Understanding the governance of urban water services from an institutional logics perspective

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A B S T R A C T

In recent decades, the urban water sector has experienced accelerating social complexity that derives from conflicting goals and beliefs, making the sustainability of the sector primarily a governance issue. However, existing governance models do not reflect the new reality. There is thus an urgent need to develop an urban water governance model reflecting this increasing complexity, to support sustainable governance. We integrate concepts from sociology, institutional theory and sustainability transitions to build a governance framework that includes interactions of social structures, and practices, shaped by different institutional logics and categorised at strategic, tactic, operational, and reflexive level.

1. Introduction

Water is a core element of numerous societal functions in urban areas, including the delivery of potable water to households, business and industries, disposal of waste, drainage and flood control, fire-fighting, provision of aesthetic values in public spaces and support of biodiversity, among many others. All these functions are referred to as *urban water services*. Until the late 20th century, these services were few, well-defined and uncontested (Pahl-Wostl et al., 2011), effectively supporting rapid economic growth and rising living standards in industrialised countries. Centralised and hierarchically organised government was then strictly occupied in applying well-known solutions of a technical character.

However, in recent decades we have witnessed ever-growing complexity and uncertainty (Bauman, 2000; Beck et al., 2003; Castells, 2010), simultaneously triggering the emergence of new technical, social, economic and environmental issues. Examples are climate change adaptation, maintenance of infrastructures under financial constraints, prevention of terrorism and cyber-security risks, provision of aesthetic and recreational services, and maintenance of healthy ecosystems. These needs are diverse and ill-defined, and often reflect conflicting values, beliefs and goals that cannot be solved with simplistic technical solutions or effectively handled by a centralised government in isolation. There is a growing recognition that sustainable development

of the water sector is generally not hindered by technical problems, lack of knowledge or resources, or financial constraints, but rather by socio-institutional challenges (Brown and Farrelly, 2009; van Dijk, 2012). The Global Water Partnership (GWP, 2000, p. 17) has even claimed that "the water crisis is mainly a crisis of governance", a proposition often echoed by leading international organisations such as the UN, World Bank and OECD.

Research on governance has burgeoned in diverse fields (including political science, public administration, economics, sociology and geography) during the past two decades, addressing disparate issues and producing diverging interpretations (Kemp et al., 2005; Kersbergen and van Waarden, 2004; Kjær, 2004; Kooiman, 2003). This growing interest is also reflected on the study of urban water governance (Neto, 2016), which usually departs from a definition of governance constrained to a "narrowly technical decision-making process" (Bakker, 2010, p. 8). The different conceptualisations of governance suggested for the urban water sector are often supplemented by non-coherent incorporation of ideas from these diverse fields, preventing understanding and consensus about what *governance of urban water services* actually means (van de Meene et al., 2011; van Dijk, 2012) and impeding successful design of sustainable governance configurations (OECD, 2011).

To address this issue, Loorbach (2010) devised a governance framework for managing sustainability transitions in Western democracies. This framework is simultaneously analytic and normative.

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Analytically, it recognises four different governance levels (strategic, tactical, operational and reflexive), advancing understanding of what governance actually means in different applied sectors, including the urban water sector. Normatively, the model may be used in the purposeful design of governance instruments that orient transitions in certain societal sectors (such as transportation, health or water) toward more sustainable configurations. Although Loorbach's research is widely cited for its innovative approach to "transition management" (orienting transitions), it does not take into consideration the cultural-cognitive background of governance, i.e., the co-existence of diverse structures of values, beliefs and goals (here referred to as institutional logics) that are a source of conflicts and fragmentation, often hampering sustainable development (Besharov and Smith, 2014). Loorbach (2010, p. 169) notes that "governance activities" are dependent on the "'culture' of the societal (sub-)system", but offers no further explanation. We include this cultural-cognitive aspect in the governance framework with the support of the institutional logics perspective (Friedland and Alford, 1991; Thornton et al., 2012). Instead of creating a framework that merely facilitates "implementation of governance strategies and instruments" (as Loorbach aimed to do), we argue that awareness of an underlying cultural-cognitive structure (institutional logics), and how it shapes the instruments and operational outcomes of governance, has significant potential to orient and accelerate sustainability transitions (Abson et al., 2017; Meadows, 1999).

Specific objectives of this study were to: (i) provide a better understanding of the governance of urban water services and its components in Western democracies; and (ii) illustrate how governance can be simultaneously shaped by multiple (sometimes contradictory) cultural backgrounds. The framework developed by Loorbach (2010) was extended to include an institutional logics perspective borrowed from the field of institutional theory (Friedland and Alford, 1991; Thornton et al., 2012) to achieve these objectives.

The contribution of this extended framework is twofold. First, it serves as a basis for developing theory on urban water governance and provides the congruence that this sub-field of research currently lacks. Second, it raises awareness among urban water practitioners, policymakers and decision-makers about the meaning and content of *governance*, and the need to consider the interplay between contested values, beliefs and goals, when seeking to produce sustainable solutions for urban water services.

2. Methodology

Based on a theoretical review, we extended an existing classification of governance practices and structures (2010) developed in the field of sustainability transitions with elements borrowed from sociology, with emphasis on institutional theory.

As described by Fuenfschilling (2019), in recent years researchers in the novel area of sustainability transitions have resorted with growing frequency to the field of institutional theory to extract concepts and ideas that help explain how socio-technical regimes are structured and their dynamics of transformation. Prominent examples are the seminal paper by Geels (2004), and other recent publications by Smink et al. (2015), Jolly and Raven (2016) and Franco-Torres et al. (2020a). In these studies, the idea of *institutional logics* is central. It is useful in understanding how institutional structures in socio-technical regimes contradict and relate to each other and influence the cognition and behaviour of actors to support or prevent sustainability transitions.

The outcome of this study is an innovative and encompassing governance framework of a 'neutral' character that serves to analyse all styles of governance shaped by different institutional logics. We illustrate this framework by applying it to the governance of urban water services, which involves three differentiated *ideal types* of institutional logics defined by Fuenfschilling and Truffer (2014). Ideal types are tools for empirical analysis of abstract, rich and generalisable static models designed to classify observations (Doty and Glick, 1994). In the present case, they are ideal and thus exaggerated visions of institutional logics, inferred from empirical analysis, that are not found in the real world but are useful to illustrate the co-existence and conflict of governance logics that hinder sustainable development.

The remainder of this article is structured as follows. We first present a short definition of governance of urban water services, followed by a description of the theoretical building blocks of our governance framework, including concepts such as social *structures* and *practices* (Giddens, 1984), *social institutions* (Scott, 2014) and *institutional logics* (Friedland and Alford, 1991; Thornton et al., 2012). We then present three concrete (institutional) logics identified in the urban water sector and apply these when describing the governance framework and illustrating its elements. The analysis ends with a short discussion and some conclusions.

3. Governance of urban water services

Until recently, in sectors where political influence has traditionally been low, such as the water sector, the term governance has rarely been used. According to the Scopus scientific database, the term "water governance" was only used in one article (considering title, abstract or keywords) before the year 2000. However, since then there has been exponential growth in the frequency of use of this term, which appeared in 81 articles published in 2009, in 254 articles in 2017 and in a total of 2235 documents by October 2020.

