable of or unwilling to provide.” SOAs encompass “traditional” units of analysis like inter-governmental and nongovernmental organizations, but include less structured forms of social behaviour including transnational coalitions, issue networks, and global civil society. The critical common factor is that “these SOAs create challenges to the authority of the contemporary nation-state in a wide range of issue areas, from the land mine ban to monitoring human rights conditions and governmental corruption.”

Complex systems display sensitivity to initial conditions, for which humans may be read as the history of relevant events. There is a possible communication path from an individual in Iowa to the head of the World Bank, but the mapping of the rules onto the actors determines the degree of democratic governance. There can be bifurcations, such as many believe occurred with the attacks on the United States in September 2001. Fractal patterns can occur over time, and the much smaller World Trade Centre attack in the early 1990s, as well as the bombing of a night club in Bali in 2002 may all be part of the “pattern.” Identification of the values driving the patterns can assist in redirecting them for more sustainable outcomes, and avoiding counter-productive responses that incite further escalations.

Not all the patterns reflect democratic values. Some exclude citizen participation, while others have the potential to override national sovereignty. Individuals form clusters, formal and informal. Organisational and institutional clusters, from a local Parent and Teachers Association to the World Trade Organisation (WTO) and the United Nations, create spheres of authority and defacto systems of governance that increasingly have digital representation or at least a fingerprint. These may or may not include provision for information and decision-making, transparency, citizen participation, and accountable evaluation of the outcomes. These concepts of global governance as a CAS are discussed more fully in Geiselhart (2004). One assumption of this theoretical approach is that democratic “attractors” for global governance will make use of negative feedback loops. In a CAS, these bring the system back to a norm, like a thermostat. Positive feedback loops, on the other hand, facilitate the system moving further from equilibrium, possibly to beyond the

6 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

[www.igi-global.com/chapter/global-governance-complex-adaptive-system/11606](http://www.igi-global.com/chapter/global-governance-complex-adaptive-system/11606)

## Related Content

---

### A Conceptual Framework for Smart Governance Systems Implementation

Salvador Muñoz-Hermoso, Francisco J. Domínguez-Mayo, Agustí Cerrillo-i-Martínez and David Benavides (2025). *International Journal of Electronic Government Research* (pp. 1-25).

[www.irma-international.org/article/a-conceptual-framework-for-smart-governance-systems-implementation/376170](http://www.irma-international.org/article/a-conceptual-framework-for-smart-governance-systems-implementation/376170)

### Managing Stakeholder Interests in E-Government Implementation: Lessons Learned from a Singapore E-Government Project

Chee-Wee Tan, Shan L. Pan and Eric T.K. Lim (2007). *International Journal of Electronic Government Research* (pp. 61-84).

[www.irma-international.org/article/managing-stakeholder-interests-government-implementation/2027](http://www.irma-international.org/article/managing-stakeholder-interests-government-implementation/2027)

### Socio-Technical Determinants of Information Security Perceptions in US Local Governments

Eunjung Shin and Eric W. Welch (2016). *International Journal of Electronic Government Research* (pp. 1-20).

[www.irma-international.org/article/socio-technical-determinants-of-information-security-perceptions-in-us-local-governments/167746](http://www.irma-international.org/article/socio-technical-determinants-of-information-security-perceptions-in-us-local-governments/167746)

### Supporting Public Policy Making Processes with Workflow Technology: Lessons Learned From Cases in Four European Countries

Aggeliki Tsohou, Habin Lee, Karim Al-Yafi, Vishanth Weerakkody, Ramzi El-Haddadeh, Zahir Irani, Andrea Ko, Tunc D. Medeni and Luis Miguel Campos (2012). *International Journal of Electronic Government Research* (pp. 63-77).

[www.irma-international.org/article/supporting-public-policy-making-processes/70076](http://www.irma-international.org/article/supporting-public-policy-making-processes/70076)

### Is Open Data Enough?: E-Governance Challenges for Open Government

Gianluca Misuraca and Gianluigi Viscusi (2014). *International Journal of Electronic Government Research* (pp. 18-34).

[www.irma-international.org/article/is-open-data-enough/110954](http://www.irma-international.org/article/is-open-data-enough/110954)