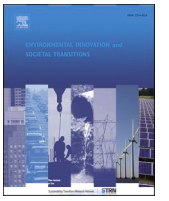
Environmental Innovation and Societal Transitions 48 (2023) 100751

Contents lists available at ScienceDirect

Environmental Innovation and Societal Transitions

journal homepage: www.elsevier.com/locate/eist



Innovating Urban Governance for Sustainable Energy Transitions: Between Institutional Design and Institutional Adaptation

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ARTICLE INFO

Keywords:
governance
sustainability transitions
institutional adaptation
institutional design
city administration
organizational perspective

ABSTRACT

While recent years have seen sustainable transition (ST) scholarship intensely explore field-level analyses of multi-actor governance initiatives, the internal organizational processes have received relatively less attention. This article contributes to theoretical advances on governance and innovation in ST by proposing and developing an overarching theoretical framework of institutional change that meaningfully connects field- and organization-level analyses of ST processes. Based on a multiple method qualitative study of six city administrations, we develop four propositions that illuminate internal organizational processes involved in the institutionalization of novel ST governance arrangements. These processes involve crucial components that trigger institutional adaptation and institutional design mechanisms. Adaptation operates though professional, city, and regional networks as well as through sources of ST financing. Design involves institutional entrepreneurs working in city administrations from the bottom up and leaders in city administration and politics who innovate with ST governance internally, building organizational infrastructures that support and operationalize energy transition agendas.

1. Introduction

Many researchers and politicians indicate that cities face growing urgency to play a part in sustainability transitions and system innovations, e.g. due to high energy consumption, CO2 emissions, and population growth (e.g. Fuenfschilling et al., 2019). This accumulation of issues has made cities into key sites for negotiating and shaping sustainable development, economic growth, technological innovation, and social cohesion (Raven et al., 2019). More often than ever, cities are being addressed as "sustainability solutions" and being more than "sustainability problems" (Angelo and Wachsmuth, 2020). Initiatives like Covenant of Majors, Climate Alliance, Transition Towns, or Eurocities foreground that urban actors successively gain confidence about their expected roles in transforming cities into smart, sustainable, and just communities.

In this vein, city governments have begun to introduce novel governance arrangements for sustainability transitions (ST). They continue to do so with differing intensity and diverse means, ranging from the establishment of international networks through

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https://doi.org/10.1016/j.eist.2023.100751
Received 28 March 2022; Received in revised form 2 July 2023; Accepted 10 July 2023
Available online 15 July 2023

implementation of international sustainability policies to – more recently – the urban experimentation in cities all around the world (Broto et al., 2022; Evans et al., 2016; Raven et al., 2019). Typically, such experimentation involves inviting multiple urban actors, including public administrators, entrepreneurs, citizens, and academics to come together and collaborate in the exploration and design of new configurations for urban energy systems, food provision, mobility, and housing (Fuenfschilling et al., 2019).

In the ST literature, novel collaborative arrangements are analyzed under the theoretical frame of governance (Turnheim et al. 2018; Köhler et al., 2019) and understood as "the totality of interactions, in which public as well as private actors participate, aimed at solving societal problems or creating societal opportunities; attending to the institutions as contexts for the governing interactions, and establishing a normative foundation for all those activities" (Kooiman, 2003, p. 4). Indeed, this definition is especially suitable for discussing the governance of ST because it acknowledges the multi-actor nature and normative character of the phenomenon. Unlike other definitions (e.g. Bevir, 2011; Sørensen and Torfing, 2018), Kooiman's classical definition indicates a certain path dependency, namely the existence of historically embedded institutional structures that shape the governance of ST. We must recognize these structures and act upon them in transition processes. Because ST aims at regime shifts, it needs to de-institutionalize existing configurations and institutionalize new, potentially more desirable ones (Fuenfschilling et al., 2019).

What follows is that the study of governance in ST predominantly explores the construction, diffusion, and outcomes of novel governance approaches at the level of industry, like renewable energy industry, or at the level of an interorganizational field constituted by a shared domain of action, like the development of a smart city project. These field level analyzes focus on multiple-actor collaborations, foregrounding knowledge about (a) the role of cross sectoral collaborations and learning in strategic niche management (Smith and Raven, 2012; Sengers and Raven 2015; Costa et al., 2022), (b) diverse roles actors take in governing processes (Amundsen et al., 2018), and (c) how participatory forms of governance challenge power dynamics and provoke institutional changes (Galego et al., 2021; Klein et al., 2012).

While in recent years ST scholars have intensely explored field-level analyses of multi-actor governance initiatives, the internal organizational processes have received relatively less attention. However, governing ST requires significant adaptations and design activities in internal structures of the focal actors who participate in governance processes. These adaptations and design activities include changes in routines, regulations, protocols, and stakeholder/citizen engagement methods (Van den Buuse et al., 2021) as well as changes in organizational members' ideals, values, and attitudes (Besharov and Khurana, 2015; Struminska-Kutra and Askeland, 2020).

Field-level and intra-organizational changes are two sides of the same coin, which we should consider jointly if we are to understand sustainability transitions governance. Our article contributes to the theoretical advances on governance and innovation in ST by proposing and developing a theoretical framework that meaningfully connects the field- and organization-level analyses.

Regarding the first contribution, we will introduce a typology of institutional change models, which originates from institutional analysis in organizational sociology and management studies. The typology combines two dimensions: levels of institutional change, so field level or single-actor level, with modes of change, meaning reproduction or construction of institutions. This approach produces four different yet complementary views on the change: institutional diffusion, collective action, institutional adaptation, and institutional design (Hargrave and Van de Ven, 2006). We will show how existing research on ST governance and innovation fits into the framework, and we will indicate a gap in the theorizing and empirical analyzing of the organizational level.

Regarding the second contribution – development of organization-level theorizing of ST governance and innovation – we will present empirically informed propositions explaining how city administrations innovate governance arrangements in response to pressures to move toward sustainable energy transitions. Empirical data comes from a multiple-method qualitative research of six cities engaged in novel, often experimental, multi-actor, and multilevel governance processes of sustainable transitions in the context of energy. Through interviews and documents analysis, we identified four types of locally used narratives of change (Wittmayer et al., 2019) that provide legitimacy for internal organizational changes and trigger processes of institutional reproduction and creation. The propositions illuminate internal organizational processes involved in institutionalization of novel ST governance arrangements. These processes involve the following crucial components: (1) professional, city, and regional networks; (2) institutional and organizational infrastructures that support and operationalize energy transition agendas; (3) institutional entrepreneurs in city administration who work from the bottom up and city administration leaders who work from the top down to support and develop governance arrangements; and (4) external resources for shaping transition agendas in city administrations.

2. Innovating sustainability governance on the city level: The institutional theory perspective

Governance and innovation processes in ST have a complex nature. As outlined in the definition of the governance concept, they encompass interactions that span across e.g. policy-making or government levels, they are multijurisdictional by combining e.g. housing and energy sectors, they are hybrid because of their reliance on mixing hierarchical, network-based, and market-based modes of governance, and they are multi-actor by involving actors from the private, the non-governmental, and the public spheres (Bevir, 2011; Sørensen and Torfing, 2018). Moreover, governance happens in institutional contexts that need to be attended to (Kooiman, 2003).

