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Institutional work in smart cities: Interviews with smart city managers

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ABSTRACT

This exploratory analysis investigates self-reported work practices that managers consider to be crucial for driving smart city transformation. We build upon the literature on institutional work and highlight different institutional work types. Using interviews, we show that smart city managers use a combination of institutional work that includes (a) creation (e.g., introducing new ideas, technologies, methods, and policies), (b) maintenance (which involves preserving certain aspects of existing institutional arrangements that are deemed valuable), and (c) disruption (such as by challenging entrenched institutional arrangements). The results provide deep insights into how smart city managers express their roles and responsibilities in smart city transformation. We discuss implications for theory and practice and conclude with avenues for future research.

1. Introduction

The smart city concept has gained significant attention and importance in research and practice in the last decade (Mora, Bolici, & Deakin, 2017). The term refers to ways of making cities more competitive, efficient, ecological, service-oriented, innovative, and inclusive (Appio, Lima, & Paroutis, 2019; Caragliu, Del Bo, & Nijkamp, 2011). To date, numerous studies have offered definitions of the term (Albino, Berardi, & Dangelico, 2015) and provided integrative smart city frameworks (Chourabi et al., 2012; Gil-Garcia, Pardo, & Nam, 2015).

Despite extensive research, however, the term *smart city* remains controversial and the subject of ongoing debate with regards to its definition and characteristics. Thus, the perceived benefits are often offset by numerous concerns, including issues regarding its effectiveness at addressing urban problems (Baeten, 2011; Datta, 2015, 2018), large corporations' roles and influence (Wiig, 2015), and citizen surveillance and hypervisibility (Jameson, Richter, & Taylor, 2019).

Urban governance scholars have highlighted various actors who drive smart city transformation in cities, either through 'top-down' (e.g., by executive-level politicians) (Alizadeh, 2017; Dierwechter, Herrschel, & Lintz, 2017; Wiig, 2015) or 'bottom-up' approaches (e.g., by citizens) (Shelton & Lodato, 2019; Townsend, 2013). Additional actors in smart city transformation include intermediaries such as community associations, local organizations, and ad hoc volunteer groups (Burns & Welker, 2023; Odendaal, 2016). This actor diversity underscores the fact that smart city initiatives are highly dispersed (Luque-Ayala & Marvin, 2015).

We focus on a group of smart city managers tasked with driving transformation in city administrations (Guenduez & Mergel, 2022), with the goal of examining smart city managers' self-reported work practices. It is not that smart city managers' roles in urban development have been neglected entirely in the literature. Some of the most interesting research on public sector modernization has focused on smart city managers, emphasizing the diverse domain responsibilities (e.g., streetlights, mobility, smart grids, waste management) and competencies (e.g., city planning capabilities, legal competencies, soft skills) associated with their position (Michelucci, De Marco, & Tanda, 2016), as well as how they may help to build smart city governance in their cities (Broccardo, Culasso, & Mauro, 2019; Halegoua, 2020). Other work on smart cities and urban governance has emphasized smart city managers' positioning as active participants in smart city transformation (Guenduez & Mergel, 2022).

In the present study, we focus on work practices and how smart city managers break with existing institutional settings and create new processes. Theoretically, we draw upon the concept of institutional work, which places the spotlight on actors' efforts to change institutions (Battilana, Leca, & Boxenbaum, 2009; Lawrence, & Suddaby, 2006). Based on Scott (2008, 2014) and other institutional scholars (e.g., Audretsch, Belitski, & Cherkas, 2021; Busenitz, Gomez, & Spencer, 2000; Koskela-Huotari, Edvardsson, Jonas, Sörhammar, & Witell, 2016), we conceptualize as institutions the existing socio-technical structures and formal and informal rules in cities, including existing policies, laws, regulations, established technologies, digitized artifacts, procedures, city administrations' culture, widely shared knowledge, skills, and understanding.

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Against this backdrop, the institutional work perspective is helpful in conceptualizing smart city transformation as work carried out by smart city managers aiming at moving away from established institutional arrangements in their city (e.g., traditional city administration with high levels of administrative burden, complex hierarchical structures, and established business- and citizen-friendly urban environments), so that new and innovative digital technologies and solutions can be used to improve resource use, reduce emissions, create more efficient services, and promote a more inclusive and responsive city government (European Commission, 2022). Viewing the issue through an institutional work lens, we argue that this concept is important for analyzing how smart city managers interact with their institutional context and deal with it to bring about change. In so doing, we question the assumption of a linear relationship between technology use and smart city development, which often is explicitly (and even more often implicitly) assumed and expressed in the literature. In contrast to this technocentric view, which has been criticized in the literature for its shortcomings (Lara, Da Costa, Furlani, & Yigitcanlar, 2016; Meijer & Bolivar, 2016), and in line with the institutional work literature (Battilana and Casciaro, 2012; Battilana et al., 2009; Scott, 2008; Suddaby & Viale, 2011), we consider transformation into a smarter city to be the product of the activities of smart city managers (i.e., professionals who purposefully strive to bring about change in their city) (Guenduez & Mergel, 2022; Michelucci et al., 2016). Lastly, the institutional work lens, combined with qualitative analysis, allows us to adopt the perspective of smart city managers, understand how they express and report their work practices, and highlight the set of activities they consider most critical for smart city transformation.

With this in mind, we ask: *What work practices do smart city managers perceive as key for driving smart city transformation?* The answer to this research question offers promising opportunities to expand our thinking on moving toward smarter cities, as it explicitly places the focus on human behavior and agency. Therefore, activities rather than achievements are at the core of this study of institutional work (Lawrence, Suddaby, & Leca, 2009, p. 10). Consequently, smart city transformation itself is the object of this research, and the activities carried out by smart city managers at the core. For the study, we conducted interviews with smart city managers to explore how they perceive their roles and responsibilities as part of the smart city transformation.

