



Zooming Into the Ecosystem: Agency and Politics Around Open Data Platforms in Lyon and Berlin

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Open data platforms provide free access to datasets in key areas of urban development. Often managed by the local state, open data platforms constitute a part of smart city strategies worldwide, serving different, potentially contradictory aims, i.e., fostering economic development, pursuing civic objectives or improving administrative efficiency. Reflecting these diverse orientations, our interest lies in understanding how open data platforms are coproduced by different actors based on their conceptions of open data. Taking a critical stance toward the often functionalistic interpretation of open data initiatives as ecosystems, we conceptualize the development of open data initiatives through a dynamic approach to agency, focusing on the strategies of different actor groups shaping open data initiatives and platforms in specific local governance contexts. Empirically, the paper analyses the development of open data initiatives and platforms in two European cities, Lyon and Berlin. Starting with the initial steps for setting open data on the agenda, we apply a process perspective unpacking actors' conceptions of open data and their strategies to shape open data initiatives and platform design. The analysis is based on tracing development processes and on interviews with representatives of city administrations, open data initiatives and civil society. Our findings indicate the objectives of open data initiatives were narrowed down to economic development and administration efficiency, despite broader visions on open data among other actors. This can be traced back to the high importance of personnel, financial and technical resources for defining the implementation of open data initiatives.

Keywords: open data, urban platforms, data policy, structure and agency, urban governance

INTRODUCTION

As a part of many smart city programmes, data on urban flows and processes are seen as a resource for an effective management of services in the city (Barns, 2018). Optimistic accounts in this regard stress potential improvements in transport, energy and financial flows, and underline the possibilities for collaboration and participation in the development of data platforms (Paskaleva et al., 2017). Against this, there are fears and contestations concerning rights to information in the city, especially when information gets privatized by large technology firms (Viitanen and Kingston, 2014; Shaw and Graham, 2017). Therefore, data should not be seen from a technical viewpoint alone. Kitchin (2014, p. 25) conceives of data as an element forming part of a wider

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“data assemblage,” consisting of different forms of knowledge, technical infrastructures, practices, subjectivities, and organizations. According to the Open Knowledge Foundation, the main defining element of open data is that it should be freely used, re-used, and redistributed by anyone. Within this spectrum, open data initiatives operate under the premise of providing free access to datasets in key areas of urban development, thus increasing the information base, and potentially empowering citizens (Baack, 2015). Sieber and Johnson (2015) discuss different pathways of how open data can mediate between the state and civil society, from simply opening up government data to a participatory design, in which governments and citizens co-produce data together.

To grasp such collaboration, open data research and practice extensively refer to the term “open data ecosystem” defined as a loose group of diverse actors with various skills and interests, linked by dynamic interaction through cooperation, competition, and negotiations (Zuiderwijk et al., 2014, p. 20; Dawes et al., 2016). After starting with a more holistic approach to studying ecosystems, research has started moving the focus toward the contributions of individual actors, their motivations, and strategies based on their context and situated knowledge (Harrison et al., 2012, p. 911; Reggi and Dawes, 2016; Ruijter et al., 2020). Building on these debates, this paper discusses the relationship between actors’ conceptions of and their strategies for implementing open data in two European cities, Lyon, France and Berlin, Germany. We seek to illuminate the internal dynamics of open data ecosystems, thereby reconstructing how decision-makers and developers shape urban open data initiatives.

Beyond providing an empirical account of the developments in Lyon and Berlin, our conceptual ambition is to accentuate the importance of local contexts and agency in face of often functionalistic tendencies in open data research. This paper focuses on two research questions: Which actors pursue the implementation of open data platforms, and with which objectives? How are open data platforms constructed in relation to specific contexts of urban governance? In pursuit of these questions, we argue that holistic views on open data ecosystems need to be complemented with a more detailed analysis of the agency of single actors. Agency here refers to conscious strategies toward shaping institutional environments in urban governance (see Moulaert et al., 2016), in this case the formation of the open data initiative and its digital platform.