On the city level, administration is one of many actors engaged in innovating governance arrangements around ST issues like local climate change activities, smart city infrastructures, or issues of energy poverty (Fuenfschilling et al., 2019). They hold the key rights and responsibilities to enable changes to energy systems (Feldhoff, 2016; Brugger and Henry, 2021; Torrens et al., 2019), including supervising local energy supplies, urban planning, and housing infrastructures. While city administrations participate in many very diverse collaborative efforts toward ST, they also remain under pressure to innovate their internal governing mechanisms, adopting more democratic, open, and inclusive decision-making processes, and facilitating social actors' inclusion in political systems (for a

scoping review, see Galego et al., 2021). This is also where the adoption of multilevel perspective becomes useful because it indicates that participation in a collaborative, innovative ST process requires both the governance of innovation at the process level and innovating governance, namely the adjustment and design of new structures at the level of participating organizations. The two are tightly coupled and intertwined, like the research cited above suggests.

We must recognize that governing innovation toward ST requires innovating governance on the organizational level to better understand the micro foundations of transition processes. Nevertheless, the organizational focus remains a contested topic in the ST literature. Some ST scholars call for using the organizational studies perspective in ST studies (Hansmeier et al., 2021; van den Busse et al., 2021) by indicating the importance of organizational and technical capacities of city administration for the effective governance of ST innovations (see Bundgaard and Borras, 2021). Others consider the organizational theoretical perspectives as limited in applicability for the analysis of institutional change involved in ST (Kungl and Hess, 2021).

Below, we will introduce an overarching framework of institutional change that can be used to highlight diverse yet interconnected dimensions of ST governance and innovation. We will use the framework to illustrate how existing ST research – mainly focused on the field level – can be enriched by the organizational-level analysis. The use of the framework will allow us to identify gaps in the currently available analysis of ST governance. The gaps emerge in the understanding of how an organization internally innovates to adapt own structures to the requirements of new cross-boundary collaborations (e.g. creation of network organizations) and field-level events (e.g. national energy policy changes) or how it designs new structures to lead the change (e.g. energy team establishment in city administration) and to fit in and support field-level innovative institutions (e.g. building arenas for sustainable transitions).

The theoretical framework results from juxtaposing two dimensions: mode of change and focus of analysis (Hargrave and Van de Ven, 2006). Modes of change include the construction of institutional arrangements and reproduction of institutional arrangements among institutional actors through evolutionary and adaptive processes. Focus of analysis may either follow the behavior of focal actors engaged in designing or adapting institutional arrangements or scrutinize the level of the industry, population, or interorganizational field in which multiple actors engage in the construction or diffusion of an institutional arrangement. The resulting matrix provides four models of institutional change (see Table 1), each exploring a different aspect of the same multilevel and multidirectional process: institutional diffusion, collective action, institutional adaptation, and institutional design (Hargrave and Van de Ven, 2006).

2.1. Field-level ST governance and innovation: Institutional diffusion and collective action models

Orientation toward systemic change in ST research has resulted in the proliferation of research that adopts a perspective matching field-level models of institutional change, even though the explicit use of field concept itself happens rarely (Kungle and Hess, 2021). Naturally, what prevails in ST research is the *collective action model* that explores the creation of new arrangements. The model describes an interactive process in which actors espousing multiple and often conflicting views confront each other and engage in political behaviors to create and change institutions (Hargrave and Van de Ven, 2006). In this vein, Feunfschilling and Truffer (2016) employ the institutional work concept to show how civil society organizations and social movements contest dominant institutional logics and formulate alternative logics. Similarly, Rohde and Hielscher (2021) utilize the concept of institutional work to explain how organizations in smart grid developments attempt to reconfigure institutional arrangements in diverging or even contradictory ways. Pesch et al. (2019) illustrate how experimentation creates space for democratization and self-governance that far exceeds traditional institutional boundaries. Rajagopalan and Breetz (2022) explore the roles of national policies, institutional innovations, and policy narratives in facilitating developments of off-grid solar. In turn, some use the concept of strategic action fields (SAFs) and the role of agency, strategy, rules, framing, institutional context, and power in ST transitions (for a comprehensive overview, see Kungl and Hess, 2021).

Sustainability transitions research provides examples fitting for the *institutional diffusion* model that emphasizes institutional reproduction. In this context, Von Wirth et al. (2019) study the strategies deployed by diverse governance agents to diffuse governance innovations. Bundgaard and Borras (2021) research the scaling-up of smart city projects to underscore the role of networks in the diffusion of sustainability transitions solutions and popularization of the tools used for their implementation. Drapalova and Wegrich (2020) show how specific types of smart city policies and governance are produced in interaction with existing institutions of

Table 1
Perspectives on institutional change

		Mode of change Reproduction	Construction
Focus	Zoom out on multiple actors in interor ganizational field	**Institutional diffusion** Reproduction, diffusion, or decline of an institutional arrangement in a population or organizational field. Evolutionary processes of variation, selection, and retention (isomorphism). Organizational institutional ecology literature	**Collective action** Political action among distributed, partisan, and embedded actors to solve a problem or issue by changing institutional arrangements. Framing processes, mobilizing structures, and political opportunities. Social movements and industry emergence literature
	Zoom in on single	**Institutional adaptation** Organizational efforts to achieve legitimacy by adapting to institutional environmental pressures and regulations. Coercive, normative, and mimetic processes. New organizational institutional literature	**Institutional design** Purposeful social construction and strategies by an actor to create/change an institution to solve a problem or correct an injustice. Bounded agency: affordance and partisan mutual adjustment. Old institutional literature

democratic decision-making and the uneven distribution of economic power. Raven et al. (2019) explore how the respective regulative, normative, and cognitive institutional arrangements in cities affect smart city experimentations, along with affecting national governance styles and policy programs. Moreover, ST studies reveal how reproduction mechanisms can either scale up change or, on the contrary, perpetuate status quo and inhibit change. Investigations of smart city projects and civil society organizations functioning as sustainability innovators show how these initiatives risk perpetuating a neoliberal logic (Frantzeskaki et al. 2016; Cardullo and Kitchin, 2019). Finally, Simoens et al. (2022) use institutional perspective to analyze institutional lock-ins that reproduce unsustainable governance practices as in their case of the food packaging industry.

Hargrave and Van de Ven's (2006) typology of institutional change perspectives suggests supplementing field-level perspectives with two other models of institutional change that explore institutional reproduction and construction while zooming-in on a single actor engaged in processes of change. These models provide different yet complementary views of the same processes. Nevertheless, studies of these models remain relatively scarce in ST research.

2.2. Organization-level ST governance and innovation: Institutional adaptation and design models

By zooming-in on a single actor participating in field-level processes of change, we explore the individual and organizational foundations of ST governance. By doing so, we combine already well-developed knowledge about field-level processes of institutional change with the analysis of individual agency and intraorganizational dynamics. To explore the linkages between institutional change in organizational fields and the internal organizational dynamics, we made use of both the *institutional adaptation* and *design* models. We focused on city administration as a local government agency that innovates own regulations, protocols, and work routines to support, facilitate, or directly manage existing transition processes by engaging multiple interdependent actors in the delivery of public products and services.