How urban governments can effectively manage transformation and change is both theoretically and practically relevant (Zhu, Li, Yi, & Wu, 2022). To address this question, this study provides empirical insights into institutional change and the work needed in smart cities through an analysis of self-reports made by smart city managers. Their perspectives are essential for a comprehensive and reliable understanding of smart city development, as they are the ones who adapt to change and directly manage complex urban issues (Michelucci et al., 2016). Their understanding of what it takes to make cities smarter facilitates a new awareness of smart city transformation and reinforces and deepens the existing research findings by providing first-hand accounts of how smart city managers work to implement change. These accounts add new information to the smart city literature that will inform future research and practice.

Our study enhances the current research on smart city transformation (Mora & Bolici, 2015; Mora, Deakin, & Reid, 2019), governance (Broccardo et al., 2019; Pereira, Parycek, Falco, & Kleinhans, 2018), and management (Guenduez and Mergel, 2022; Michelucci et al., 2016) by highlighting that smart city managers employ a combination of creation (e.g., introducing new ideas, technologies, methods, policies), maintenance (e.g., preserving certain aspects of existing institutional arrangements that are deemed valuable), and disruption (e.g., challenging and questioning entrenched institutional arrangements) to drive smart city transformation. These findings also provide new insights to the literature on institutional work (Koskela-Huotari et al., 2016; Lawrence & Suddaby, 2006), where with few exceptions (e.g., Broccardo et al., 2019; Ligorio, Venturelli, & Caputo, 2022) smart cities have rarely been studied.

Below, we present the main concepts from the literature on institutional work and descriptions of the roles and responsibilities of smart city managers and our research design. We then offer the results of our empirical investigation. Lastly, we discuss our findings in light of the existing literature and consider the implications of our study.

2. Background

2.1. Smart cities as a contested and evolving research area

Over the past three decades, the *smart city* concept has emerged as a key area of both research and practice. However, even after decades of research on the topic (Mora et al., 2017), the term remains “fraught and contested” (Burns & Welker, 2023, p. 309). There are ongoing discussions of what constitutes a smart city in both academia (De Jong, Joss, Schraven, Zhan, & Weijnen, 2015) and practice (Morozov & Bria, 2018). The concept of the smart city and uses of new technologies and methods serve as opportunities to make cities more competitive, efficient, ecological, service-oriented, innovative, and inclusive (Appio et al., 2019; Caragliu et al., 2011). Yet some researchers have questioned the de facto contributions of the smart city concept to the elimination of problems in urban spaces and raised criticism that the neoliberal paradigm risks disregarding the basic needs of people and nature, instead only serving large corporations (Baeten, 2011; Datta, 2015, 2018). A strong focus on technology can lead to a sense of increased surveillance and hypervisibility among citizens, contributing to the erosion of trust and development of counterstrategies (Jameson et al., 2019; Sadowski, 2020). Green (2019, p. 4) argued that “taking an exclusively technical view of urban life will lead to cities that appear smart but under the surface are rife with injustice and inequality.” Thus, researchers have stressed looking beyond the boundaries of ‘smartness’ to create more equitable, sustainable, and livable cities (Mackinnon, Burns, & Fast, 2022).

2.2. Actors involved in smart city transformation

Research on *smart cities* has shown that transformation can occur both from the top down and the bottom up (Burns & Welker, 2023). From the bottom-up (or grassroots) perspective, citizens are seen as key actors in smart city transformation (Ratti & Townsend, 2011; Townsend, 2013). Technology is used to strengthen democratic processes and facilitate the highest level of collective participation in decision-making (Charnock, March, & Ribera-Fumaz, 2021). However, rhetoric and reality can differ greatly. Scholars have found that citizens are often excluded from decision- and policy-making processes. Their influence is weakened by strong paternalism in the state and commercial entities (Cardullo & Kitchin, 2019). Thus, the promise of greater citizen engagement often remains little more than a promise (Shelton & Lodato, 2019). It takes substantial normative effort to truly realize smart citizenship (Kitchin, Cardullo, & Di Felicaiantonio, 2019).

From the top down, city (Wiig, 2015) and regional governments (Dierwechter et al., 2017) and large corporations such as IBM drive the smart city paradigm (Alizadeh, 2017; Wiig, 2015). In this regard, “smartness is seen as a program dominated and unrolled by powerful actors” (Burns & Welker, 2023, p. 312). Yet the strong involvement of private companies fuels criticism that they are assuming tasks that should be the responsibility of the state (Hollands, 2015). This is contrary to a socially just state, where value is produced in a bottom-up fashion and flows back to the citizens responsible for its creation (Greenfield, 2013).

However, the terms “top-down” and “bottom-up” do not adequately reflect the variety of actors involved in smart city transformation. Burns and Welker (2023) identified interstitial actors who behave in a fashion that is “neither top-down nor bottom-up, but play an important role in envisioning, implementing and contesting how ‘smartness’

is framed" (p. 308); these actors include community and local organizations and ad hoc volunteer groups that often are formally integrated into the planning process and lead a wide range of dispersed and disconnected smart city initiatives (see also Luque-Ayala & Marvin, 2015; Odendaal, 2016). Interstitial actors also include people such as the elderly, who tend to have little technological or digital presence or literacy. Efforts to include them also drive transformation processes in cities (Burns & Welker, 2023).

2.3. Research into smart city managers' roles in smart city transformation

Taking the top-down approach, we focused on smart city managers' efforts to drive smart city transformation. In recent years, smart city developers have increasingly drawn academic attention. The focus has primarily been on the emerging cadre of officials seeking to transform cities and city administrations (Goldsmith & Crawford, 2014) by implementing e-governments (Almazan & Gil-Garcia, 2011), open governments (Criado and Ruvalcaba-Gomez, 2018), other innovations, and new technologies (Gong, Janssen, & Weerakkody, 2019). Smart city developers tend to adopt a more human-centered approach and seek to make cities responsive, efficient, sustainable, and safe through ongoing processes (Halegoua, 2020). Taking a closer look at smart city managers, a recent empirical study by Michelucci and colleagues (2016) listed various domains within which smart city managers operate, including natural resources and energy, transportation and mobility, buildings, living conditions, the government, economy, and people. The researchers concluded that smart city managers have horizontal and cross-sectoral responsibilities when managing smart city projects in different service areas and are not restricted to administrative silos. Managing smart city projects, interacting with citizens, and training public managers and residents for smart city efforts are key activities (Broccardo et al., 2019; Michelucci et al., 2016). Reviewing the literature on smart urban governance, Meijer and Bolivar (2016, p. 392) concluded that "city managers should realize that technology by itself will not make a city smarter: building a smart city requires a political understanding of technology, a process approach to manage the emerging smart city and a focus on both economic gains and other public values." In their recent study, Guenduez and Mergel (2022) describe a set of dynamic capabilities used by smart city managers in their day-to-day work to drive the city's transformation.

