



## Review

# Informational governance – A systematic literature review of governance for sustainability in the Information Age



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## ABSTRACT

The rapid developments in all kinds of new information technologies, information networks and social media are increasingly affecting societies around the world. The so termed Information Age not only influences social relationships, economy and science, but also governance. Against this background and in the specific field of sustainability, informational governance is an emerging concept. It addresses two interrelated processes: (1) new forms of governing through information, and (2) transformative changes in governance institutions due to the new information flows. The aim of this article is to gain more insights into ways in which the Information Age impacts sustainability, and to suggest a research agenda with relevance to the field of informational governance. A systematic literature review resulted in a selection of 39 articles, of which 23 and 16 articles were identified in two-parallel searches. The increased human interconnectedness through e-governance, self-organization, private governing and empowerments are identified as core informational governance trends dealing with sustainability in the Information Age, and essential to future research.

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## 1. Introduction

Societies around the world are increasingly affected by rapid developments in all kinds of new information technologies, information networks, and social media. In our daily life, the so termed Information Age influences our social relationships (Twitter, Facebook and WhatsApp), our economy (virtual auction), our science (scientific information losing much of its credibility and authority due to a variety of other information sources), and our politics (WikiLeaks). The Information Age has been widely studied and theorized upon but also strongly celebrated and heavily criticized.

The centrality of information in the Information Age increasingly impacts governance processes (Bichler, 2007; Clifford, 2009; Işık, 2013; Seraj, 2012). Governance can be addressed analytically by describing institutions as ‘the patterns that emerge from the governing activities of social, political and administrative actors’ (Gerritsen et al., 2013), but also by emphasizing processes meant for guiding, steering, controlling or managing sectors or facets of

societies (Kooiman, 1993, p. 2). On the one hand, the hyper-connectivity across the globe opens up enormous possibilities for information exchange, knowledge creation, feedback, debate, learning and innovation, social networking, marketing and advertising. On the other hand, it erodes the power of classic public and private institutions as nobody is in control of information. Whereas conventional governance highly relies on authoritative resources, belief in information control and state power, in the Information Age uncontrolled flows of information is becoming a crucial (re)source with transformative powers for a variety of actors (Mol, 2008).

In particular, information plays a key role in governing environmental issues such as climate change, biodiversity loss, depleting resources and competing land use claims. Human–environmental relationships are complex issues because of time-lags between human actions and environmental effects and the lack of understanding of multiple scaled ecological systems (Underdal, 2010).

Against this background, informational governance (Mol, 2008) is emerging as a new concept in the field of environmental policy and sustainability issues. It addresses two interrelated processes: (1) new forms of governing through information, and (2) transformative changes in governance institutions due to the new information flows appearing in the Information Age. The

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informational governance concept is inspired by Castells (1996, p. 21) who in a similar manner within a market context distinguishes between ‘information economy’ referring to flows of information, and ‘informational economy’ linking it with institutional change. Institutions are here interpreted broadly, accounting for formal as well as informal rules which encourage or restrain actors’ behaviours, and which influence the structures of contexts for acting (Ostrom, 2009).

The main aims of this article are to gain more insights into informational governance, and to suggest a research agenda. At present, literature that explicitly uses the key word informational governance is limited to six articles (Hoefnagel et al., 2013; Mol, 2006, 2009; Naus et al., 2014; Toonen and Lindeboom, 2015; Toonen and Mol, 2013). All these studies are connected with the same research community (Wageningen University and Research Centre, the Netherlands). Special applications have been conducted in research fields such as energy (Naus et al., 2014) and marine governance (Hoefnagel et al., 2013; Toonen and Mol, 2013).