Institutional adaptation model emphasizes the conditioning effects of institutions on actors, hence providing an analytical tool that connects internal processes with the institutional arrangements that penetrate the organizations' field. This quadrant of the typology is mainly occupied by neo-institutional approaches that highlight processes of organizational structures' homogenization. The homogenization results from efforts to achieve legitimacy by adapting to institutional environmental pressures and regulations. To explore city administrations' efforts to achieve legitimacy by adapting to institutional pressures and regulations (e.g. changes in energy policy or national funding cuts for city administrations), we used the concept of institutional isomorphism (DiMaggio and Powell, 1983). Following this classical perspective, we differentiated between three types of institutional pressures toward isomorphism: coercive, mimetic, and normative pressures (DiMaggio and Powell, 1983). Coercive pressures originate mainly from legal sources. Mimetic pressures emerge from uncertain situations, evidenced by copying practices proven to be successful. Normative pressures derive from approaches and orientations of professional groups. Accordingly, innovating governance related to sustainable energy transitions can occur through adaptation to legal changes (coercive) or the observation of other public agencies that implement governance practices (mimetic). The third option is the development of new practices through the intake of elected and nominated public officials educated in the new governance tradition, communication in professional circles, or through the ongoing education of long-years' officials, e.g. in the form of training and workshops (normative).

Institutional design models emphasize agency as the basis of action (Hargraves and Van de Ven 2006). To understand internal organizational and creative responses toward pressures, we use the concept of institutional work understood as purposive actions aimed at the building, modification, or destruction of institutions (Lawrence and Suddaby, 2006), as well as concepts of institutional entrepreneurship and institutional leadership (Besharov and Khurana, 2015). Although these concepts partially overlap, the use of them all allows for capturing behaviors crucial for building governance capacities. This means initiating the process from the bottom of organizational structures (institutional entrepreneurship), building strategic organizational structures and policies that anchor the novel arrangements into existing ones, and modifying the latter if necessary (work performed by institutional leaders). Institutional entrepreneurship distinguishes individuals who: (1) initiate various changes and (2) actively participate in the implementation of these changes (Battilana et al., 2009). Institutional leaders make decisions with long running implications for organizational identities, organization roles, and meanings in wider societal networks (Struminska-Kutra and Askeland, 2020).

In all modes and levels, institutional change is accompanied by the process of institutionalization, namely a process in which a structure becomes taken for granted as efficacious and necessary by members of a social group, organization, or field, thus serving as an important causal source of stable patterns of behavior (Surachaikulwattana and Philipps, 2017; Tolbert and Zucker, 1996). In the case of ST, this specific aspect becomes crucial because without the institutionalization of structures carrying ST governance and innovation, transition processes may lose both their dynamics and legitimacy.

3. Research approach and scheme of analysis

Our inquiry into urban governance toward sustainability was part of a European project[1] aiming to create an inter- and transdisciplinary understanding of the diversity and processes of social innovations in the energy sector (SIE).

Social innovation in energy (SIE) is defined as "(combinations of) ideas, objects and/or activities that change social relations, involving new ways of doing, thinking and/or organizing energy. … Such SIE can be transformative, and thus address societal

[1] Social Innovation in Energy Transitions (SONNET), project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 837498.

challenges, to the extent that it challenges, alters and/or replaces dominant societal institutions in the process" (Wittmayer et al., 2022, 3). The project focused on urban areas as major hubs for SIE. For the purposes of this article, we observed cities' efforts to build the infrastructure for SIE governance[2] and their struggles with integrating novel approaches to energy into the existing institutional landscapes.

This article is based on data gathered through interviews, reflection circles, documentary analysis, and the participatory format of city labs. The iterative process of analyzing data and scrutinizing theoretical considerations from the literature on social innovation, ST, and institutional perspective resulted in the development of propositions that facilitate the understanding of the dynamics underpinning the development of novel governance arrangements in city administration.

3.1. Selection criteria

Both, the project and analysis presented in this paper focused on six European cities (Mannheim, Antwerp, Grenoble, Bristol, Warsaw, and Basel) selected following two main criteria: commitment to local energy transitions and existence of diverse social innovation initiatives, including initiatives related to the energy sector. First, all cities share the goal to encourage local energy transitions and are committed to climate protection targets. In 2022, all the cities except for Basel were selected as part of the EU mission for 100 climate-neutral cities by 2030, with the aim to reach climate neutrality by 2030. Furthermore, the six cities have committed to the pioneering city-led initiative Global Covenant of Mayors for Climate and Energy, meaning the first global platform for cities and local governments to cooperate on climate and energy policies. Second, all cities show a diversity of social innovation activities and labs that require or build on changes in urban governance structures. This includes initiatives in areas of energy demand, energy efficiency, smart energy, energy production, microgrids, and energy storage (see Table 2 below).

Except for the city of Warsaw – the capital of Poland with more than 1.7 million inhabitants – all the cities share similarities in terms of size and role as regional centers. Table 2 summaries the crucial selection criteria and characteristics.

Our analysis treated SIE and city administration's engagement in its facilitation as instances of governance arrangements toward sustainability. Using qualitative research methods, we observed how city administrations adjust their own formal and informal structures to engage in these types of SIE. The research included the investigation of past processes through interviews and documentary analysis, along with real-time observation of city lab processes and the analysis of documents they produced. City labs were part of the project, in which city partners collaboratively developed SIE.

3.2. Research methods and empirical data analysis

Data gathering and analysis consisted of two stages. In stage one – conducted in January and October 2020 – we conducted five reflection circles and 12 interviews with city administration representatives. Reflection circles were facilitated dialogues between researchers and public administration practitioners (four to five people in each circle), serving the development of a semi-structured interview guide. Two public officials from each partner city were interviewed. We interviewed people in the city administration who create conditions for SIE's functioning and public administration representatives (both elected and appointed) who perform public and collaborative governance in sustainability and energy.

The data from interviews was supplemented with documentary data mentioned by the interviewees, typically two to three documents per city. Apart from two interviews in Polish, all interviews were conducted in English, documents under analysis were both in English and in other national languages. Based on these three sources of data (reflection circles, interviews, and documents), we developed first categories for the analysis and provisional propositions. At the beginning of the analytical process, different types of environmental pressures were coded following the mimetic, coercive, and normative theoretical categories (DiMaggio and Powell, 1983). As the analysis proceeded, these codes were changed to substantial codes related to shifts in narratives (i.e. narratives of change) linked to energy and sustainability. Types of narratives of change emerged from the data as relevant to how SIE and energy transitions are governed in the cities (see Table 3). Focusing on practices of governing SIE that happen at the interface of city administration and its environment – and within organizational structures of the city administration itself – we eventually selected the following codes: institutional work, institutional entrepreneurship, and leadership. The analysis of structural changes resulted in the development of codes corresponding to defining features of governance phenomenon, which included multilevel, multijurisdictional, hybrid, and experimental character, along with a diversity of actors involved (Bevir 2011).