We expand upon these previous studies and are particularly interested in smart city managers' self-reported activities as they are associated with their professional roles. To examine these activities, we adopt for this research the theoretical framework of institutional work, which we outline below.

2.4. Theoretical grounding

Institutional theory has emerged as a dominant philosophy for various organizations (Greenwood, Oliver, Sahlin, & Suddaby, 2008). It puts institutions, defined as the combination of formal policies, rules, laws, and regulations (regulative); shared norms, habits, roles, and responsibilities (normative); shared values, beliefs, meanings, and assumptions (cultural-cognitive) (Scott, 2008, 2014); institutional change (Dacin, Goodstein, & Scott, 2002); and the roles of the actors in this process (Fligstein, 1997) at the core of the analysis. Actors who purposefully initiate and actively participate in changing existing institutions and creating new ones are called *institutional entrepreneurs* (DiMaggio, 1988).

This study draws on the concept of *institutional work*, a sub-stream of institutional theory (Smets & Jarzabkowski, 2013) *that* seeks to explain actors' roles in creating, maintaining, and disrupting institutions (Lawrence & Suddaby, 2006). The concept of institutional work refers to "the purposive action of individuals and organizations aimed at creating, maintaining, and disrupting institutions" (Lawrence & Suddaby, 2006, p. 215). Applied to the smart city context, the concept provides a theoretical lens through which we can examine smart city managers' efforts to drive smart city development by disrupting institutional arrangements and creating and maintaining new ones.

Disruption: The act of disrupting is an understudied institutional work type that is often viewed as a byproduct of the emergence and dissemination of new institutions (Fuenfschilling & Truffer, 2016). However, research has suggested that specific actions by institutional actors can cause institutional destabilization. According to Oliver (1992) and Lawrence and Suddaby (2006), disruption involves the deliberate attack of the legitimacy of well-established traditions or activities (existing institutions) with the goal of either dismantling them completely or rendering them ineffective. Actors attempt to disassociate rewards and sanctions from particular practices, technologies, or rules to disrupt institutions, often using coercion to redefine concepts and challenge regulatory structures. They may also cause disruption by eroding their moral foundations or challenging their core assumptions and beliefs. Removing the costs associated with deviating from established practices can allow for new practices to emerge and reduce the perceived risk of innovation and differentiation (Lawrence & Suddaby, 2006).

Creation: Scholars have uncovered various institutional work types that seek to change institutional settings. Among these, many have studied mobilization, the effort to activate financial, political, and regulatory support (Battilana et al., 2009; Lawrence & Suddaby, 2006), as well as legitimization, which justifies a break with established practices, standards, and policies (Fligstein, 1997). Through the use of rhetorical strategies such as stories, discourses, and cause-and-effect chains (Phillips, Lawrence, & Hardy, 2004), actors can create shared standards that facilitate the development of new institutional arrangements (Greenwood, Suddaby, & Hinings, 2002; Lawrence & Suddaby, 2006; Suddaby & Greenwood, 2005). To this end, institutional entrepreneurs seek to connect new practices to those already existing (Duygan, Stauffacher, & Meylan, 2019) and reinterpret them from an alternate normative perspective (Battilana & Casciaro, 2012). Another institutional work type is collective action (Fligstein, 1997), which is aimed at achieving cooperation and collaboration among diverse actors by mediating and brokering connections between groups (Battilana et al., 2009). Furthermore, institutional work involves creating favorable political, economic, and moral factors that promote institutional change (Wijen & Ansari, 2007) and constructing rule systems and structures that define the boundaries of membership and confer status and identity within a field (Fligstein & McAdam, 2012; Lawrence & Suddaby, 2006). The creation of "normative networks" that serve as "inter-organizational connections" (Lawrence & Suddaby, 2006, p. 221) enabling the normative sanctioning of practices and positively influencing other actors' decisions to participate in or promote institutional change (Battilana et al., 2009) is one such example of institutional work that has been studied extensively. Notably, these different institutional work types are often complementary and can be carried out together to affect change in institutional settings.

Maintenance: A third institutional work type seeks to maintain institutions so that they can endure. Maintenance ensures compliance with established practices, rules, and norms. Actors maintain institutions through their daily activities, sometimes unconsciously, but also deliberately to counteract ongoing change (Lawrence & Suddaby, 2006). Institutional work aimed at maintaining institutions involves supporting, repairing, and recreating the social mechanisms that ensure compliance. To achieve this, institutional entrepreneurs connect new practices to existing ones and reinterpret them from an alternative normative perspective (Duygan et al., 2019). Lawrence and Suddaby (2006) identified six practices that actors engage in to maintain institutions: enabling, policing, deterring, valorizing/demonizing, mythologizing, embedding and routinizing. Enabling facilitates and supports institutions, while policing enforces compliance and deterrence establishes coercive barriers to affect institutional change. For instance, when Edison introduced electric lighting, he faced political obstacles such as the denial of an operating license and fees for wiring being inflated beyond those imposed on gas companies, examples of deterrence in action (Hargadon &

Table 1
Data Analysis Process.

