



Servitizing climate science—Institutional analysis of climate services discourse and its implications



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ABSTRACT

The complex and severe challenge presented by climate change has led to diverse and intense discussion about the interaction between science, society and policy. One part of this discussion has been the emergence of climate services. Although the concept is still ambiguous, such services can be defined as the production and delivery of climate related information for any kind of decision-making. The servitization concept has been championed especially by the World Meteorological Organization and the European Union.

This paper approaches the emergence of climate services from an institutional perspective, using discourse analysis as the method. Using World Meteorological Organization Bulletin articles, climate services are analyzed as a developing organizational field undergoing a theorization process, where the necessity and characteristics of the field are conceptualized and institutional logics are formed. Within the paper, these logics and their implications are also assessed in the context of climate change adaptation and mitigation, decision-making and service development.

Results show that, within the studied texts, climate services are justified by global challenges, specific needs, technological potential, economic value and shortcomings of existing climate science communication; and that the emerging field is characterized by user orientation, new roles and responsibilities and ambiguous service content. These discourses reveal emerging institutional logics that are based on somewhat narrow assumptions on human and organizational behavior and adaptation dynamics. These indicative results, from this limited study, call for more diverse and critical research approach to climate services.

1. Introduction

“...a new fertile scientific community breaks down walls between public and private; pure and applied; science and industry. This intellectual and technical fusion offers opportunities as we seek to develop greater resilience to climate change and extreme events.” (Sample article #46, WMO Bulletin, Vol. 60, Iss. 1, 2011)

The complex and severe challenge presented by climate change has

led to diverse and intense discussion about the interaction between science, society and policy. As the quote above illustrates, new ways of organizing the production, delivery and use of climate information are sought for and suggested. One part of this development has been the emergence of so called ‘climate services’.

Climate services can simply be defined as serving climate related information to someone. According to Vaughan and Dessai (2014) they involve the generation, provision, and contextualization of information and knowledge derived from climate research for decision-making at all levels of society. Ideas about delivering such information as a service emerged already in 1970's and 1980's (Changnon et al., 1980; Hecht, 1984; National Academy of Sciences, 2001) but the current momentum and institutional development is unprecedented. This turn indicates a shift in mindset. As Millner (2012) explains, what once was a pure research enterprise is now increasingly a business of service delivery. Especially, the World Meteorological Organization (WMO, 2014) and the European Union (EU, 2015) have promoted the concept of climate services in their agendas.

Climate services can be considered as an emerging organizational field. Organizational fields are aggregates of actors in a recognized area of institutional life (DiMaggio and Powell, 1983) or sets of organizations that share a common meaning system and interact more frequently within the set than outside it (Scott, 1995). Both of these definitions apply to climate services. A key process in field emergence is theorization (Strang and Meyer, 1993; Tolbert and Zucker, 1996) during which the developing practices and structures are conceptualized by developing shared meanings, leading to legitimacy and increased objectification (Greenwood et al., 2002). This process is also tightly connected to agreement on the institutional logics (Thornton

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and Ocasio, 1999) of the new field which in part leads to shared and socially constructed assumptions, values and rules. Climate services can be seen as currently undergoing a theorization process.

The aim of this paper is to explore this emergence of climate services. This is done by analyzing the articles discussing climate services within a selected professional publication: the WMO Bulletin. The bulletin articles are considered to constitute an interesting sample of professional texts that theorize and conceptualize climate services. Such a limited set of texts causes the resulting picture of the emerging field to remain partial, but the importance of WMO as an institution means that the theorization taking place within its publication has the potential to affect the development of the field as a whole.

This paper uses discourse analysis to study the emergence of the field of climate services. There is a long tradition in using discourse analysis in environmental policy research (Hajer and Versteeg, 2005) and also in studying climate policy specifically (O'Brien et al., 2007; Gillard, 2016).

The motivation of this study is clear. It is important to understand the emergence of climate services because of the immense global challenge posed by climate change. If even a partial response to this challenge is the servitization (Vandermerwe and Rada, 1988) of climate science, this transformation from science into services needs to be sound. Critical analysis is currently absent in the academic literature on climate services. The few studies with a broader approach, such as those by Vaughan and Dessai (2014) and Reinecke (2015) explain and conceptualize the issue but lack the analysis of the servitization process itself.

The paper is structured as follows. Section 2 elaborates the paper's connections to relevant theoretical literature. The third section describes the research design. The fourth section is devoted to the results of the discourse analysis, followed by the discussion about these results in the fifth section. The sixth and final section concludes the paper.