As part of the second stage – from September 2020 to April 2021 – we conducted interviews with actors engaged in SIE[3] (60 interviews in six cities), while in autumn 2021, cities delivered their transdisciplinary city lab reports.[4] This body of empirical data was used to modify categories and codes developed in the first stage and to modify the initial propositions. During both stages, the categories, codes, and propositions were reviewed and discussed in the research team, including city representatives and researchers.

The analytical categories were developed by moving back and forth between the data and theoretical perspectives. Eventually, we arrived at three aggregated dimensions. The first two correspond to the two general models of institutional change: institutional

[2] Examples of such an infrastructure may include programs, policies, new organizational positions, and procedures that promote and facilitate SIE.

[3] Apart from authors of this article, several other researchers and city partners gathered empirical data, discussed the findings, and prepared research reports. Thus, we want to recognize the contribution of all SONNET city partners and researchers, especially of Adélie Ranville, Iska Brunzema, Boleslaw Rok, Flor Avelino, Heike Brugger, and Karoline Rogge.

[4] Available at https://sonnet-energy.eu/citylabs/

Table 2
Characteristics of the cities: selection criteria and general characteristics combined

	Antwerp (BE)	Basel (CH)	Bristol (UK)	Grenoble (FR)	Mannheim (DE)	Warsaw (PL)
Commitment to climate protection and energy transitions	Global Covenant of Mayors EU mission for 100 climate neutral cities by 2030	Global Covenant of Mayors. European energy Award Declared climate emergency in 2019	Global Covenant of Mayors EU mission for 100 climate neutral cities by 2030 European Green capital in 2015 Declared climate emergency in 2018	Global Covenant of Mayors EU mission for 100 climate neutral cities by 2030 European Green capital in 2022	Global Covenant of Mayors EU mission for 100 climate neutral cities by 2030 Global Green City Award in 2017	Global Covenant of Mayors EU mission for 100 climate neutral cities by 2030 Declared climate emergency in 2019
Selected implementation activities related to SIE and their characteristics	City administration seeks to recentralize, restructure, and democratize energy Aim to address energy poverty	Incentive fee for energy allows local authorities to fund different energy-related lighthouse projects Local energy utility owned by the city	Long history of environmental engagement, a variety of initiatives engaged in sustainable energy Strong linkages between local initiatives and city administration	City administration engages in financial support to combat energy poverty Central role of city administration in initiating and supporting different activities	Active role of city administration and local climate protection agency in climate protection	City administration started to take climate protection efforts, organized a climate panel
City size	ca. 529,400 inhabitants largest city in Flanders, second-largest city in Belgium.	ca. 171,000 inhabitants third-largest city in Switzerland	ca. 472,000 inhabitants largest city in South West England	ca. 185,000 inhabitants third-largest city in the region of Auvergne-Rhône-Alpes	ca. 322,000 inhabitants second-largest city in the region of Baden-Württemberg	ca. 1,795,000 inhabitants capital and the largest city in Poland

Source: own elaboration.

adaptation and institutional design. The third dimension of institutionalization refers to structures emerging through intertwined adaptation and design processes.

Table 3 illustrates the data structure emerging from our analyses. It allows to trace how empirically grounded concepts were distilled from the data (Gioia, Corley, & Hamilton 2013). Columns present first-order codes, second-order themes, aggregated dimensions, and corresponding theoretical models. First-order codes were the most basic and close to empirical language. Second-order themes were then assembled by creating a wider category, sharpened by theoretical reflection. Aggregated dimensions gathered second-order codes into more abstract theoretical categories. The latter were embedded in a general theoretical model (of adaptation, design, and institutionalization). For every type of data, we used two first letters of the city name (An, Ba, Br, Gr, Ma, Wa), for interviews we added information about the stage (first or second), and the interview number. Other data sources were named explicitly, e.g. city lab report (CL report).

4. Findings: Institutional pressures for ST and administrations' creative responses

We ordered our empirical findings following two main sections. The first section distinguishes and describes four narratives of change connected to ST and energy sector. In line with Wittmayer et al. (2019) we understand narratives as linguistic instruments that logically structure events and actions in relation to internal and external occurrences in time; when related to change, the narratives point to relevant reasons, actors, and approaches to change (Wittmayer et al., 2019). In the case of our research, narratives convey ideas about desirable purposes and methods of governing energy transitions, representing the pressures triggering institutional reproduction and creation processes. In this sense, they connect field-level and internal organizational processes.

The second section illustrates adaptive and creative responses to the pressures, especially how administrations innovate governance, who is involved, and what are the results of these processes.

4.1. Four narratives of change in energy sectors

Based on the empirical data analysis, we distinguished four narratives of change that provide justification for innovating governance of sustainable energy transitions on the city level. Each narrative was repeatedly used in the documents and interviews to create legitimacy for the creation and maintenance of novel governance arrangements involving cross-departmental, cross-sectoral, multi-actor, and participatory processes.

4.1.1. Shift from technocracy to participation

The following quote illustrates the changing content of beliefs, assumptions, and frames around the question of the main actors involved in decision-making processes around energy transitions: "So it was in the beginning of 2015 that … we needed to do more on innovative projects in these topics of innovation and energy, because there was already the idea that cities will play a bigger role in climate in general" (An-1-2).