Phase	Output	Example
Literature review	Theoretical start list (first-order concepts from the literature)	Mobilizing resources (Battilana et al., 2009; Maguire et al., 2004)
Deductive coding of interview data	Identification of smart city managers' work practices (first- order codes)	"Every year, I fight for money… It's really a hostile fight to get more money from the government's budget." First-order code: *Mobilize the necessary financial resources for implementation of the city's strategy and projects.*
Inductive coding of interview data	Institutional work inducted from the interview data (first-order codes from the interview data)	*Build the necessary city infrastructure for data transfer such as fiber optic network, LoRa WAN, 5 G, etc.*
Grouping into broader categories	Aggregated second-order categories and dimensions for institutional work in smart cities	*Mobilizing financial and human resources* is a second-order category derived from the co-occurrence of first-order codes (*mobilizing the financial resources necessary for implementation of the city's strategy and projects* and *mobilizing the human resources necessary for implementation of the city's strategy and projects*). *Mobilizing resources and support* is an aggregated dimension derived from the co-occurrence of second-order categories (*mobilizing financial and human resources* and *mobilizing support*).

Douglas, 2001). Valorizing or demonizing provides positive or negative examples that illustrate an institution's normative foundations, while mythologizing preserves its normative underpinnings by creating myths about its history. Embedding and routinizing involve infusing an institution's normative foundations into everyday routines and practices. These practices help to sustain institutions through the stabilizing influences of repetitive practices and routines.

3. Research design

3.1. Data collection

Many actors are involved in smart city initiatives, whether they act in top-down, bottom-up, or interstitial ways (Burns & Welker, 2023). We took a top-down perspective and focused our data collection on smart city managers and actors charged with leading smart city development in their cities. We used purposive sampling, a common technique employed in qualitative research that involves selecting interviewees based on particular criteria relevant to the research objective (Palinkas et al., 2015). To identify smart city managers, we proceeded as follows. We began our data collection by accessing the International Institute for Management Development's (IMD) Smart City Index (IMD, 2019). This was an appropriate starting point because with 102 smart cities listed therein, the database provides a comprehensive list of smart cities around the world, allowing us to identify many potential interviewees. In addition, several listed smart cities had been examined in previous work (e.g., Caragliu et al., 2011; Fernandez-Anez, Fernandez-Guell, & Giffinger, 2018; Mora et al., 2020), offering a unique opportunity to uncover new insights about these cities.

To gain a deeper understanding of the institutional change in smart cities, we solicited the expert views of smart city managers uniquely positioned to provide insights into this complex process and the tasks required of them. Such individuals are commonly responsible for directly initiating, leading, and implementing transformative initiatives (Guenduez & Mergel, 2022; Michelucci et al., 2016), and thus their expert views can complement existing research on smart city transformation, either confirming or challenging existing knowledge. Additionally, their firsthand accounts of the institutional work carried out in smart cities can provide fresh insights for future research and practical implementation.

Actors tasked with the transformation in such cities often hold positions with a variety of job titles (De Tuya, Cook, Sutherland, & Luna-Reyes, 2020; Guenduez & Mergel, 2022). Thus, when looking for interviewees, we were interested in those individuals in city administrations whose roles and responsibilities included driving smart city transformation, even if this was not directly evident from the job titles. Due to resource constraints, we interviewed only one smart city manager per city, selecting the one official tasked with heading the city's transformation. The experts included in this study were key actors involved in the transformation of a city's administration and public services. From the formulation of smart city strategies to their implementation, they were involved in and familiar with the efforts required to drive such transformation. For an overview of the interview partners, see Supporting Information, Appendix Table A.1.

We used different means of contacting our interview partners, including e-mail, telephone, and social media. We conducted interviews from October 2019 to May 2020. A total of 19 smart city managers from the cities listed in the IMD agreed to participate. Following a snowball sampling approach (Biernacki & Waldorf, 1981), at the end of each interview, we asked for recommendations of individuals from other cities who the interviewees thought might fit our study purpose. Thus, we received a number of additional contacts and were able to expand our sample by 21 interviews. In total, we conducted 40 interviews. Different contexts and cultures were not a part of this study. Instead, we looked for how interviewees described similar activities and then derived themes. Our subjects were primarily from Europe (n = 30), followed by North America (n = 5), Asia (n = 3), and Oceania (n = 2). We conducted interviews in English (n = 21), German (n = 13), and French (n = 6). Interviews took place by phone, on Skype, or face-to-face, and lasted 56 min on average, for a total of 37 h and 35 min.

Our protocol followed a semi-structured guide to ensure comparability and consistency across the interviews (Newcomer, Hatry, & Wholey, 2015), while at the same time encouraging interviewees to elaborate upon the practices related to smart city transformation they deemed the most important and frame them in their own words (Myers & Newman, 2007). All interviews were recorded and transcribed verbatim for subsequent analysis. Table 2 in Supporting Information, Appendix Table A.2 includes the interview guide.

3.2. Data analysis

The interviews were coded by a team of two, using the qualitative software program NVivo12 (QSR International 2018). Both coders were trained and supervised, and each was fluent in at least two relevant interview languages. Similar to Wilson and Mergel (2022), our data analysis followed a four-stage process (see Table 1).

First, the relevant literature was reviewed to generate a theoretical start list of institutional work (Wilson & Mergel, 2022). These first-order concepts were then used to code the interview data, identifying interview responses that described specific institutional work in the smart city context. Following Gioia, Corley, and Hamilton (2013), this deductive coding phase was followed by an inductive coding phase, in