2. Theoretical approach

The idea of organizational fields is rooted in institutional theory. Institutional theory can be described as a theoretical approach that emphasizes the processes and impacts related to development and existence of resilient social structures (Scott, 2008). Institutions are these social structures and can exist in many forms, such as organizations, practices, norms or rules. The key role of institutions in climate change adaptation has been pointed out by several authors (Bakker, 1999; Adger, 2000; Nass et al., 2005; Dovers and Hezri, 2010) and institutional theory has proven useful in studies of science policy (Martin, 2012).

Organizational fields were originally defined by DiMaggio and Powell as “sets of organization that, in the aggregate, constitute an area of institutional life; key suppliers, resource and product consumers, regulatory agencies, and other organizations that produce similar services or products.” (1983: 148–149). As Phillips et al. (2004) mention, organizational fields consist of shared institutions. A critical phase in the emergence of institutions is *objectification* where general, shared social meanings are developed and attached to behaviors (Tolbert and Zucker, 1996). *Theorization* or theorizing is a central activity enabling objectification (Strang and Meyer, 1993; Tolbert and Zucker, 1996; Greenwood et al., 2002). During theorization the shortcomings of existing institutions are conceptualized and new potential solutions are presented, creating moral and pragmatic legitimacy for the institutional change (Greenwood et al., 2002). Theorization is closely related to the idea of *institutional logics*. Institutional logics are defined by Thornton and Ocasio (1999) as the socially constructed patterns of practices, assumptions, values, beliefs and rules that guide, organize and provide meaning, and therefore they can be viewed as the outcome of the theorization.

Discourse analysis has become an important tool within the development of institutional theory because it offers a way to understand

how institutional logics develop, by whom and to what effect. It is also useful in explicating social construction processes such as theorization. (Nelson and Oswick, 2012) This importance of discourse in the emergence of a field has been pointed out by several authors (Phillips et al., 2004; Maguire and Hardy, 2006; Grodal and Granqvist, 2014) as discourses create the meanings that ultimately define the field and its boundaries. Discourse analysis has also been applied extensively in climate change policy research (see e.g. Detraz and Betsill, 2009; Cannon and Müller-Mahn, 2010; Hartmann, 2010).

3. Research design

The empirical component of this paper consists of a document analysis aiming to study the prevailing discourses in the climate services field. Document analysis is an established and popular method in qualitative research that offers an efficient and exact way to achieve high temporal and spatial coverage to track change and development (Bowen, 2009). In general, document analysis involves superficial examination by skimming, more thorough examination by reading and finally interpretation leading to analysis (Bowen, 2009).

The documents selected are WMO Bulletin articles published between 2007 and 2015. This time period was chosen because of its availability and to represent the most recent phase in the emergence of climate services from the scientific-professional point of view. The period also covers both the immediate development of WMO's Global Framework of Climate Services (WMO, 2011, 2014) and its immediate consequences; thus covering perhaps the most substantial formal processes related to the emergence of climate services.

The WMO Bulletin is the official journal of the World Meteorological Organization. It is issued twice a year with the exception of additional special issues, and regards the atmospheric sciences community as its target audience with extended outreach to the broader informed public (WMO, 2016). Because of the global and interdisciplinary nature of the bulletin's audience, highly technical or scientific material is discouraged. Articles are submitted by scientists and professionals in the fields of meteorology, climatology, hydrology, the environment and related fields, and large share of the content is also provided by the editorial board and WMO secretariat.

There are various reasons justifying this selection of documents. First, as Phillips et al. (2004) propose, texts produced by actors that are considered legitimate or formal authorities, central within a field, are more likely to become embedded in the action shaping discourse. The WMO Bulletin articles certainly fall into this category. Second, Greenwood et al. (2002) showed that professional associations have a pivotal role in the theorization phase of institutional change. Although the WMO is not by strict definition a professional association, it is a similar community of professionals, within which many of the most notable discussions of the relevant professions take place. It is also worth noting that while WMO membership is country-based, the countries are typically represented by their national meteorological and hydrological services (NMHS) (i.e. scientists and professionals of atmospheric sciences).

The material for in-depth document analysis was selected by identifying all the WMO bulletin articles published between 2007 and 2015 and selecting those ones which explicitly mentioned “climate services”, “climate information services”, “climate change services” or “climate adaptation services” in the topic or the body of the text. This framing resulted in a cohort of 109 articles. The selection criteria is likely to exclude some articles that discuss the issue but do not use the exact terms and it included multiple articles that discussed climate services only briefly. It can, however, be considered to sufficiently represent the climate services debate within WMO's circle during the time period. The list of sample articles is presented in Appendix A.

After initial scoping and selection the material was processed in three phases. First, the documents were skimmed through to form a general idea on the climate services discussion. During this skimming

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