Table 3
Data structure

1st order concepts	2nd order themes	Aggregated dimensions	Theoretical model
Holistic approach, e.g. "energy plans need to have neighborhood-specific focus" (An-1-5) Emphasis on participation, e.g. "it used to be all about technology, now it's all about participation" (Ba-1-1)	a shift from technocracy to participation	**Content of institutional pressures toward sustainable energy transitions**	**INSTITUTIONAL ADAPTATION**
Increased role of local government, e.g. "it's a process of municipalization, through this they shift away from national power, at least they try" (Gr-1-1) Taking up ambitious, energy-transition-related goals, e.g. "Bristol is now moving forwards with innovative pilot schemes that will help build the city's future smart energy system" (Br-CL report)	a shift from centralization to decentralization		
Cross sectoral frame of initiatives, e.g."we try to take an integral perspective, look beyond the sector, to see city as an interlinked ecosystem" (Ba-2-7) Cross-sectoral design, e.g. Partnership for Climate in Warsaw, which is a city-led cross-sectoral network oriented at cooperation in addressing green transition (Wa-CL report)	a shift from silos to cross-departmental and cross-sectoral organizing		
Time pressure, e.g. "climate school strikes has shown us we need make things more quickly" (Ba-2-5) Increased sensitivity toward citizens' demands, e.g. "the citizens of Basel have demanded action for sustainable energy," Ba-CL report)	a shift from climate change to climate emergency		
Emergence of energy professionals, e.g. the European Investment Bank awarded Bristol City Council a grant that paid for a few "energy professionals" to work in the council (Br-1-1)	Normative	**Type of institutional pressures toward energy transitions**	
European and UN policies, e.g. "Mannheim used 17 UN sustainable developments goals as a framework for Mission Statement 2030" (MA-CL report) Local policies and regulations, e.g. "already in 1979, the voters of the canton of Basel-Stadt accepted a popular initiative that required the active promotion of renewable energies" (Ba-CL report)	Coercive		
Project-based cooperation, e.g. "this peer-to-peer learning, which we also do in all the [other] projects. I find that very, very valuable" (Ma-1-2) Networks, e.g. "climate neutrality commitment by 2050, made with the signing of the Covenant of Mayors in 2009" (An-CL report)	Mimetic		
Intrinsic motivation, e.g. "There are lots of officers in the council who want to make a difference. … They have a passion" (Br-1-2) Influencing existing procedures, e.g. creating possibility for additional financing of energy transition initiatives by influencing climate fund call themes (An-CL report) Creating alternatives, e.g. "we push through, despite difficulties, so that everything is ready to go whenever it is legally allowed" (An-CL report) Embedding work, e.g. reach out and inspire other departments (Ma-1-2)	Bottom-up processes (institutional entrepreneurship)	**Institutional work around SIE governance**	**INSTITUTIONAL DESIGN**
Political support, e.g. "That was a massive achievement. Every councilor unanimously supported the motion of zero emission target in 2030" (Br-1-1) Existence of policies and strategies, e.g. "The strategy, talking has been done …. We just have to get on and deliver" (Br-1-1) Creation of top leadership positions for sustainability or departments working across administrational structures, e.g. Coordination Department for Civil Participation (Ma-CL report)	Top-down processes (institutional leadership)		
Creation of new positions responsible for sustainable energy transitions, e.g. "We have a Deputy Mayor for climate and energy or a Grid Director who sets up new structures in the field and manages them" (An-1-2)	Multilevel and multijurisdictional	**Novel governance arrangement**	**INSTITUTIONALIZATION**

(*continued on next page*)

Table 3 (*continued*)

1st order concepts	2nd order themes	Aggregated dimensions	Theoretical model
Cross-departmental collaborations, e.g. "the Climate Strategy Office working with the health department for developing the Heat Action Plan" (Ma-CL report)			
Experimenting with integrated services to address energy poverty, e.g. Antwerp initiated an urban innovation lab in 2013 to systematically and collaboratively work on solutions toward a climate neutral city in 2050 (An-CL report)	Hybrid and experimental		
New participatory tools for policy-related decision-making, e.g. the citizen panel "Warsaw Climate Panel" (Wa-CL report)			
Sustainability strategies developed and implemented by a set of diverse actors, e.g. "The new 2030 climate plan makes maximum use of co-creation with residents, companies, and industry" (An-CL report)	Multi-actor		
Creation of new organizational structures at the interface of administration and society, e.g. Climate Action Agency (Ma-CL report)			

Source: own elaboration.

Those innovative projects are often participatory, even experimental. The shift from technocracy toward participation implies an integrated holistic approach to sustainable energy. Such a shift resulted from a disappointment with the slow adoption of new technologies and growing criticism of neglecting the social and cultural context of technology and energy. This can be illustrated by the growing recognition of concepts such as climate justice and energy poverty, along with the tendency to consider "social issues within environmental issues" jointly (Gr-1-1), as exemplified by the "yellow vests and green vests" protests (An-1-2).

The growing recognition of the social aspect serves as a background for the changed perceptions of the role of public administration and the professional identities of public officials. A Mannheim official explained: "In earlier days, it was harder to reach people in administration. Now, there is this idea of service, that the administration is for the citizens …. Many, many cities write a kind of a Bible, a handbook including quality standards for participation" (Ma-1-1).

The analyzed city lab processes revealed examples of the growing recognition of the importance of participation. The participatory format was described as a value in itself. City representatives argued that certain knowledge and insights are unavailable to them without the participation of citizens. As explicitly emphasized in the analyzed city lab reports, Covid-19-related restrictions imposed during the city labs were experienced as the key hindering factor in the experiments' realization, as they limited direct citizens involvement. Strategic efforts and planning for energy transition in cities were also increasingly consulted to the point of co-creation with citizens, as in the case of Warsaw's climate panel.

4.1.2. Shift from centralization to decentralization

The shift in framing responsibility for energy governance linked to centralization and decentralization processes was a constant reference point in the analyzed interviews, documents, and reports, which is well illustrated by the following quote: "Decentralized energy production – this is a development happening for the last 30 years. A lot of people decided to organize themselves … [this was possible because] there was a huge movement which was connected to the regulation of energy feed in tariffs of electricity. Germany started it 25 years ago" (Ba-1-1).

One of the most important milestones for the dissemination of this narrative among local governments was the Covenant of Mayors organized by the European Commission in 2009. The Covenant of Mayors set the foundation to the European and later global network of city administrations. It triggered the design of Sustainable Energy Action Plans, Climate Action Plans, etc. on the city level. The decentralization narrative formed an important reference point in energy governance at the city level in all the analyzed cities, which however did not mean the process is happening. Interviewees referred to the narrative to indicate that, in most countries except for Switzerland and Germany, this decentralization is not happening in the energy sector. Interviewees from Bristol argued that in the case of the UK, decentralization processes were reversed by the national level through decisions made by the Conservative Party. Regulations privileging local energy production and consumption were lifted despite intense lobbying organized by decentralization supporters. Similarly, interviewees based in Grenoble indicated the uniqueness of the city. Thanks to the specific geographical conditions, the city of Grenoble owns an energy company,[5] which provides the city administration with the possibility to control energy production and energy prices, a possibility inaccessible to other city administrations that function in a centralized system of energy production and provision.

Other cities experienced the lack of this possibility as limiting. As a result, the main areas in which the innovating governance of

[5] The example of the city of Mannheim shows that ownership structures of local energy providers can also further complicate the governance of local energy transitions. The city holds 51% of the shares of the local energy company MVV. Consequently, the city must balance the interests of different stakeholders (e.g. the city's climate protection agency and the energy company), which vary between a cost-effective and sustainable energy supply.

energy transitions occurs were related to housing (esp. energy efficiency), public utility buildings (e.g. schools, hospitals, public administration offices), mobility (public transportation and reduction of private car use), and the provision of information and support to actors innovating in the energy sector.

Issues that cities consider under their influence were often those with increased participatory approach. The analyzed processes of city labs were organized around topics such as addressing energy poverty (Antwerp), awareness raising and behavioral change to increase energy efficiency in public buildings and among citizens (Grenoble, Basel, Warsaw), and novel funding models for energy efficiency measures in community buildings (Bristol). The impact depended on the participatory involvement of different stakeholders and required certain flexibility and adaptability of city administrations as key decision-makers.

4.1.3. Shift from silos to cross-departmental organizing

We noticed changes in approaching the question of how to organize the governance of energy transitions in public administration in each of the six cities.

The narrative of "breaking the silos" was clearly visible. In the last couple of years, each of the cities has created new offices or positions responsible for cross-departmental coordination of sustainability, and for reaching out to lower levels of governance – like city districts – along with NGOs and private sector organizations. For example, the Climate Change Strategy Office in Mannheim is responsible for steering strategic design and implementing it across departments with a special focus on the development of "a good participatory culture in the administration's departments and also with the people on the street and in the districts (e.g. with district managers)" (Ma-1-1).