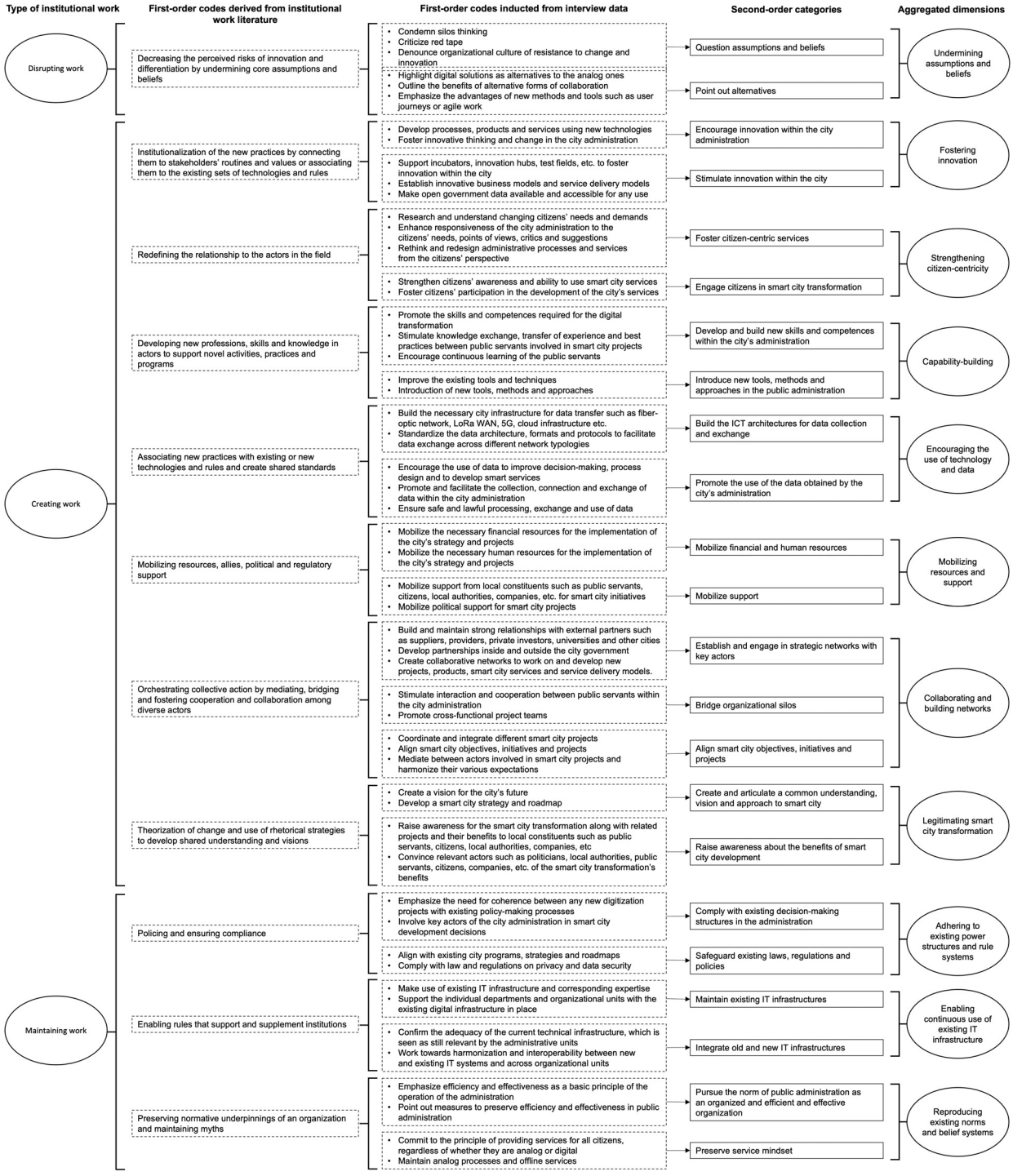

Fig. 1. Data structure.

which specific aspects of institutional work were coded from the interview data. In this step, we also identified institutional work practices not previously discussed in the literature. In the fourth phase, the first-order codes derived from the literature and first-order codes inductively identified from the interview data were grouped according to similarities. This process yielded the identification of 23 s-order categories for institutional work that were present in the interview data. Finally, we combined the second-order categories and bundled them into 11 aggregated dimensions that provide insights into institutional work practices.

The data structure depicted in Fig. 1 emerged as the result of this in-depth coding process. In the following sections, we present our findings. Following Pratt's, (2009) recommendation regarding data reporting for qualitative studies, we provide exemplary quotes for our coding that support our interpretation (see Supporting Information, online Appendix Table A.3).

4. Results

Our results show that smart city managers engage in all three forms of institutional work to drive transformation. Table 2 provides an overview of the disruption, creation, and maintenance work in service of smart cities transformation that we collected from our interviews.

Table 2
Institutional Work Types Observed in Smart City Managers.

Institutional work type	Aggregated dimensions	Description of the effect desired from smart city transformation
Disruption	Undermine assumptions and beliefs	Decreased support for norms, beliefs, and practices that inhibit innovation; increased support for alternative processes, tools, methods, and ways of working.
Creation	Foster innovation	Increased innovativeness in both the city and its administration in developing new services, products, and processes addressing urban challenges.
	Strengthen citizen-centricity	Citizen needs and priorities become the heart of smart city development and citizens are empowered by and engaged in the process
	Capability-building	City administration's capabilities are improved by enhancing the digital skills of public servants and introduction of new tools and methods.
	Encourage the use of technology and data	Informed decision-making, improved service delivery, and increased problem-solving capacity in the city administration through the use of new technologies and data.
	Mobilize resources and support	Necessary resources are available, especially human and financial, and there is political support for smart city development.
	Collaborate and build networks	Smart city network established with key stakeholders pooling knowledge and resources and working together toward shared goals
	Legitimate smart city development	Broad acceptance of and commitment to the smart city transformation, and a shared vision of and approach to smart city development.
Maintenance	Adhere to existing power structures and rule systems	Existing city policies, programs, and roadmaps remain relevant, and smart city projects and initiatives align with them.
	Enable the continuous use of the existing IT infrastructure	Existing IT infrastructure is continuously supported if it remains useful and new digital solutions are integrated into it.
	Reproduce existing norms and belief systems	Regardless of whether services are provided by traditional (analog) means or digital formats, the focus remains on being effective, efficient, and service-oriented.

4.1. Disruption

The interview data demonstrate that smart city managers perform a set of activities designed to undermine and thereby disrupt existing institutional arrangements. These work practices form the foundation of the smart city transformation.