We open this paper with a critical introduction to the ecosystem metaphor and its usage in studying open data. Then, we present our approach that rests on three dimensions to understand how, in specific governance contexts, agency and different conceptions of open data get reflected in urban open data platforms. The following section depicts how our methods of data gathering and analysis were inspired by the notion of process tracing and organized in practice. The subsequent two sections lay out the development of open data in Berlin and Lyon. The two cities provide an interesting comparison as they depict different dynamics around open data: while in Berlin the process was managed by the city’s administration and supported by research and civil society initiatives, in Lyon open data was promoted by

the metropolitan administration, involving start-ups and utilities. In both cities, economic and bureaucratic conceptions of open data become dominant, side-lining civic orientations. Based on this analysis, we conclude with a reflection questioning overly functionalistic assumptions of ecosystems thinking in the field of open data.

OPEN DATA: FROM ECOSYSTEMS TO AGENCY

The Rise of the Ecosystem Metaphor

Originating in ecology, the term “ecosystem” occurred as an analytical metaphor in Innovation Studies and Organizational Theory from the 1990s onwards. Coined by management scholar Moore (1993), the ecosystem perspective was introduced as an alternative conception to a sole focus on competition in business research, highlighting elements such as interdependence and the alternation of cooperation and competition in systems of firms. Ecosystems, consisting of loosely coupled members and one or a few central actors, so called “keystone” leaders, were seen as fostering innovation and improving resilience in relation to changing business environments. The advantage of the term “ecosystem” was found in tolerating a higher level of “boundary porosity” than in similar notions like “cluster” or “network” (Daidj, 2011). At the same time, the metaphoric nature of the term “ecosystem” presents difficulties, as authors stress divergent definitions highlighting different parameters, most of them derived from analogies with biological ecosystems (Parisot, 2013).

The ecosystem metaphor is widely used to describe actors and dynamics in the field of digital innovation, and with that, also in the development and use of open data platforms, both by researchers and practitioners (Pollock, 2011; Harrison et al., 2012; Dawes et al., 2016; Schäfer and Mayer, 2019). The major reason for its currency is found in the notion that developing, publishing and using open data requires different skills and, therefore, the involvement of actors from various fields (Kitchin, 2014; Gonzalez-Zapata and Heeks, 2015). Thus, Harrison et al. (2012, p. 900) understand ecosystems regarding open data as “a metaphor [...] to convey a sense of the interdependent social systems of actors, organizations, material infrastructures, and symbolic resources that must be created in technology-enabled, information-intensive social systems.”

In this perspective, different groups of actors are distinguished according to their functions within the system. Dawes et al. (2016) identify data beneficiaries and data providers, along with an intermediary group of data users (transparency advocates and civic technology community). Gonzalez-Zapata and Heeks (2015) classify members of open data ecosystems into primary (mainly public actors) and secondary stakeholders (ICT providers, civil society, and academics). Following their assumption, these roles result in different interests and power resources, but also in typical patterns of interaction. Lastly, intermediaries are accredited a central role in open data ecosystems due to the need for “mediators, people who bridge distances across institutional boundaries and translate across

disciplines for members” (Harrison et al., 2012, p. 906). Hence, the earlier strategy of publishing “data over the wall,” that is without including users in the development of the platform, has been criticized (Alexopoulos et al., 2014; Sieber and Johnson, 2015).

Though this perspective accounts for the diversity of actors and their visions regarding the development of open data platforms, “ecosystem thinking” pertains to a holistic perspective focussing on the development of the entire system as the level of analysis. Accordingly, Danneels et al. (2017, p. 368) define the role of governance as “catering to ecosystem health [which] implies a focus on ecosystem productivity, robustness and meaningful diversity,” so that in its most efficient form the “open data ecosystem is an autonomous system that recreates itself.” This functionalistic thinking has three implications that we seek to overcome: first, the ecosystem metaphor produces a top-down understanding of open data initiatives reducing individual actors to their role and contribution for the entire system; second, the emphasis on system stability potentially mutes opposition and conflict within and outside the system; and third, the generalization of different types of actors does not account for different formations of open data initiatives dependent on local contexts.