Despite the existence of these structures in all six cities, cross-departmental cooperation addressing complex social and environmental problems was still described as a huge challenge: "It is a problem. Sometimes you don't even know what people are doing in another section of your own department. Not to mention in other departments!" (Wa-1-2). Insufficient cross-departmental cooperation and exchange was also identified as the limiting factor for innovative, participatory projects such as city labs. Both city representatives and evaluators pointed to this issue in their reports, discussing city labs' conditions of success and potential impact. This proved to be experienced as demotivating, especially by the committed civil servants who devoted more work and energy to the organization of participatory, socially engaged projects. Internal coherence in city administrations and support among departments were perceived as necessary to solidify novel arrangements and support social innovation in energy. However, a common pattern emerged: officials themselves admitted that – over time – more significant progress was made in developing collaborations with external actors like non-governmental organizations, communities, citizens, and businesses than in the design of intra-organizational collaborations.

4.1.4. Shift from climate change to climate emergency

Sustainable energy transitions and – more broadly – ST become a relatively uncontested topic or even something that one "must refer to, to be correct" (Ma-1-2). In the narratives presented by the interviewees, this shift occurs through activities of large social movements that elevated green political parties to political arenas and enhanced the recognition of the sustainability agenda on international, national, and regional levels. The same narrative shift is also pushed further through bottom-up, grassroots initiatives and growing local expectations: "We see citizens' environmental demands [as they say] "go faster, do more" (Gr-1-1). Officials engage with these initiatives and facilitate their development. In fact, some of them share the feeling of urgency, as they motivate themselves and others to continue to work toward sustainability by saying: "climate change takes no break" (Ma-1-2). For others, the feeling of urgency is accompanied by frustration. One of the officials mentions "what we currently do is like a drop of water on a hot stone" (Ba-1-2).

4.2. Institutionalization of SIE governance structures: Between top-down and bottom-up processes of adaptation and design

The analysis of the gathered empirical material indicates at least four institutionalization patterns related to innovating energy governance in the urban context. Each of them illustrates translation processes of the above-described narratives of change into local practices performed in city administrations. Those practices include more adaptational changes seeking to "fit" to trends in a broader institutional field as well as practices directly aiming to create or change an institution to solve a problem or correct an injustice (Hargrave and Van de Ven, 2006). Over time, new governance practices and roles become taken for granted, meaning institutionalized. Importantly, although associated with stability and predictability, institutionalization also refers to processes that are used to govern creativity and experimentation, like city labs or citizen panels. Each of the patterns presents an idealized type of governance innovating that revolves around one crucial dynamic or phenomenon. In practice, those patterns are intertwined and come in different proportions. The institutionalization patterns focus on sources of ideas for innovating, city administration actors who push for change from the bottom up and top down, and financial conditions surrounding governance innovation for SIE. Each of the patterns is described in the section below.

4.2.1. Sources of ideas for innovating governance

One of the core patterns recurring in our data refers to the major sources of ideas that trigger governance innovation toward sustainable energy transition. These sources are located in city networks that gather members around sustainability-related issues. By focusing on a common problem, city administration representatives may observe, learn from, and copy each other's solutions. They collectively produce strategies and programs initiated in networks and associations. Study participants explicitly named more than a dozen regional, national, European, and global networks, e.g. Covenant of Majors, ICLEI, Eurocities, Climate Alliance, URBACT. In fact, membership in networks – especially in more formalized initiatives like projects – produces the social and knowledge capital that is an important currency. This currency often enables accessing new collaborations and financial resources, thus reinforces sensitivity

toward new trends emerging in the institutional environment. For the energy sector, those new trends are encapsulated in the "net zero," "climate neutrality," and "climate emergency" concepts. Adoption of this language facilitates fitting in the collaborative networks and reproduces new ST-related institutions. While the most active networks associate cities formally, they are much more heterogeneous informally by including academic experts and representatives of the private and non-governmental sectors, who occasionally join common projects financed by external agencies, in which experimentation and transdisciplinary knowledge exchange are explicit project goals, e.g. funded by the European Commission under subsequent Framework Programs or through the Joint Programming Initiative Urban Europe. Our partnering cities were prominent examples of "serial project members."

Exposure to the heterogeneous actors functioning in networks dedicated to sustainability resulted in the intake of employees socialized in the work environment different than public administration, which traditionally has been neither experiment- nor sustainability-oriented (Søresnen and Torifing, 2022). Careers of our interviewees highlight this trend, typical of the normative isomorphic pressures that emerge through professional education and work socialization processes (Di Maggio and Powell, 1983). Many of the interviewees were recruited *because* of their experience in the private sector or the non-governmental sector, in which they were responsible for the development of energy governance solutions, e.g. by organizing public consultations of energy infrastructure development (Mannheim), organizing energy cooperatives (Bristol), or executing energy audits (Grenoble). Reflecting on this trend, one of the interviewees mentions that "it was important that the knowledge stays in the administration. This is why the grant that we have got to develop climate neutrality [from the European Investment Bank] was used to create new positions devoted to energy governance in the administration, instead of outsourcing the energy-related task to the external entities, like auditing companies" (Br-1-1).

4.2.2. The role of institutional entrepreneurs

While the first institutionalization pattern was carried by networks as sources of new ideas and pressure for institutional adaptation, the second institutionalization pattern is carried by the institutional entrepreneurs, who introduce the new ideas to public agencies and lobby for their implementation. Theoretically speaking, the institutional entrepreneurs perform institutional work related to the creation of new patterns of thinking and acting. Practically speaking – in the case of governance innovating toward sustainable energy transitions – it means pushing forward new participatory practices, such as: (1) hubs for sustainable innovation in which local ideas and initiatives are supported through financing and mentoring schemes (e.g. EcoHouse in Antwerp); (2) new cross-departmental communication channels like those harnessing the potential of informal communication for the dissemination of information about sustainability-related initiatives in city administration (e.g. FlurfunkE in Mannheim); and (3) adoption of climate action programs in city administration and their promotion among partnering cities. A large part of the work performed by institutional entrepreneurs is based on interpersonal relations and values. Their engagement and intrinsic motivation stem from concerns about what is the right thing to do in the face of climate crisis, social inequality, etc. This value-oriented drive toward change makes their responses to new trends in the institutional environment closer to institutional design than "simply" adaptation. They typically "go the extra mile" to claim areas and activities without being asked to do so. For instance, a representative of the city of Bristol mentions the following: "I saw community energy as a huge opportunity, assisting them was not part of my job responsibilities, but I have done it anyway" (Br-1-1). The representative of the city of Mannheim initiated a social media action #ClimateChangeMakesNoBreak by posting a picture with the hashtag on social media, which was to motivate everyone engaged in climate issues to continue full-time work during the Covid-19 pandemic.