Over the past two decades, *governance* has become increasingly identified with participatory, bottom-up, network or multi-stakeholder policymaking, and gradually detached from its traditional meaning as the exclusive responsibility and duty of central government (Kooiman, 2003; Osborne, 2010). Participatory governance was thus adopted as the dominant understanding of *governance* in the water sector from the beginning. However, this is a narrow use of the concept that neglects other existing governance modes, such as market-based governance or hierarchical governance (Windhoff-Héritier, 2002).

Consequently, we broadly define the *governance of urban water services* as the collaborative social practices, together with their supporting and resulting structures, that set the scene for management of water services. It is important to note that although *water governance* and *water management* are sometimes used interchangeably, they refer to two closely interrelated but distinct processes. According to Pahl-Wostl (2009), *management* refers to activities that directly involve control of resources, e.g., monitoring, analysis, planning, design, construction, operation or maintenance, and the assets used to control these (technical, financial or human). In contrast, *governance* provides socially constructed elements such as goals, rules or roles that constrain and support management activities.

The definition above implies that *governance* simultaneously comprises social structures and social practices. Social structures are patterns of behaviour and cognition that guide and limit social practice, leading to cooperation. For example, Young (2013, p. 88) defines *governance* as practices "centered on steering human groups toward desired outcomes and away from undesirable outcomes", while he defines *governance system* as "an ensemble of elements [structures] performing the function of governance in a given setting". The structure determines practice, but practice also determines the structure, because structures are social patterns that are continuously created, carried, maintained and reproduced through repeated action (Giddens, 1984). We extend Loorbach's (2010) framework, which recognises four types of "governance activities", by suggesting that these activities can be viewed as four types of governance structures and related agency shaped by a cultural-cognitive background (institutional logics).

4. The building blocks of the governance framework

4.1. Social institutions

The concepts of *structures* and *practices* are made more tangible in the

context of governance when identified with *social institutions* (Barley and Tolbert, 1997), which in this study are understood as established law or practice. Social institutions "comprise regulative, normative and cultural-cognitive elements that, together with associated activities and resources, provide stability and meaning to social life" (Scott, 2014, p. 56). They "give rise to social practices, assign roles to the participants in these practices, and guide interactions among the participants" (Young, 2013, p. 89).

Scott (2014) identifies three *pillars of institutions*: regulative, normative and cultural-cognitive. They can be placed along a spectrum, with the regulative pillar (formal rules that are conscious and legally enforced) on one extreme, and the cultural-cognitive pillar (beliefs and assumptions that are unconscious and taken for granted) on the other extreme. The normative pillar—norms and values—is in an intermediate position. *Regulative* institutions constrain and regularise behaviour through rule-setting, monitoring and sanctioning activities (Scott, 2014), i.e., they set the "the rules of the game" according to North (1990, p. 4). These formal rules, which were the only object of study of early institutional theorists, assume that individuals are rational decision-makers who optimally evaluate the convenience of compliance with the rules to achieve their objectives. *Normative* institutions are a collection of values, viewed as legitimised ends, norms and means (Scott, 2014). In other words, normative institutions represent the actions and objectives of individuals that are accepted by society. In this view, actors are not rational instrumentalists, but rather have behaviours that are oriented by moral guides, relying on feelings of shame or honour. *Cultural-cognitive* institutions serve as "the software of the mind" (Hofstede et al., 2010). These shared symbols guide the selection of information (deciding what gets our attention), interpretation of the information and construction of meaning. Cultural-cognitive institutions do not suggest recipes for action, but set the stage where the action is played out (Schneider, 1976, pp. 202–203 in Scott, 2014). Actors are often unaware of the limiting and supporting context that these cultural-cognitive institutions provide, and mimetically follow socially accepted prescriptions in a taken-for-granted manner, since other behaviours are not conceivable. Cultural-cognitive institutions are legitimised when they are comprehensible, recognisable and culturally supported. These structures are instrumental in complex and uncertain situations, providing ready-made solutions that are not necessarily optimal, while compliance protects actors from confusion and anxiety.

A central concept within institutional theory is the institutional field, which comprises "clusters of organisations and occupations whose boundaries, identities, and interactions are defined and stabilized by shared institutional logics" (Greenwood and Suddaby, 2006, p. 28). The urban water sector fits well into the institutional field concept, as it involves a network of diverse organisations (e.g., water utilities, regulatory agencies, formal authorities, constructors, consultants, suppliers, researchers, landowners, non-government organisations, service consumers) convened around the provision of water services. These organisations share a common understanding of the services, the means they use, the rules they follow and the needs they fulfil, all shaped by customised institutional logics (Scott, 2014). An institutional field like the urban water sector does not exclusively rely on one pillar of institutions, but instead incorporates all three pillars, which tend to more or less converge around various *institutional logics*. Next, we explain what the concept of institutional logics means, with particular focus on urban water services.

4.2. Institutional logics

Friedland and Alford (1991) introduced the concept of *institutional logics* as a set of cultural elements that shape practices and structures (institutions) at all social levels. Thornton and Ocasio (1999, p. 804) went on to define these as "the socially constructed, historical patterns of material practices, assumptions, values, beliefs, and rules by which individuals produce and reproduce their material subsistence, organise

time and space, and provide meaning to their social reality".

Thornton and Ocasio (1999) also describe in detail how institutional logics constrain and facilitate action and help to make sense of reality. In a complex world full of uncertainty that exceeds the human capacity to analyse all possible interpretations of reality, options of action and their consequences, the societal landscape provides actors with ready-made institutional logics, i.e., rationalities of behaviour that can be adapted for particular settings in the form of specialist structures and practices. Institutional logics support actors to create vocabularies and understand the world, and give meaning to action by focusing attention on some aspects of reality, while obscuring others. Selection and adhesion to these rationalities provides legitimacy, effective responses, feeling of order and ontological security (Giddens, 1984; Thornton and Ocasio, 2008).

Institutional logics thus reflect broader societal discourses that permeate the regime, influencing the vocabulary of discursive hotspots and becoming established in institutions, to which they provide content and meaning (Lawrence and Suddaby, 2006). At the agency level, individuals and organisations can borrow and combine institutions that represent different logics to create identity, expose their interests and needs, and shape corresponding behaviours (Friedland and Alford, 1991).

In Friedland and Alford's (1991) perspective, the macro scale of society is an *inter-institutional system*, a complex system of mixed cultural material that serves as a foundation for constructing more sector-specific institutional logics. This varied content can be classified into different *institutional orders*, which represent cultural subsystems governing different areas of life, each one with its own organising principles, cultural symbols and rationalities. Thornton et al. (2012) extended this insight by describing seven institutional orders, i.e., *family*, *community*, *religion*, *state*, *market*, *profession* and *corporation*. They provide a detailed typology of each order with its respective elemental categories consisting of root metaphors; sources of legitimacy, authority and identity; basis of norms, attention, and strategy; control mechanisms; and economic systems (see Thornton et al., 2012, p. 56 for a detailed description).