Undermining assumptions and beliefs: Our findings indicate that smart city managers often criticize and challenge hierarchical and siloed structures, red tape, and organizational cultures and mindsets that resist change and hinder smart city transformation. Rather than the technology, the entrenched organizational culture and mindset are the object of the disruptive work done by smart city managers: "*I very quickly learned that technology plays a small part. The bigger part is around changing mindsets*" (Interviewee 34). This work requires a considerable amount of time and effort: "*So that's what we need to work on the most in the administrations, on changing the mentality*" (Interviewee 26). Yet the disruption of existing institutions does not occur swiftly, and rather is the result of long-lasting efforts, as Interviewee 33 pointed out:

> *The silo effect is one of the burdens we carry on our backs and that's something that we need to, I wouldn't say break, but erode little by little.*

However, the work of undermining assumptions and beliefs involves not only criticism but also the proposing of suitable alternatives. Interviewee 10 summarized this practice as follows: "*Smart city means to ask what problems exist here, how to solve the issues of the future.*" Further, the interviewees emphasized the benefits of introducing alternative digital solutions, methods, helpful tools, and alternate collaboration types such as working on interdisciplinary teams in service of the development of a smart city.

4.2. Creation

The results indicate that smart city managers perform seven different types of creation work.

Fostering innovation: A work type often mentioned by the smart city managers in the interviews is the fostering of innovation in their city. Individuals in such positions tend to encourage innovation in the city's administration by spotting novel information and communications technologies that can be used to modernize internal processes and explaining to various departments how such technologies can improve existing and deliver new services. Further, smart city managers create space for innovative thinking in an administration. As Interviewee 28 noted, "*For me, my role is about creating the circumstances [for] collaborative innovation that address wicked urban challenges*." Outside of the city administration, smart city managers also engage in various activities to stimulate innovation throughout the city. They help establish hackathons, living labs, maker spaces, and innovation hubs to allow for collaboration among different actors and accelerate innovation and the development of new products, services, and business models. In this regard, the interviewees emphasize the need to make collected data publicly available to boost innovation: "*We built an open data portal… we have three-hundred and forty-three datasets ready. They come from different areas that startups can use for a project, for developing an app, for example*" (Interviewee 29).

Strengthening citizen-centricity: A second set of activities involves strengthening citizen-centricity, with a particular focus on providing services and engaging citizens in smart city transformation. The ambition is to serve citizens throughout their lives, as Interviewee 21 states: *"The city accompanies a citizen from the cradle to the grave; that is, you are born in a public hospital and are buried in the public central cemetery."* To develop these services in a citizen-centered way, their needs and demands must first be identified and understood:

> *We created services because we started realizing and empathizing with what people go through in interacting with the city and government. I think it's incumbent on us to be able to engineer these things to a point where it makes the most sense to the customers: our citizens or businesses. It's really about listening to customers and what they need, and then delivering the services… services that are readily available in the quickest, simplest possible ways.* (Interviewee 14)

The interviewees indicate that developing services requires direct engagement with citizens during the city transformation process. People's awareness can be raised through the traditional paths of direct feedback and via digital channels such as the city's website, social media, and informative events. As the interviews show, cities also offer programs to increase citizens' skills in using digital services and engagement. For instance, they offer *"modules with videos and tutorials on e-government services, combined with training and e-learning on basic skills"* (Interviewee 26) to empower citizens to use services and tools for participation.

Capability-building: Capability-building is important not only for citizens but also within a city administration. Developing and building new skills and competencies in a city's administration is a key driver of smart city transformation. As Interviewee 38 succinctly summarizes: "*If we want to become a smart city, we need to ensure that we have the right skills."* Smart city managers mention numerous skills and competencies that are often are lacking, such as agile project management and leadership, as well as analytical, self-organization, communication, and IT-related skills such as technical and data science literacy. The smart city managers also repeatedly emphasize their struggle to recruit qualified employees. They point out that it is even more important to promote continual learning and training among current public servants. Capability-building also includes improving and implementing various tools, techniques, and approaches, of which agile project management, design thinking, and working on interdepartmental teams are the most frequently mentioned in the interviews.

Encouraging the use of technology and data: Creating smarter cities goes hand-in-hand with the use of data and technology. This work is emphasized by Interviewee 5: "*The city administration and I are concerned about the expansion of the IT infrastructure, so we are putting all our efforts into this because, as I said, without this we cannot bring the services to the citizens.*" Our data reveals that a key work practice of smart city managers is building IT infrastructure such as the sensors, Internet of Things, 5 G, long-range wide area networks, fiber optic networks, and cloud infrastructure needed to collect, store, and share data. Building the necessary infrastructure to collect data is not sufficient to guarantee usage, which is why smart city managers also promote the utilization of collected data. The interviewees highlight the importance of data exchange across departments. In this regard, Interviewee 25 states: "*We attempt to facilitate partnerships across silos within government and across sectors more broadly within the city to implement technologies and utilize data in smarter ways to make the government more efficient and improve the quality of life of all citizens.*" The interviewees provide multiple examples of optimized services in sectors such as healthcare, where data analytics is used to help prevent deaths and enhance patient treatment; transportation, for minimizing traffic congestion; and governance, for facilitating the establishment of policies tailored to citizens' needs. Further, various interviewees emphasize the importance of ensuring citizens' privacy and the lawful and ethical use of the data they collect.

Mobilizing resources and support: Smart city development further depends on availability, and therefore smart city managers' efforts to mobilize financial and human resources and support. Although some interviewees state that they have sufficient financial resources at their disposal, most agree that gathering funds to finance projects is a substantial challenge. Interviewee 27 even reveals that *"Every year, I fight for money… It's a hostile fight to get more money from the government's budget."* Smart city managers frequently lack sufficient human resources, which can become a barrier to the realization of smart city projects. After all, the adequacy and availability of the resources required will determine which smart city projects will be pursued and which abandoned. Another integral part of the work is gaining support from internal and external actors. Managers often seek to support citizens, public officials, and private businesses by asking for suggestions to improve existing services and develop new policies. Implementation of smart city projects also depends on backing from political actors. Owing to their powerful position, they can influence the political agenda and financial resources made available for smart city initiatives. Interviewee 5 emphasizes this: *"All the projects we do are relatively expensive, and we always need the support of the city council, which releases the money."*

Collaborating and building networks: The interviews show that smart city transformation must bring together the efforts of dispersed actors. We grouped all activities related to this creation work under collaboration and the building of networks. The interviewees agree that establishing collaborative networks inside a city government and with actors such as IT service providers, universities, think tanks, and other cities is what makes smart city transformation possible. For instance, Interviewee 21 stresses the importance of exchanges with large IT companies so that they do not simply sell a *"business case, but a product that meets the administration's needs."* However, the most prominent issue expressed by the interviewees relates to collaboration within the city administration. Organizational silos impede coordinated smart city transformation, which is why smart city managers put great effort into connecting public servants and encouraging collaboration. One way is to foster cross-functional project teams to harness multidisciplinary know-how and synergies for smart city transformation. Smart city managers coordinate different projects within their city and try to *"understand what is going on across the [city administration and] try to join the dots where possible and link people up… My role to some degree is about pulling all these different strands together, if you like, and … identifying where people could collaborate or work with one another"* (Interviewee 38). For instance, they often mediate between the various actors involved in smart city projects through workshops and meetings, harmonizing the expectations of smart city transformation to facilitate collaboration.