The work of institutional entrepreneurs rapidly gains on effectiveness as the institutionalization of new governance arrangements progresses, meaning when (1) energy and sustainable transitions become part of widely acknowledged targets in city administrations, and (2) structures dedicated to these targets are developed. These structures – namely programs, policies, new organizational positions, and procedures – operationalize aspirations into organizational procedures, therefore reinforcing their implementation. An example of such formal structures that stabilize expectations and procedures around energy transitions are the policies operationalized into reporting schemes and procedures, e.g. reporting on CO2 emissions savings. The following quote illustrates how sustainable transitions gained a certain level of "taken-for-grantedness". Once an innovation – like the pursuit of climate neutrality – an idea has become part of everyday practices in the city administration: "Now when I come with some projects to other departments, they ask me how much it will cost and how much CO2 it will save" (Br-1-1).

4.2.3. The role of political leadership

The third institutionalization pattern demonstrates the role of political and top management leadership. Leaders personally committed to the sustainability cause are major actors of change, and their appointment on a job becomes a milestone for innovating with governance arrangements toward sustainable transitions. Committed leaders accelerate change, whereas "neutral" leaders remain "indifferent" rather than supportive, so they may slow progress. An indifferent attitude means that top leaders cannot be "mobilized" by those working on new solutions (institutional entrepreneurs) to convince refractory departments to collaborate. Such strategic interventions from the top leadership may involve a range of practices from short talks enlightening new priorities in policymaking to the issuing of regulations that impose interdepartmental collaborations.

Interestingly, external pressures for sustainable transitions seem not to influence "indifferent" leaders. The empirical material revealed no story of a "converted" leader; "indifferent leaders" at best adopt sustainability rhetoric to gain popularity. Change is usually reached with the change of the leader herself:

> "We had a deputy mayor, who … was completely not into the topic of energy and, actually, her cabinet wasn't either … so we could do what we wanted, but we ... did not have extra means to go further. … of course, climate and energy issues are getting

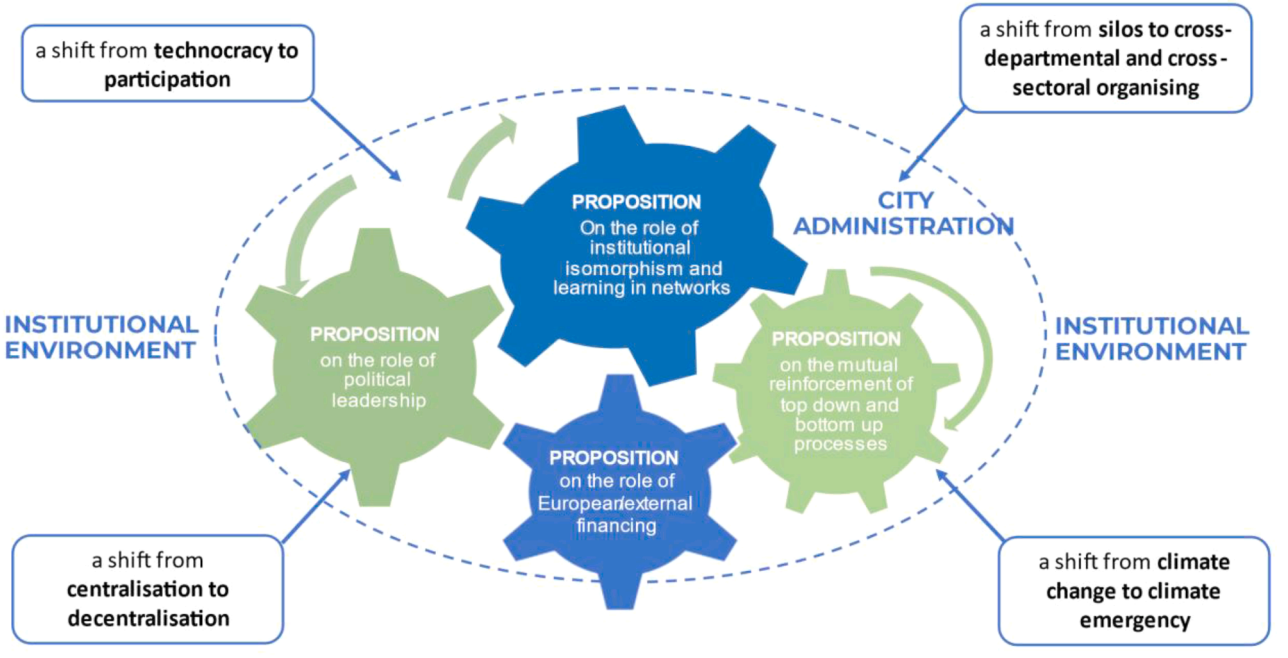

Fig. 1. Innovating governance in response to institutional pressures towards sustainable transitions

> on the agenda more and more …. But now we have a new deputy mayor for energy … [who] knows exactly what is needed (and then the development of a new governance strategy really started)" (An-1-2).

When referring to the role of top leadership, the representative of Mannheim says bluntly: "If you have a top mayor who is not interested in that topic, you can almost forget it." (Ma-1-1).

The diverse factors promoting sustainable energy transitions and innovating governance arrangements for these transitions are difficult to separate. Moreover, the case of "committed" leaders is also ambiguous. Since issues of sustainability became the source of legitimacy, some leaders have made them into their topic to reach out for more political support. To be effective, the efforts of institutional entrepreneurs toward introducing novel governance arrangements by facilitating social innovation in energy must be supported by political leadership and top management in city administration.

4.2.4. The role of financial pressures

Support sometimes comes from unexpected sources, especially when the change process is led by "indifferent" leaders. What pushes the change forward is often the scarcity of financial resources at the city level and the need to apply for external funding. This usually means partaking in European Commission's programs, which are often linked to the discussed narrative shifts, namely participation, decentralization, cross-sectoral cooperation, and urgency of sustainability problems. These programs – and European policies in general – exert significant coercive pressure on the adoption of SIE-related governance, both through reproducing solutions already adopted elsewhere (institutional adaptation mechanism) and through bottom-up innovation and design efforts. The influence of external funders' expectations was mentioned by all cities' representatives. For example, the city of Bristol started developing renewable energy initiatives with a project financed by the European Investment Bank. The project delivered the opportunity not only to experiment but also to develop knowledge in the organization, as the interviewee mentions:

> "[The] grant from the European Investment Bank really opened up a lot of new opportunities. [The person who received the grant] decided that Bristol should employ specialists in clean energy to accelerate these programs. And this was actually quite an alternative [approach]. A lot of councils at [the] time [were] spending money [on] consultants. And the expertise was going outside the council, and it seemed like her idea was that "no, the council needs to employ directly, they need to take some risks. They need to directly employ specialists that can keep the knowledge inside the council" (Br-1-1).

Although our selection of cities was biased toward cities active in international cooperation and project development, we observe that the introduction of the discussed changes is supported by multi-actor partnerships established to acquire financial resources from external sources (e.g. the EU) in the context of the scarcity of financial resources in national, regional, and local budgets.