4.3. Urban water services sector logics

Fuenfschilling and Truffer (2014) identified three distinct ideal types of institutional logics that may apply to every water sector in industrialised countries: *hydraulic logic*, *market logic* and *water sensitive logic*. The *hydraulic logic* has been the dominant rationality in most industrialised countries during the past 150 years, corresponding to what some scholars call the *old water paradigm* (Franco-Torres et al., 2020b). This approach focuses on meeting basic water-related needs through a command-and-control strategy. However, the hydraulic logic has been challenged since the 1970–80s by the market and water sensitive logics. The *market logic* appeared during the 1980s with the introduction of New Public Management reforms advocating reduced influence of central government and greater market influence (Bakker, 2010). This logic focuses on optimisation and efficiency in the use of resources through adoption in the public sector of market tools and modes of management proper of private corporations. The *water sensitive* logic derives from the environmentalist movement of the 1970s. It emphasises the limited nature of natural resources and their intrinsic value, as well as their connection with renewed appreciation of community values and social equity. In this logic, the urban water sector is seen as a complex system that requires integrated and participatory management to achieve sustainability.

According to neo-institutionalism, organisations (e.g., water utilities) belonging to the same regime or institutional field (i.e., the urban water services sector) have similar practices and structures (are isomorphic), because they are exposed to the same environment and seek the same sources of legitimacy (Meyer and Rowan, 1977). Therefore, we argue that these organisations tend to follow the same

institutional logics, which define the content and meaning of institutions and limit the behaviour of actors, leading to homogeneity. However, Meyer and Rowan (1977, p. 356) also recognised that "organisations in search of external support and stability incorporate all sorts of incompatible structural elements". A regime may then be heterogeneous and semi-coherent, with contradictory elements of governance at all levels (Howlett and Rayner, 2007). Thornton et al. (2012) explain this apparent contradiction by suggesting that several institutional logics coexist in the institutional field, cooperating or competing, reinforcing each other or producing incoherences—a view supported by Besharov and Smith (2014). We argue that in order to understand and handle the complexity in urban water services provision, it is necessary to understand and manage the multiple institutional logics (hydraulic, market, water sensitive) that shape the governance of these services. Next, we present a theoretical governance framework for urban water services that takes institutional logics into consideration.

5. The governance framework

Inspired by the work of Loorbach (2010), our water governance framework (Fig. 1) separates governance structures and practices into four levels: strategic, tactic, operational and reflexive.

The strategic, tactical and operational levels move from the abstract to the concrete in three different dimensions: social, temporal and spatial (Table 1). Strategic governance broadly affects the cultural structure of the institutional field (the urban water sector), with a temporal scale of approximately 30 years. Tactical governance is more specific, affecting concrete areas of the institutional field that deal with specific types of challenges, with a time scale that varies between five and 15 years. Operational governance has an application to concrete behaviours in defined cases or projects, and its time scale is that of projects, usually under five years.

Institutional logics are the foundation of this governance framework, moulding all structures and associated practices. This influence also operates in the opposite direction, as practices create and reinforce

Table 1
Representation of the strategic, tactical and operational levels of governance.

	Structure	Practice	Location	Time horizon
Strategic level	Policy goals	Policy design	The institutional field	30 years
Tactical level	Policy tools	Institutional work	Concrete areas of the regime	5–15 years
Operational level	Identities, goals and schemas	Sense-making, decision-making and mobilisation	Projects	0–5 years

certain structures and rationalities through use (Greenwood and Suddaby, 2006; Maitlis and Christianson, 2014). This process of transformation or redefinition is explicitly captured in our framework by the fourth level of governance, the reflexive level.

5.1. Strategic level of governance

The strategic level of governance (Table 2) focuses on developing a vision, defining priorities and setting objectives in a long-term perspective. At this level we ask "Where do we want to go and why?" in its broadest form, providing responses that are firmly attached to the field logics, borrowing their meaning, values and mission, and setting the direction of the regime. In our governance framework, these structures and practices are represented by policy goals and policy design, respectively.

In reality, policy design is sometimes carried out in a thoughtful and meaningful way, while at other times, it is contingent and irrational, resulting from informal political negotiation (Howlett, 2014). Loorbach (2010) argues that discussion of long-term goals resembles the latter, as it usually lacks a formal arena (goals are not institutionalised) due to the mid-term range of political cycles, individual interests and public pressure. Nevertheless, institutional logics always guide policy design.
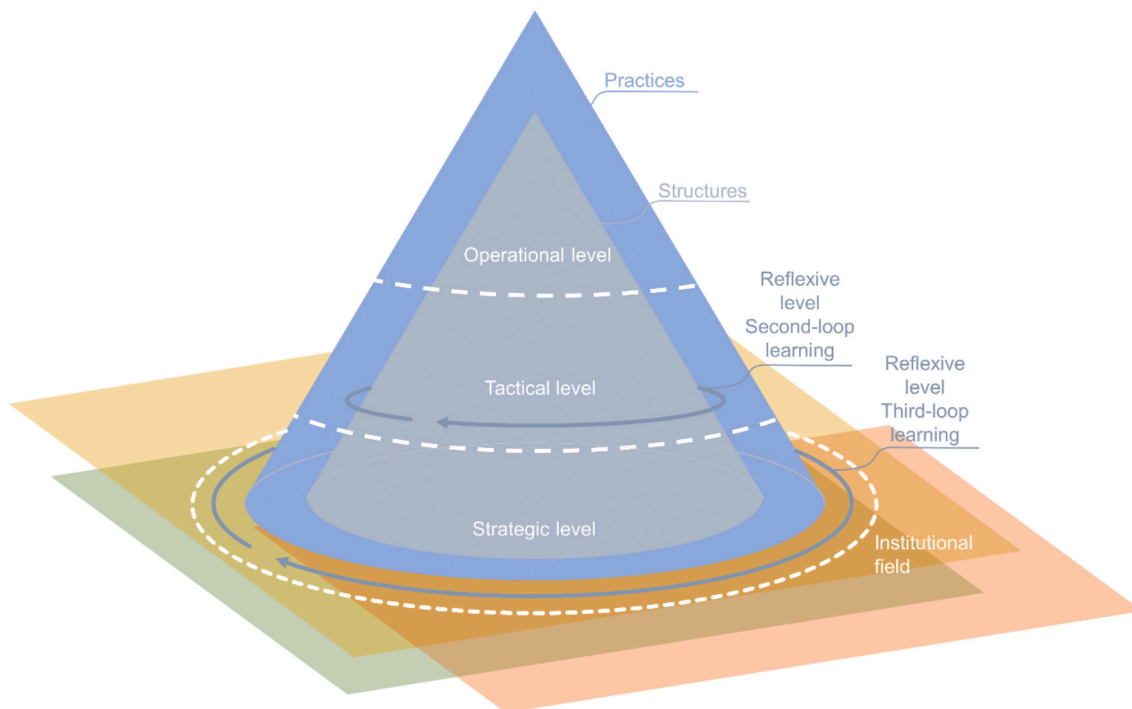

Fig. 1. The urban water governance framework. Governance is composed of structures (grey cone) and practices (blue cone), built on one or several institutional logics (superposed tiles of different colours) within an institutional field (largest white-dotted circle). Governance also involves four levels: operational (tip of the cones), tactical (middle of the cones), strategic (base of the cones) and reflexive (the two circular arrows that renew the structure and the institutional logics).