Legitimating smart city transformation: The last group of activities related to the creation work we identify in our data involves legitimating smart city transformation among key constituencies, such as citizens, businesses, startups, the media, local authorities, and government officials. Our analysis reveals two groups of activities related to legitimacy work. First, smart city managers are called upon to articulate a vision, clear strategy, and concrete implementation roadmap to create a shared vision and understanding of the smart city transformation:

> *What does the city need? An overall strategy. And we are currently in the process of creating one … We have worked a lot with external parties and now we need to start involving the internal administration.* (Interviewee 10)

A second important part of smart city managers' work is raising awareness of the drivers of transformation and highlighting why this is necessary to advance change. Their job is to emphasize the benefits of smart city transformation and potential downsides of not pursuing the goal of becoming a smarter city. This work of convincing people requires strong communicative efforts. Smart city managers have to constantly advocate for change and address doubts and concerns.

4.3. Maintenance

As introduced by Lawrence and Suddaby (2006), institutional entrepreneurs not only engage in disrupting and creating institutional arrangements but also in maintaining existing ones. Regarding smart city transformation, we identify three maintenance work tasks that smart city managers commonly engage in.

Adhering to existing power structures and rule systems: A set of activities frequently mentioned by smart city managers in the interviews is adhering to existing power structures and rule systems in an administration. The smart city managers interviewed emphasize that they must ensure compliance with existing decision-making structures to avoid unnecessary resistance to new smart city projects and initiatives. Also, the interviewees agree that involving the key actors in a city administration in smart city development decisions is crucial to a smart city project's success. Interviewee 10 explains: "*We try to involve our decision-makers from the city council relatively early in our processes*." Attention must be paid to ensuring that new smart city projects and initiatives are consistent and compliant with the existing laws, regulations and policies, city programs, and roadmaps of the city and individual departments. For instance, when introducing new technologies, smart city managers are required to ensure compliance with regulations on privacy and data security: "*[we] ensure that people are safe and that the technologies are secure and they're not violating anyone's privacy"* (Interviewee 13).

Enabling continuous use of existing IT infrastructure: The interviewees reveal that smart city managers enable the continuous use of the existing IT infrastructure in city administrations. This maintenance work

ensures that the IT infrastructure in place and corresponding expertise are supported and retained. In this regard, smart city managers are "*trying to get the most out of the assets [they] have in the city*" (Interviewee 22). Part of this enabling work is smart city managers' support of individual departments and organizational units with the existing digital infrastructure they have in place, as well as through planned digitalization projects. This also requires smart city managers to integrate and harmonize old and new IT infrastructure across organizational units. Given the scarcity of financial resources emphasized by most of the interviewees, making the most out of the existing digital infrastructure is often a necessity.

Reproducing existing norms and belief systems: The last set of activities engaged in by smart city managers relates to existing norms and belief systems. First, this includes the core principle that the administration must be organized and operate efficiently and effectively. The traditional bureaucracy with hierarchical decision-making and a rigid siloed organization is no longer seen as an expression of efficiency. Thus, restructuring and innovation in public administration are necessary to serve people and society and create the outputs and outcomes they want and need in a timely, informed, and cost- and time-efficient way. Organizational restructuring, building cross-functional teams, connecting organizational silos, adapting agile and citizen-centric methodologies, and building new capacities are all important if one is to embody the core values of public administration.

A second core value made clear by the data is service to the public. Related to this is the strong belief that all citizens should have access to administrative services, regardless of their digital capabilities and resources. While the expansion of digital service delivery is supported by the interviews, the importance of maintaining analog service delivery is also emphasized numerous times. Analog processes and offline services are commonly maintained alongside the development of digital ones. The interviews also show that smart city managers retain analog channels where digitalization does not bring clear added value: "*simply because we also have services here that, even if they're not digital, function very well in some cases, and where this added value that electronic processing offers me can only be realized to a relatively limited extent*" (Interviewee 20).

5. Discussion

The literature has proposed that actors driving smart city transformation can be subdivided into top-down, bottom-up, and interstitial groups (Burns & Welker, 2023). Taking a top-down approach, this study explored the work practices that smart city managers considered critical for driving smart city transformation, an issue that to date has received little attention in the literature (Mora et al., 2019; Schiavone, Appio, Mora, & Risitano, 2020). Research on institutional work has identified a range of activities that disrupt, create, or maintain institutions (Lawrence & Suddaby, 2006). To investigate our research question, we reviewed the literature on institutional work and interviewed 40 smart city managers. Through an application of this theoretical framework of institutional work to the smart city context, this study makes the following contributions to the literature.

Our results reveal that to facilitate smart city transformation, smart city managers are engaged in disruptions that challenge and move past commonly held beliefs, assumptions, and practices. Disruption is a relatively under-researched type of institutional work in the literature (Fuenfschilling & Truffer, 2016; Lawrence & Suddaby, 2006). Indeed, our findings show just one type of disruptive work (i.e., *undermining assumptions and beliefs*), as the smart city managers interviewed do not often mention this form of work in the context of their smart city development. One explanation for this scarcity is that disruption and creation often go hand-in-hand. Indeed, disruption creates the conditions necessary and paves the way for a wide range of creation in smart cities. Our study contributes to the institutional and smart city literature by showing that through disruption, smart city managers de-institutionalize existing institutional arrangements (i.e., practices, assumptions, and beliefs) and enable the emergence of new ones. Interrogating existing assumptions, rules, beliefs, and practices and identifying alternatives play important roles in the development of smart cities.