5. Discussion and conclusions: Innovating governance between institutional design and adaptation

While most ST governance and innovation literature related to cities focuses on interorganizational collaborations, we have argued for the need to understand intraorganizational dynamics and structures that provide micro foundations of these processes. To this end, we have proposed an overarching theoretical framework that builds the connection between field-level and organization-level processes and demonstrates the currently unexplored potential for organizational-level analysis. We have shown how existing research exploring innovation and governance in urban spaces fits the framework and presented empirical findings that complement existing research by exploring the organizational level of ST governance and innovation. Our analysis of findings revealed how building structures for ST innovation and governance can be understood as innovating governance on the organizational level, a purposive effort to design new or adapt and modify existing governance structures to address ST challenges in a novel and more effective way.

In the case of city administration governance, innovation happens as an intertwined process of adaptation to environmental pressures, which locally assume the form of narratives of change and processes of design triggered by local agents that push change forward. Figure 1 below illustrates city administration as embedded in an environment penetrated by the four narratives of change related to sustainable energy transitions.

The analysis of empirical data identified four idealized driving forces behind innovating governance for ST: networks as sources of ideas for innovating; financial deficits; institutional entrepreneurs; and institutional leaders. While the first two capture institutional adaptation, conditioned by environmental pressures, the latter two entail agency-centered institutional design. Figure 1 below distinguishes between these two by indicating the direction of influence (inward arrows in the case of institutional adaptation and outward arrows in the case of institutional design). In practice, the four driving forces are intertwined in diverse proportions and produce changes in all three spheres captured by the concept of governance.

First, there is the building of multijurisdictional and multilevel structures. Positions like Deputy Mayor for Climate and Energy (Antwerp) or Climate Strategy Office (Mannheim) were created to coordinate sustainability-related processes vertically (across organizational hierarchies) and horizontally (across organizational siloes), e.g. by connecting Mobility Departments to Urban Planners or Housing Departments to Social Departments.

Second, over the last decade, all six cities established methods for hybrid and experimental ways of governing ST, connecting them to administration structures responsible for their continuous operations, such as the urban innovation lab created in Antwerp to systematically and collaboratively work on solutions toward a climate neutral city in 2050; or for the use of a specific tool like a climate panel monitored by a cross-departmental team subordinated directly to the city mayor in Warsaw; or a climate hackathon in Basel coordinated by the Department of Environment and Energy.

Third, cities systematically innovate governance structures for the engagement of diverse kinds of actors. The need for such an

innovation is explicitly expressed by city officials. For instance, while innovating with participatory governance structures was an original goal of the Mannheim city lab, the city administration of Antwerp focused the development of the second climate action plan (2030 climate action plan) on the design of governance structures for ST that "makes maximum use of co-creation with residents, companies, and industry" (An-CL report).

The process of innovating governance for ST that happens in city administration can be summarized by the following propositions, which highlight some of the dynamics and interconnections between the crucial factors underlying institutionalization patterns.

Proposition 1. *Innovating governance arrangements in city administration is facilitated through the adaptive mechanism of institutional isomorphism based on mimetic and normative characteristics. Examples of this mechanism are peer pressure among city and regional networks and the implementation of solutions because other cities have done so.*

The application of the institutional perspective allows for capturing the complexity of relations in which the cities operate. External pressures facilitate innovative change, especially peer-pressure among cities. This allows thinking beyond city-specific path-dependencies and highlights the importance of knowledge exchange and shared narratives that create pressure between cities.

Proposition 2. *The introduction of novel governance arrangements (esp. multi-actor partnerships) is facilitated by the scarcity of financial resources in state, regional, and local budgets, along with the possibility to obtain financial resources from external sources (e.g. the EU). What becomes a driver for innovating ST governance arrangements is compliance with European-level policies and regulations as well as with the framings used by international or private financing schemes.*

The proposition suggests that innovating governance for ST is a strategy for securing financial resources. While the existence of economic factors is hardly surprising, it is interesting how search for financing possibilities and collaborations may shape innovating around ST. Recent research on smart cities governance indicates how the economic power of actors involved in ST innovation processes may result in diverse types of smart city governance, (Drapalova and Wegrich 2020).

Proposition 3. *Novel governance arrangements depend on the existence of institutional structures (like policies and strategies) that operationalize sustainability goals and on the individual engagement of institutional entrepreneurs (e.g. public officials promoting sustainable energy transitions).*

Innovating with novel governance arrangements depends on how external pressures are received locally and translated into local organizational structures. Hence, institutional adaptation mechanisms that highlight governance conditioning are reinforced by institutional design mechanism emphasizing the role of agency.

Proposition 4. *The extent to which institutional entrepreneurs (those who introduce novel governance arrangements) can introduce changes (embed novel solutions in existing structures) depends on the support of political leadership and top management in city administration.*

Our study revealed that the role of individuals in the adaptation and design of structures carrying ST governance and innovation is crucial. Individuals translate external pressures into local context and take agency in pushing innovative change. This applies especially to local bottom-up leaders in city administrations, who build legitimacy by reaching out to narratives of change. The institutional work conducted by committed individuals who operate in administration structures is often the starting point for innovating urban governance, albeit remains ineffective without the support of top leadership (both political and managerial leadership).

The analysis of empirical data indicates that the levels and modes of institutional change are tightly intertwined and mutually reinforcing. While the two first propositions address mechanisms of primarily adaptive character with some elements of creative responses, the latter two emphasize institutional change that evolves from the agency and design mechanisms, that are still tightly connected with attempts to fit in ST network, ST policies and ST financing.

The interconnectedness of field level and organization level, as well as of adaptation and design efforts provides yet another argument for forwarding attempts at theorizing organizational-level changes related to ST, especially when reflecting on governance and innovation. This is where innovating governance is rooted and where conditions for effective governance of innovation in ST are shaped (Bungaard and Borras, 2021). Obviously, there are many ways to open the black box of organizations involved in ST governance on the city level, like in the recent research applying organizational ambidexterity to analyze sustainable urban innovation by van de Buuse et al. (2021). The advantage of the Hargrave and Van de Ven's (2006) typology of institutional change models is that it provides a way of looking at a specific phenomenon without losing a broader and – at the same time – more detailed picture.

Future research could benefit from assuming a long-term perspective on these change processes. Moreover, this would also allow for comparing outcomes of novel forms of governance, therefore revealing the interlinkages between governance *as* innovation and novel forms of governance *of* innovation. Moreover, the SONNET city partners present a biased selection of cities actively engaged in sustainability transitions and experienced in harnessing social and economic capital through this engagement, hence they present highly capable municipalities, disposing of the organizational and technical capacity crucial in processes of sociotechnical changes (Bundgaard and Borras 2021). Recent research suggests city administrations tend to choose different ways of governing sustainable innovation depending on the available capacity. Empirical analysis suggests that our conclusion could be "tested" against contrasting empirical backgrounds of the city administrations that pursue the goals alternative to sustainable energy transition and climate change mitigation.

Financial support for the conduct of the research was provided by European Union's Horizon 2020 research and innovation programme under grant agreement no. 837498.

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.

Data availability

Some of the data are available on request or can be downloaded from the project webpage (https://sonnet-energy.eu/). But some are confidential and will not be shared

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