Table 2

Illustration of strategic governance structures and practices through the lens of hydraulic logic, market logic and water sensitive logic.

	Hydraulic Logic	Market Logic	Water Sensitive Logic
Structures: Policy goals	- Public welfare. National development. Paternalistic - Provision of basic needs - Water as a public good	- Make the most of available resources - Rationalisation and optimisation - Water as an economic good	- Protection of the environment - Quality of life - Water as a heritage and an essential element for liveability
Practices: Policy design	- Hierarchical - Technocratic	- Multi-centric - Corporatist	- Heterarchical - Participative, transdisciplinary

5.1.1. The strategic level of the hydraulic logic

The hydraulic logic is grounded in the *state* and *profession* institutional orders. From the state, it takes the strategy of providing public welfare and national development, while from the profession it takes notions of personal expertise and reputation, as particularly represented by the engineering profession. In this logic, water is a public good related to basic needs, e.g., provision of drinking water of sufficient quality and quantity, removal of hazardous waste, or control of flooding. Central government behaves paternalistically and makes itself responsible for these needs. This rationality corresponds with the command-and-control paradigm that dominated the urban water institutional field during the past 150 years. The approach envisages a relatively simple system where water-related problems are pressing, but few and simple, and the solutions straightforward and consensual, involving the control of nature through physical, technical and centralised solutions like dams and pipes (Franco-Torres et al., 2020b).

In the hydraulic logic, strategic activities are carried out according to the most classical (Weberian) understanding of governance and public administration, with clear divisions between actors and the hegemony of the public sector. Public authorities govern in a hierarchical mode and are exclusively in charge of policy definition. The hydraulic logic involves strong agreement on objectives, resulting in clear policies focusing more on technical aspects (e.g., how infrastructure can achieve the objectives) and usually ignoring the social sphere (Hurlbert and Gupta, 2015).

5.1.2. The strategic level of the market logic

The market logic is based on the institutional order of the *market* and the *corporation* and regards water as an economic good. Thus, unlike the hydraulic logic, it does not provide water services at any price, but to an economically rational extent, focusing on efficiency and optimisation of available resources. This optimal point is achieved through market mechanisms, where actors, promoting their own interests, balance out supply and demand for services. Policy design is more open to participation, with economists, consultants and market agents having high relevance. Public authorities and engineers have a secondary role, subject to market forces and the rationality of economic efficiency.

5.1.3. The strategic level of the water sensitive logic

The ideal type of water sensitive logic is based on the *community* and *professional* institutional orders. The environmental sphere is considered an actor in its own right, but at the same time highly relevant for human quality of life. In this logic, water is essential for liveability, not only for survival, and its policies guide toward conservation of natural resources, equity of access, and connections between nature and human wellbeing, aiming at environmental and social sustainability. The urban water sector is viewed as a complex system, where problems such as non-sustainability, poor resource management or climate change are highly unstructured, the needs are diverse, changing and interconnected, and the goals can be conflicting, with disagreement on science and values (Hurlbert and Gupta, 2015). Therefore, policy design is ideally self-organised in a network mode, where transdisciplinary and participatory processes are used to incorporate a variety of views and the needs of all (including public, civil and private actors) to achieve balanced public service delivery. In this mode of strategic governance, which Osborne (2010) calls "New Public Governance", the policymaking process aims at reaching agreement among actors, but also other valuable outcomes like increased social and political capital, learning, innovation and flexibility (Connick and Innes, 2003). All actors of the regime show commitment, with community goals acquiring status and relevance, but professionals such as natural and social scientists, NGOs and civil organisations play a prominent role.

5.2. Tactical level of governance

At the strategic level (Table 3), we ask "Where do we want to go and why?" and at the tactical level we ask "What tools are needed to get there?" The tools are *policy instruments*, i.e., institutions that serve to influence the regime toward the achievement of policy goals (de Bruijn and Hufen, 1998). Policy instruments have a shorter time horizon than policy goals (5–15 instead of 30 years), and are narrower in scope, focusing on concrete challenges while neglecting general development of the institutional field (Loorbach, 2010).

A functionalist approach to policy instruments views these as technical, rational and objective tools that government chooses to reflect its policy goals accurately. However, in the interpretative approach, these instruments are viewed not as neutral, but as conveying additional meanings and assumptions (Majoor and Schwartz, 2015). Our governance framework recognises that policy instruments are non-neutral elements that reflect the values, beliefs or assumptions of the regime's logic(s). Thus, they are not only formal, visible instruments such as laws and regulations exclusively created by the government, but also norms, values or cognitive elements that are consciously and unconsciously created and followed by the members of the institutional field.

In our framework, tactical practices correspond to what Lawrence and Suddaby (2006, p. 215) call *institutional work*: "the purposive action of individuals and organisations aimed at creating, maintaining and disrupting institutions", these activities being carried out by "institutional entrepreneurs", i.e., certain actors that have the vision, motivation and ability to affect institutions (DiMaggio, 1988).

Political scientists have produced several classifications of governance policy instruments (Majoor and Schwartz, 2015). The most popular taxonomy is probably that by Hood and Margetts (2007). They apply a more government-centered, "intentional design" approach that distinguishes four types of resources that governments can use to achieve changes in behaviour to accomplish policy goals. The first, *nodality*, refers to the position of government as a node in an information network. The second, *authority*, concerns regulatory and coercive instruments. The third, *treasure*, denotes the economic assets and capabilities that are at the disposal of the government. The fourth, *organisation*, refers to the organisational structures that provide the capacity to control action. For a broader understanding of governance (Osborne, 2010) this classification is still useful, as actors other than government, e.g., private and civil actors, can create instruments based on the same types of resources. For example, some policy instruments do not involve government actors at all, e.g., codes of conduct, eco-labels, benchmarking, best practices, co-regulation or voluntary agreements (Zito et al., 2003), which some call *New Governance Arrangements* (NGA) (Howlett and Rayner, 2007).

In practice, most regimes have developed a varied range of policy instruments that belong to all three pillars of institutions and adapt to specific problems through coexisting top-down and bottom-up

Table 3

Illustration of tactical governance structures and practices through the lens of hydraulic logic, market logic and water sensitive logic.

	Hydraulic Logic	Market Logic	Water Sensitive Logic
Structures: Policy tools	- Authority and organisation resources - Institutions as formal rules - Formal and well-defined - E.g., laws and technical guidelines	- Organisation and treasure resources - Institutions as norms and values - Formal/informal - E.g., corporatisation of water utilities, full cost recovery and cost-benefit analysis	- Nodal resources - Institutions as norms, values and cognitive elements - Informal and ill-defined - E.g., education, labels, standards and benchmarking
Practices: Institutional work	- Done by public authorities - Purposeful design	- Done by public/private actors - Purposeful/emergent design	- Done by public/private/civil actors - Emergent design

governance modes (Jordan et al., 2013). They often include formal institutions that are purposefully designed by public authorities and more emergent institutions, usually norms, values or cognitive elements, which arise from the interaction of non-government actors that are more or less aligned with each other and with certain (institutional) logics (Howlett, 2014; Howlett and Rayner, 2007).