In contrast to the less prominent disruption, our results show a diversity of creation in smart cities. These acts include creating awareness of the need for and relevance of smart city transformation among internal colleagues (i.e., *legitimating smart city transformation*), convincing the administration to be receptive to the needs and demands of businesses and citizens, and involving them in the design and improvement of processes and services (i.e., *fostering a citizen-centric city*). Managers work to develop the necessary tools, skills, and competencies in the administrative staff of city administrations (i.e., *capability-building*) and mobilize the required political, financial, and human resources (i.e., *mobilizing resources and support*). By building networks, mobilizing actors from the city administration, civil society, and politics, creating new interaction channels for engaging citizens and businesses, bridging administrative silos, and fostering collaboration with other actors (i.e., *collaborating and building networks*), smart city managers position themselves as key players in smart city transformation. They embrace their role by developing city-wide smart city strategies for transformation and establishing a vision for the future (i.e., *fostering innovation*), as well as by introducing new standards related to data and technologies that help to transform the city as a whole (i.e., *encouraging the utilization of technology and data*). Thus, our findings support previous research (e.g., Broccardo, Culasso, & Mauro, 2019; Goldsmith & Crawford, 2014; Guenduez, Frischknecht, Frowein, & Schedler, 2024; Guenduez & Mergel, 2022; Halegoua, 2020) highlighting smart city developers' role in enhancing citizen-centricity, promoting data use, and fostering collaboration and co-creation as part of the smart city transformation. Our study also substantiates the findings of the literature on institutional work (Lawrence & Suddaby, 2006; Lawrence et al., 2009), showing that creation is central to institutional change because it is by far the work most frequently mentioned in the interview data.

Our study also demonstrates that while disruption and creation efforts are required in cities to drive transformation, at the same time, smart city managers also seek stability and continuity in certain areas. They achieve this by engaging in maintenance work. This work type is most evident in areas where strong path dependencies exist and changes are not considered necessary (i.e., *enabling the continuous use of existing IT infrastructure*), where smart city managers lack competency and decision-making authority (i.e., *adhering to existing power structures and rule systems*), or when they encounter significant resistance (i.e., *reproducing existing norms and belief systems*). Our findings support previous institutional work research emphasizing the importance of maintaining certain institutions and rules as integral to innovation (Koskela-Huotari et al., 2016). This study contributes to this line of research by identifying three such maintenance tasks. With these findings, our study adds to the smart city literature, which to date has predominantly emphasized change and paid only limited attention to investigating efforts aimed at preserving established practices and beliefs. Studies have often explored maintenance when examining resistance to change (Rho, Jung, & Nam, 2021). Our findings contribute to the ongoing debate by highlighting that maintenance, when accompanied by change efforts, is a key component of smart city transformation. We demonstrate that smart city managers incorporate maintenance as integral to their larger plan.

Our study contributes to existing findings on smart city transformation (Mora & Bolici, 2015; Mora et al., 2019), smart city governance in general (Broccardo et al., 2019; Pereira et al., 2018), and smart city managers in particular (Guenduez & Mergel, 2022; Michelucci et al., 2016) by highlighting their creation, maintenance, and disruption work. In so doing, the results provide clarity regarding smart city managers' roles and responsibilities in smart city transformation. Our findings provide support for insights in the institutional work literature that highlight how actors skillfully simultaneously combine the three institu-

tional work types and balance the breaking and making of institutional arrangements (Koskela-Huotari et al., 2016).

6. Conclusions and implications

In this study, we described and highlighted what smart city managers do and their roles in contributing to smart city transformation. We have contributed to both the institutional work and smart city literature by underscoring a set of work practices essential to smart city transformation, thereby answering our research question. By focusing on the purposeful actions of smart city managers, we were able to offer insights into the process of changing old institutional arrangements and establishing new ones.

There are two primary insights and implications for practice that should be noted. We outlined smart city managers' multifaceted roles and responsibilities and a number and variety of activities and practices; these will help in developing professional education and training programs for smart city managers, facilitating the improvement of the skills and competencies required for their tasks. Finally, human resource managers in public administration should use our insights when formulating job profiles and recruiting smart city managers.

Our study also offers several starting points for future research. First, our findings show how smart city managers engage in smart city transformation, but not their work's impacts. Since smart city transformation can be characterized as a process of institutional change, it is crucial to consider how changes become institutionalized. Here, longitudinal studies could show the impact of efforts and how change becomes established over the long term.

Second, smart city managers may prioritize certain work activities, depending on the specific objectives, constraints, and potential trade-offs between creation, maintenance, and disruption work. Future studies can determine what factors influence smart city managers' work choices and how their work changes over time. In this way, researchers could provide a more nuanced and dynamic picture of institutional work in smart cities.

Third, smart city transformation is not the result of the activities of a single person or specific professional group, but rather of many (Burns & Welker, 2023). We focused only on smart city managers and did not consider the efforts of other key actors such as citizens, community associations, local organizations, large corporations, and universities (Luque-Ayala & Marvin, 2015; Odendaal, 2016; Ratti & Townsend, 2011; Townsend, 2013). Exploring their efforts will shed light on the different facets of institutional work in smart cities and deepen our understanding of the efforts needed to drive smart city transformation.

Despite its numerous contributions, this study has limitations. First, due to the qualitative character of this research, the generalizability is limited. Second, our respondents work in different cities in countries with a variety of disparate traditions. We did not consider the influence of contextual factors such as city size or political culture, but these factors could have affected respondents' answers (Meijer, Gil-García, & Rodríguez-Bolívar, 2016). A third limitation concerns selection bias. Following Atkinson and Flint (2001), we sought to minimize selection bias by targeting a large sample from the outset and offering interviews in three languages, thus reaching as many diverse cities as possible. However, further analysis are necessary to evaluate the findings presented above.

Declaration of competing interest

None.

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Supplementary materials

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