Although we recognize that the concept of informational governance is hardly mentioned in the literature, we note that social, environmental and economic sciences contribute to informational governance. Particularly, we refer to literature addressing environmental policy and sustainability contexts, which link to new information technologies, new information flows and emanating institutional structures in the Information Age. Accordingly, in this article we systematically explore literature within the environmental governance domain to gain more insights into ways by which the Information Age impacts sustainability. More precisely, this paper addresses the following questions:

- a. How does the emerging use of information and information technologies influence governing of firms, communities, citizens or consumers behaviours towards sustainability (referred to as governing through information)?
- b. How does new information generation, processing and transmission influence change in sustainability governance institutions in terms of norms, rules, relations, processes and organization (referred to as institutional change due to information flows)?
- c. How can these insights be used to identify research gaps and develop a research agenda for informational governance in the field of sustainability?

The method of systematic literature review is used to answer these questions (Kampen and Tamás, 2013). In Section 2 we explain how we have applied the systematic literature review method to analyze (a) governing through information, and (b) institutional change due to information flows. This is followed by both quantitative (Section 3) and qualitative (Section 4) analyses conducted to present some core findings of the systematic literature review. Finally, a discussion and concluding remarks are provided (Section 5), including an articulation of a proposed research agenda.

## 2. Method – a systematic literature review

The literature relating to informational governance was reviewed systematically by using a transparent and reproducible method for selecting literature. Systematic reviews are rapidly growing in importance in the social sciences to aggregate findings across multiple empirical studies, a method which extensively has been used in medical disciplines (Bilotta et al., 2014; Kampen and Tamás, 2013; Moore et al., 2014). In contrast with the traditional reviews, the systematic literature reviews avoid vulnerability for

unintentional bias in the selection, interpretation and organization of contents, by following transparent steps and explicitly informing of the criteria used for reaching conclusions from a body of scientific literature (Biesbroek et al., 2013). The systematic literature review applied here does not intend to cover all relevant literature available, but to provide a proxy or indication of literature covering relevant attributes to the informational governance concept.

As mentioned in the introduction, the informational governance concept is in this article distinguished into two interrelated interpretations, which are differentiated into the two research questions on; (1) governing through information, addressing information as a means to influence governing of firms, communities, citizens or consumers behaviours towards sustainability, and (2) institutional change due to information flows, exploring the way new information generation, processing and transmission fundamentally restructure governance institutions in terms of interdependencies, power relations, processes and organization. These two interpretations of informational governance are dealt with by two distinctive parallel searches in SCOPUS (Fig. 1). In the following they are referred to as search 1 and search 2, respectively.

Literature searches in SCOPUS were made in March 2015 for articles written in the years 2007–2014, thus since the term informational governance was launched by Mol (2006, 2008). Exploring the links between the new emerging information flows and how these lead to change within and across existing institutions and actors, we identified a total of four word categories, in which synonymous within each category were identified. They included (1) sustainability, (2) online information flows, (3) governing through information and (4) institutional change due to information flows (Appendix A, Table A1).

- (1) *Sustainability*. The environmental policy and sustainability context of this review puts the term sustainability central, referring to governance of the environment from ecological and socio-economic perspectives, for instance, related with multiple ecosystem services provided by landscapes, or inclusion of environmental values in food production chains. The sustainability concept is due to high complexities and have different interpretations (Frame and O’Connor, 2011) (we have used the following synonyms; ‘sustainable’, ‘sustainability’, ‘environmental protection’, ‘environmental policy’, ‘environmental management’ and ‘environmental governance’). The most well-known interpretation is given by the Brundtland commission: ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’ (WCED, 1987, p. 43). Even though the sustainability concept is criticized for having to diverse interpretations, it is also appreciated for triggering hopes about positive future trends and concerns the future direction of human civilisation when defining visions and perceptions about what is seen appropriate (Jordan, 2008, p. 28). The search results will show what interpretations of sustainability issues are represented in this literature review.
- (2) *Online information flows*. The Information Age context of this review is captured by identified synonyms to the online information flows (‘information technology’, ‘ICT’ and ‘digital information’). The relevance of online information is enhanced by the Aarhus Convention (on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters) (De Santo, 2011), among others. Increasing availability of information and communication technologies (ICTs) are affecting societies and economies in different ways around the world, and hence future sustainability (Plummer et al., 2013; Williams, 2011). Rapidly, a growing literature is addressing the implications and potentials of

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