5.2.1. The tactical level of the hydraulic logic

Since the hydraulic logic focuses on basic water needs that are fulfilled using well-known solutions, there is little room for debate, assuming that there is just one right way to do things. This logic encourages the imposition of *the* "right solution" through the adoption of rigid hierarchical schemes of social organisation underpinned by authority and organisation resources. Most policy instruments are then formal rules from the regulative pillar (such as laws, regulations and formal guidelines) that employ coercion to force cooperation. These institutions are purposefully and explicitly conceived by the central government, mostly in concrete technical terms, drawing on the knowledge of engineers. They are designed by different government agencies in isolation, based on a narrow and monodisciplinary understanding of the problem, and ignoring other needs or policy tools. These agencies usually have the capacity to monitor and sanction contravention of their rules, often generating conflicts with other rules created by other agencies. For example, government agencies may impose contradictory procedures for dealing with heavy rainstorms: The road administration may require removal of stormwater from roads to a nearby stream network as quickly as possible, to avoid disturbance to traffic; the planning administration may require some roads to be used as floodways, to prevent damage to buildings; and the environmental administration may require runoff from roads to be prevented from entering streams, as it may be polluted and could damage sensitive ecosystems.

5.2.2. The tactical level of the market logic

The market logic considers that conventional governance based on rational prediction and control is ineffective when water problems are too complicated. Bureaucratic means are too rigid and do not respond effectively to the problem of limited resources. Instead, market logic regards the provision of urban water services as an economic issue where market tools can provide optimal solutions (Chandler, 2014). As most basic urban water services are natural monopolies, the introduction of private actors aims at increasing competition and improving efficiency. Their policy of optimisation is translated into regulative market instruments and public sector reforms. The treasury-based instruments include rules for full cost recovery and consumer funding, pricing regulation and subsidies. The organisational resources can consist of an amalgamation of small local water utilities and their corporatisation (so that they become profit-oriented), outsourcing of services, and fragmentation and devolvement of hierarchical governance to independent agencies. Despite these measures, in reality, the total privatisation (asset transfers) of urban water services is rare. Public authorities usually remain central but highly dependent on many private actors (Bakker,

2010).

5.2.3. The tactical level of the water sensitive logic

In the water sensitive logic, urban water services are regarded as complex systems with intertwined needs that require adaptive policy tools, instead of rigid instruments or economic optimisation. This logic resorts mainly to network-based institutions (norms, values and cultural-cognitive beliefs) that function as mimetic mechanisms and nodal resources seeking to achieve voluntary changes in behaviour and self-organisation. Many of these instruments are well-known in the urban water sector, i.e., normative institutions such as accreditation, benchmarking, and certification provide status and legitimacy to complying actors. The fostering of transdisciplinary networks and information and education campaigns are cultural-cognitive institutions that result in taken-for-granted behaviours. In the most extreme version of this ideal type, these network policy instruments have an emergent character, i.e., they are not exclusively or purposefully designed by public authorities, but are instead the result of interactions among different actors. They are valued for their flexible, participatory, and democratic character, but also criticised for a weak focus and lack of monitoring and accountability measures (Jordan et al., 2013). A less extreme understanding of the water sensitive logic is that public authorities still have the exclusive capacity to create regulative institutions, which can include organisation and authority mechanisms. The former usually aim at creating connections between administrative bodies for vertical and horizontal coordination, to achieve integrated management of water services, while the latter usually define high environmental standards.

5.3. Operational level of governance

The operational level of governance (Table 4) includes the micro-practices resulting from situated interpretation and application of governmental policy goals and instruments. At this level we ask "What is our role, what do we want, what is the problem we face, and how can we cooperate to solve it?".

In our framework, the structures of operational governance correspond to methods individuals use for categorisation and cognition, which are culturally embedded in the incumbent institutional logics. Thornton et al. (2012) refer to these as the *micro-foundations of institutional logics*, which include *identities*, *schemas* and *goals*. These elements provide individuals with guidance to interpret the environment in interaction with others in specific situations, resulting in behaviours appropriate to their institutional context.

Of particular relevance for governance are the *roles* (a type of *identity* that informs actors how to make sense of situations, which *goals* to prioritise and how to make decisions) and *scripts* (a type of *schema* that describes recurrent activities and patterns of interaction in well-known situations) (Thornton et al., 2012). Goals at the operational level are subject to the role of the individual and the limitations of policy tools. Shared logics between individuals result in shared attention, coherent constellations of identities and schemas and shared goals, promoting

Table 4

Illustration of operational governance structures and practices through the lens of hydraulic logic, market logic and water sensitive logic.

		Hydraulic Logic	Market Logic	Water Sensitive Logic
Structures	*Roles*	- Well-defined	- Ill-/well-defined	- Ill-defined, mixed roles
		- Dominance of politicians and engineers	- Dominance of utility managers, economists and consultants	- Dominance of researchers, facilitators, and champions
		- Considers users as citizens	- Considers users as customers	- Considers users as participants
	Goals	- Few	- Multiple	- Multiple
		- Isolated	- Isolated/interconnected	- Interconnected
		- Well-defined. Basic goals	- Well-defined, economically ranked	- Ill-defined, incommensurable
		- E.g., reduce leakages in pipe networks	- E.g., reduce energy costs in water treatment	- E.g., create multipurpose infrastructures like stream daylighting
	Schemas	- Imposed routines, rigid technical procedures	- Economic, supply-demand adjustment	- Social and environmental, flexible, adaptive
Practices	*Sense-making & Decision-making*	- Based on technical knowledge	- Based on self-interest	- Participatory, based on consensus
		- Quantitative technical analysis	- Quantitative economic analysis	- Quantitative/qualitative analysis
		- Focus on outputs	- Focus on costs and benefits	- Focus on diverse meanings and values
	Mobilisation	- Coercion, command and control, and professional reputation	- Self-interest, negotiation and accommodation	- Trust and reciprocity, cooperation and alliance formation, and professional reputation

collaboration, whereas differing or contradictory logics among individuals result in divided attention, roles and goals, incoherent scripts and conflicts, struggles for power and barriers to cooperation (Besharov and Smith, 2014; Thornton et al., 2012).

Operational structures underpin operational practices of governance, which refer to day-to-day governing under specific circumstances, aiming at solving time- and space-bounded issues. They involve *sense-making*, *decision-making* and *collective mobilisation*, practices shaped by the context and activation of identities, goals and schemas, and implementation or adherence to policy tools.

Sense-making creates meaning out of a novel, unexpected, confusing, or ambiguous circumstances (Maitlis and Christianson, 2014). It translates the new understanding into language and serves as a basis for action, although shaped by the constraints of existing institutions (Barley and Tolbert, 1997), in our framework policy instruments. Sense-making underpins *decision making* and *mobilisation*, which refer to the collection of symbols and material resources and motivation of actors to accomplish collective goals or policies.

5.3.1. The operational level of the hydraulic logic

In the hydraulic logic of urban water services, identities, goals, and schemas are often formal elements that fit into the regulative pillar of institutions. The roles are standardised and unambiguous, mainly political or technical, where water utility engineers are central. Scripts are rigid, well-defined and based on regulative institutions, such as the processes used to plan and design infrastructure. The goals are uncontested and related to the solution of technical problems, e.g., reducing leakages or designing water treatment plants. Regarding practices, sense-making and decision-making are dominated by the workers of state-owned utilities, presenting a marked technocratic character. Mobilisation is based on expedience, and formal power is used to impose coercion, command and control (Kersbergen and van Waarden, 2004). All these elements have a rigid character that constrains the freedom of actors but enables social acceptance and coordination.

5.3.2. The operational level of the market logic

The market logic encompasses a mixture of well-defined and undefined roles. Managers of corporatised water utilities, economists and consultants have a highlighted position, while final users are identified as customers. The managers' goals are related to cost reduction and improvements in efficiency, through, for example, energy savings or lower construction and maintenance costs, whereas private firms aim at maximising profits. Scripts are not strictly defined, since sense-making and decision-making are based on ad-hoc cost-benefit analysis and supply-demand calculations. Mobilisation is based on negotiation and accommodation practices (Kersbergen and van Waarden, 2004), heavily

influenced by actor self-interest in gaining control of resources.

5.3.3. The operational level of the water sensitive logic

The water sensitive logic encompasses a large variety of roles that are mostly flexible and ill-defined. Typically, actors are informal, like facilitators, champions or grassroots activists. The division of power among roles is no longer clear, which introduces challenges with accountability. NGOs and researchers are important actors in this logic but are not held responsible for any decision. The collaboration networks involve a mix of public, private and civil actors, with a continuous flow of participants that are integrated in terms of their commitment to strategic (policy) goals. However, operational goals are often fuzzy because they deal with multiple needs, as in projects on construction of green roofs or daylighting of streams. The scripts of action are also ill-defined, providing room for flexibility and innovation. Sense-making and decision-making follow participatory pathways and mobilisation relies on practices such as persuasion, concerted effort, cooperation and alliance formation (Kersbergen and van Waarden, 2004).

5.4. Reflexive level

Reflexive activities involve the continuous processes of transformation and adaptation of governance structures (and derived practices) to context. Loorbach (2010, p. 170) states that "reflexive activities relate to monitoring, assessments and evaluation of ongoing policies, and ongoing societal change". We argue that reflexive activities should instead be described as a multi-level societal learning process (Pahl-Wostl, 2009), which actually implies changes in governance and implicitly includes the analysis activities described by Loorbach (2010).

Although the social learning process described by Pahl-Wostl (2009) has, in principle, three levels (*single*, *double*, and *triple-loop learning*), we believe that the concept of governance only encompasses the latter two. *Single-loop learning* falls outside the concept of governance because it exclusively involves quantitative regulation of existing management practices (Argyris, 1999; Argyris and Schön, 1978). For example, in the context of water scarcity, single-loop learning refers to further extraction of underground water or digging new wells.

The first reflexive process of the governance framework is thus *double-loop learning* (Argyris, 1999; Argyris and Schön, 1978), involving redefinition of governance structures within the same logic or from other logics at any level (strategic, tactic, operational). Following the previous example, double-loop learning may involve the imposition of new policies and rules that prohibit the use of potable water for landscaping or car-washing. This transformation may follow the hydraulic logic, which restricts the use of a scarce resource to satisfy basic human needs, or a water sensitive logic, which aims to avoid adverse effects on

the environment of greater water abstraction. In the market logic, *double-loop learning* could mean, e.g., higher water prices to incentivise users to reduce consumption, while maintaining revenues.

The second reflexive process of governance is *triple-loop learning* (Hawkins, 1991; Swieringa and Wierdsma, 1992), which we identify as adhesion to new institutional logics or abandonment of old logics, corresponding to a change in fundamental beliefs and values. Triple-loop learning could mean a change from hydraulic logic, where water is considered a human right and everybody is entitled to use it, to market logic, where water is an economic good, and only those who pay for it are entitled to use it.

6. Discussion and conclusions

In recent decades, the field of urban water management has outgrown its technocratic foundations. Rising evidence of its growing social, technical and environmental complexity has prompted research on how actors organise to achieve common and conflicting goals in complex environments or, in other words, how governance may be improved. However, what governance means in the urban water sector remains unclear. In practice, governance in this sector has traditionally been interpreted narrowly, as "decision-making" (Bakker, 2010). However, scholars have adapted ideas from disparate fields of knowledge and modified the concept to fit their particular visions of reality. The result is divergent, partial or incoherent descriptions of urban water governance, hampering theoretical development and design of practical solutions. Examples are the application of a narrow political science focus to formal policy tools or a psychological approach focusing on individualistic models of behaviour.

We present a coherent framework to organise what we consider the most critical elements of urban water governance. We also highlight some key aspects of urban water governance that have previously been overlooked. One such aspect is the dual character of governance. Previous descriptions have focused either on the structures of governance or governance practices carried out by certain actors, whereas our framework focuses on both simultaneously, as they are interdependent and mutually supportive (Giddens, 1984). Another aspect is the multi-level nature of governance (strategic, tactic, operational and reflexive), inspired by the work of Loorbach (2010). We extended this framework by including two other key aspects of governance: (i) the recognition of a cultural background (expressed in the coexistence of different institutional logics) that shapes the practices and structures of governance; and (ii) a more detailed description of the reflexive level of governance, involving double-loop (Argyris, 1999; Argyris and Schön, 1978) and triple-loop learning (Hawkins, 1991; Swieringa and Wierdsma, 1992). In particular, the recognition of the existence of multiple institutional logics (the cultural background) provides our governance framework with the ability to conceptualise some of the most acute urban water problems, i.e., a growing number of conflicts due to divergent values, beliefs and goals that often lead to institutional fragmentation and stagnation in the transition to sustainability.

Our analysis is richly illustrated by three ideal types of institutional logics previously observed in the urban water sector, namely hydraulic, market and water sensitive logics (Fuenfschilling and Truffer, 2014), demonstrating how different logics can result in entirely different governance components that often interact and compete to create incongruences and conflicts. The use of ideal types facilitates visualisation of paradoxes of understanding and performing (Smith and Lewis, 2011) and makes it possible to design strategies that accommodate conflicting values, world views or interests in order to create innovative solutions to complex problems (Jay, 2013). Application of this idea is exemplified in the case study in Franco-Torres et al. (2020a), which provides empirical evidence of how certain actors in the municipality of Copenhagen gained awareness of the conflict among logics regarding stormwater management. Equipped with a new understanding, those actors managed to create strategies that accommodated the hydraulic, market

and water sensitive logics, making possible the collaborative work required to advance the design of more sustainable management.

At a more abstract, but perhaps more powerful, level is the idea that awareness of institutional logics and their effect on cognition and behaviour provides an essential platform for transitions to sustainability. Abson et al. (2017) and Fischer and Riechers (2019) (both inspired by Meadows, 1999) differentiate between tangible/practical interventions such as adjustment of *feedbacks* and *parameters* (i.e., structures of governance like policy tools or roles), which produce minor advances toward sustainability, and abstract interventions, such as changes in *intent* or *design* (i.e., awareness about institutional logics and the ability to transcend them), which have considerable potential to move a sector toward sustainability. Similar ideas to this change in *intent* or *design* are the concept of *frame reflection* or *reframing* found in the work of Schön and Rein (1994) in the field of policy analysis, and the concept of *triple-loop learning* (Hawkins, 1991; Swieringa and Wierdsma, 1992) in the field of organisational science.

We hope that future studies use the governance framework presented in this article as a starting point for designing strategies to identify and align conflicting institutional logics, and thus overcome governance barriers that impede the transition to more sustainable futures.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

Abson, D.J., Fischer, J., Leventon, J., Newig, J., Schomerus, T., Vilsmaier, U., von Wehrden, H., Abernethy, P., Ives, C.D., Jager, N.W., Lang, D.J., 2017. Leverage points for sustainability transformation. Ambio 46, 30–39. https://doi.org/10.1007/s13280-016-0800-y.

Argyris, C., 1999. On Organizational Learning, second ed. Blackwell, Oxford.

Argyris, C., Schön, D.A., 1978. Organizational Learning: A Theory of Action Perspective. Addison Wesley, Reading, MA. https://doi.org/10.2307/40183951.

Bakker, K., 2010. Privatizing Water: Governance Failure and the World's Urban Water Crisis. Cornell University Press.

Barley, S.R., Tolbert, P.S., 1997. Institutionalization and structuration: studying the links between action and institution. Organ. Stud. 18, 93–117. https://doi.org/10.1177/017084069701800106.

Bauman, Z., 2000. Liquid Modernity. John Wiley & Sons.

Beck, U., Bonss, W., Lau, C., 2003. The theory of reflexive modernization: problematic, hypotheses and research programme. Theor. Cult. Soc. 20, 1–33. https://doi.org/10.1177/0263276403020002001.

Besharov, M.L., Smith, W.K., 2014. Multiple institutional logics in organizations: explaining their varied nature and implications. Acad. Manag. Rev. 39, 364–381. https://doi.org/10.5465/amr.2011.0431.

Brown, R.R., Farrelly, M.A., 2009. Delivering sustainable urban water management: a review of the hurdles we face. Water Sci. Technol. 59, 839–846. https://doi.org/10.2166/wst.2009.028.

Castells, M., 2010. The Rise of the Network Society. Wiley-Blackwell.

Chandler, D., 2014. Beyond neoliberalism: resilience, the new art of governing complexity. Resilience 2, 47–63. https://doi.org/10.1080/21693293.2013.878544.

Connick, S., Innes, J.E., 2003. Outcomes of collaborative water policy making: applying complexity thinking to evaluation. J. Environ. Plann. Manag. 46, 177–197. https://doi.org/10.1080/0964056032000070987.

de Bruijn, H.A., Hufen, H.A.M., 1998. The traditional approach to policy instruments. In: Peters, B.G., van Nispen, F. (Eds.), Public Policy Instruments: Evaluating the Tools of Public Administration. Edward Elgar, Cheltenham, UK Northampton, MA, USA, pp. 11–32.

DiMaggio, P.J., 1988. Interest and agency in institutional theory. In: Zucker, L.G. (Ed.), Institutional Patterns and Organizations: Culture and Environment. Ballinger Pub Co ., Cambridge, MA, pp. 3–21.

Doty, D.H., Glick, W.H., 1994. Typologies as a unique form of theory building: toward improved understanding and modeling. Acad. Manag. Rev. 19, 230–251. https://doi.org/10.2307/258704.

Fischer, J., Riechers, M., 2019. A leverage points perspective on sustainability. People Nat. 1, 115–120. https://doi.org/10.1002/pan3.13.

Franco-Torres, M., Rogers, B., Ugarelli, R., 2020a. A framework to explain the role of boundary objects in sustainability transitions. Environ. Innov. Soc. Trans. 36, 34–48. https://doi.org/10.1016/j.eist.2020.04.010Get.

Franco-Torres, M., Rogers, B., Harder, R., 2020b. Articulating the new urban water paradigm. Crit. Rev. Environ. Sci. Technol. 1–47 https://doi.org/10.1080/10643389.2020.1803686.

Friedland, R., Alford, R.R., 1991. Bringing society back in: symbols, practices and institutional contradictions. In: Powell, W., Dimaggio, P.J. (Eds.), The New Institutionalism in Organizational Analysis. University Of Chicago Press, Chicago, pp. 232–263.

Fuenfschilling, L., 2019. An institutional perspective on sustainability transitions. In: Boons, F., McMeekin, A. (Eds.), Handbook of Sustainable Innovation. Edward Elgar Publishing, pp. 219–236.

Fuenfschilling, L., Truffer, B., 2014. The structuration of socio-technical regimes—conceptual foundations from institutional theory. Res. Pol. 43, 772–791. https://doi.org/10.1016/j.respol.2013.10.010.

Geels, F.W., 2004. From sectoral systems of innovation to socio-technical systems: insights about dynamics and change from sociology and institutional theory. Res. Pol. 33, 897–920. https://doi.org/10.1016/j.respol.2004.01.015.

Giddens, A., 1984. The Constitution of Society: Outline of the Theory of Structuration. Univ of California Press.

Greenwood, R., Suddaby, R., 2006. Institutional entrepreneurship in mature fields: the big five accounting firms. Acad. Manag. J. 49, 27–48. https://doi.org/10.5465/AMJ.2006.20785498.

GWP (Global Water Partnership), 2000. Towards Water Security: A Framework for Action. GWP (Global Water Partnership). Global Water Partnership, Stockholm.

Hawkins, P., 1991. The spiritual dimension of the learning organisation. Manag. Educ. Dev. 22, 172–187. https://doi.org/10.1177/135050769102200304.

Hofstede, G., Hofstede, G.J., Minkov, M., 2010. Cultures and Organizations: Software of the Mind, third ed. McGraw-Hill, New York.

Hood, C.C., Margetts, H.Z., 2007. The Tools of Government in the Digital Age, second ed. Palgrave Macmillan.

Howlett, M., 2014. From the 'old' to the 'new' policy design: design thinking beyond markets and collaborative governance. Pol. Sci. 47, 187–207. https://doi.org/10.1007/s11077-014-9199-0.

Howlett, M., Rayner, J., 2007. Design principles for policy mixes: cohesion and coherence in 'new governance Arrangements. Pol. Soc. 26, 1–18. https://doi.org/10.1016/S1449-4035(07)70118-2.

Hurlbert, M., Gupta, J., 2015. The split ladder of participation: a diagnostic, strategic, and evaluation tool to assess when participation is necessary. Environ. Sci. Pol. 50, 100–113. https://doi.org/10.1016/j.envsci.2015.01.011.

Jay, J., 2013. Navigating paradox as a mechanism of change and innovation in hybrid organizations. Acad. Manag. J. 56, 137–159. https://doi.org/10.5465/amj.2010.0772.

Jolly, S., Raven, R.P.J.M., 2016. Field configuring events shaping sustainability transitions? The case of solar PV in India. Technol. Forecast. Soc. Change 103, 324–333. https://doi.org/10.1016/j.techfore.2015.08.015.

Jordan, A., Wurzel, R.K.W., Zito, A.R., 2013. Still the century of 'new' environmental policy instruments? Exploring patterns of innovation and continuity. Environ. Polit. 22, 155–173. https://doi.org/10.1080/09644016.2013.755839.

Kemp, R., Parto, S., Gibson, R.B., 2005. Governance for sustainable development: moving from theory to practice. Int. J. Sustain. Dev. 8, 12–30. https://doi.org/10.1504/IJSD.2005.007372.

Kersbergen, K., van Waarden, F. van, 2004. 'Governance' as a bridge between disciplines: cross-disciplinary inspiration regarding shifts in governance and problems of governability, accountability and legitimacy. Eur. J. Polit. Res. 43, 143–171. https://doi.org/10.1111/j.1475-6765.2004.00149.x.

Kjær, A.M., 2004. Governance (Key Concepts) (Cambridge, UK).

Kooiman, J., 2003. Governing as Governance. Sage, London, UK.

Lawrence, Thomas B., Suddaby, R., 2006. Institutions and institutional work. In: Clegg, R., Hardy, C., Lawrence, T.B., Nord, W.R. (Eds.), Handbook of Organization Studies, second ed. Sage publications, London, pp. 215–254.

Loorbach, D.A., 2010. Transition management for sustainable development: a prescriptive, complexity-based governance framework. Governance 23, 161–183. https://doi.org/10.1111/j.1468-0491.2009.01471.x.

Maitlis, S., Christianson, M., 2014. Sensemaking in organizations: taking stock and moving forward. Acad. Manag. Ann. 8 (57) https://doi.org/10.5465/19416520.2014.873177. LP – 125.

Majoor, S., Schwartz, K., 2015. Instruments of urban governance. In: Gupta, J., Pfeffer, K., Verrest, H., Ros-Tonen, M. (Eds.), Geographies of Urban Governance: Advanced Theories, Methods and Practices. Springer International Publishing, Cham, pp. 109–126. https://doi.org/10.1007/978-3-319-21272-2_6.

Meadows, D.H., 1999. Leverage Points: Places to Intervene in a System. The Sustainability Institute, Hartland, WI, US.

Meyer, J.W., Rowan, B., 1977. Institutionalized organizations: formal structure as myth and ceremony. Am. J. Sociol. 83, 340–363. https://doi.org/10.1086/226550.

Neto, S., 2016. Water governance in an urban age. Util. Pol. 43, 32–41. https://doi.org/10.1016/j.jup.2016.05.004.

North, D.C., 1990. Institutions, Institutional Change and Economic Performance. Cambridge university press.

OECD (Organisation for Economic Co-operation and Development), 2011. Water Governance in OECD Countries: A Multi-Level Approach. OECD Publishing, Paris. https://doi.org/10.1787/9789264119284-en.

Osborne, S.P., 2010. Introduction. The (new) public governance: a suitable case for treatment? In: Osborne, S.P. (Ed.), The New Public Governance: Emerging Perspectives on the Theory and Practice of Public Governance. Routledge, New York, pp. 1–16.

Pahl-Wostl, C., 2009. A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. Global Environ. Change 19, 354–365. https://doi.org/10.1016/j.gloenvcha.2009.06.001.

Pahl-Wostl, C., Jeffrey, P., Isendahl, N., Brugnach, M., 2011. Maturing the new water management paradigm: progressing from aspiration to practice. Water Resour. Manag. 25, 837–856. https://doi.org/10.1007/s11269-010-9729-2.

Schneider, D., 1976. Notes toward a theory of culture. In: Basso, K.M., Silby, H.L. (Eds.), Meaning in Anthropology. University of New Mexico Press, Albuquerque, pp. 197–220.

Schön, D.A., Rein, M., 1994. Frame Reflection: toward the Resolution of Intractable Policy Controversies. Basic Books.

Scott, W.R., 2014. Institutions and Organizations: Ideas, Interests, and Identities, fourth ed. Sage Publications.

Smink, M., Negro, S.O., Niesten, E., Hekkert, M.P., 2015. How mismatching institutional logics hinder niche–regime interaction and how boundary spanners intervene. Technol. Forecast. Soc. Change 100, 225–237. https://doi.org/10.1016/j.techfore.2015.07.004.

Smith, W.K., Lewis, M.W., 2011. Toward a theory of paradox: a dynamic equilibrium model of organizing. Acad. Manag. Rev. 36, 381–403.

Swieringa, J., Wierdsma, A.F.M., 1992. Becoming a Learning Organization: beyond the Learning Curve. Addison-Wesley, Wokingham.

Thornton, P.H., Ocasio, W., 2008. Institutional logics. In: Greenwood, R., Oliver, C., Suddaby, R., Sahlin, K. (Eds.), The Sage Handbook of Organizational Institutionalism. SAGE Publications, pp. 99–128. https://doi.org/10.4135/9781849200387.n4.

Thornton, P.H., Ocasio, W., 1999. Institutional logics and the historical contingency of power in organizations: executive succession in the higher education publishing industry, 1958-1990. Am. J. Sociol. 105, 801–843. https://doi.org/10.1086/210361.

Thornton, P.H., Ocasio, W., Lounsbury, M., 2012. The Institutional Logics Perspective: A New Approach to Culture, Structure, and Process. Oxford University Press on Demand. https://doi.org/10.1093/acprof:oso/9780199601936.003.0001.

van de Meene, S.J., Brown, R.R., Farrelly, M.A., 2011. Towards understanding governance for sustainable urban water management. Global Environ. Change 21, 1117–1127. https://doi.org/10.1016/j.gloenvcha.2011.04.003.

van Dijk, M.P., 2012. Introduction. Int. J. Water 6, 137–154. https://doi.org/10.1504/IJW.2012.049493.

Windhoff-Héritier, A., 2002. New modes of governance in Europe: policy-making without legislating?'. In: Windhoff-Héritier, A. (Ed.), Common Goods: Reinventing European and International Governance. Rowman and Littlefield, Lanham, pp. 185–206.

Young, O.R., 2013. Sugaring off: enduring insights from long-term research on environmental governance. Int. Environ. Agreements Polit. Law Econ. 13, 87–105. https://doi.org/10.1007/s10784-012-9204-z.

Zito, A.R., Radaelli, C.M., Jordan, A., 2003. Introduction to the symposium on 'new' policy instruments in the European Union. Publ. Adm. 81, 509–511. https://doi.org/10.1111/1467-9299.00358.