Thinking Through Agency in Urban Governance

We expect to add more clarity to the development of open data initiatives and platforms by reconstructing the visions and strategies of single actors in their specific context. Our approach is inspired by the ASID model of urban governance (Moulaert et al., 2016), seeking out the complex interrelations between agency, structures, institutions and discourse, which are shifting and dependant on previous events in the social and political processes of urban governance. Informed by Jessop’s (2008) strategic-relational approach, structure is herein operationalized as “moments of natural and/or social realities that, in the short to medium-run and in a definite spatial context [...] cannot be changed by a given individual or collective agency,” while institutions are defined as “socialized structure,” that is a relatively enduring ensemble of structural constraints and opportunities” (Moulaert et al., 2016, p. 169). Hence, the “structural element” in this analysis contains regulations, but also those economic and social relations underlying urban governance which are not susceptible to immediate transformation. In addition, this may refer to codified strategies within interurban competition, functioning as a backdrop against which specific policies are developed (Martinelli et al., 2012).

Agency depends on how individual or collective actors make sense of their surroundings and their own role, hence on the position and understandings that define their imaginaries. In Moulaert et al.’s (2016) concept, agency is conceived of as a “meaningful human behavior, individual or collective, that makes a significant difference in the natural and/or social worlds” (p. 169). Actors hold some autonomy, and can be conceived of as “reflexive, capable of reformulating within limits of their

own identities and interest” (Jessop, 2008, p. 41). This implies that agency is not determined by structures only, but also by the preferences and interests of actors, in our case, specific expectations and varying conceptions of the benefits of open data. Accordingly, actors develop strategies to shift structures in the long-run serving their interests. This notion has been spelled out in different concepts of power in politics and urban governance, such as in Hay’s notion of context shaping, targeting “the capacity of actors to redefine the parameters of what is socially, politically and economically possible for others” (Hay, 1997, p. 50). More recently, work on “institutional entrepreneurs” and “institutional work” has highlighted the agency of different types of actors inside or outside the state institutions that seek to reshape their environments in order to open up space for new initiatives in their favor (Lawrence and Suddaby, 2006; Raven et al., 2019). In this regard, we think that highlighting the influence of contextual factors and how actors cope with these to pursue their conceptions will advance the understanding of urban open data initiatives.

Conceptualizing Agency in Open Data Initiatives

The complexity of governance and advocacy is increasingly acknowledged in recent research on open data ecosystems. Starting from the assessment that ecosystems “can also be seeded, modeled, developed, managed” (Harrison et al., 2012, p. 907), the debate has turned to recognizing the divergent interests within open data ecosystems and also the politics around them. Accordingly, open data initiatives are recognized as “inevitably structured by existing policy and practice contexts which must be managed and reconfigured over time to support new cultures of innovation and citizen interaction” (Harrison et al., 2012, p. 909). Therefore, Ruijter et al. (2020) argue that generic guidelines for open data development should not be implemented without contextual analysis.

Moreover, research accounts for a plurality of objectives related to open data, ranging from economic growth to purely democratic values (Jetzek et al., 2013; Baack, 2015; Reggi and Dawes, 2016). Gonzalez-Zapata and Heeks (2015, p. 443) present a typology discerning different perspectives on open data from both within and outside governments: a bureaucratic perspective highlighting issues of regulation and processes within governments, a technological perspective focusing on technical innovation for processing and displaying government data, a political perspective concentrating on free access to information for citizens, and an economic perspective putting at the center business interests and economic growth. Other objectives, such as service innovation and law enforcement are also figuring in policy documents and research literature (Huijboom and van den Broek, 2011).

For our analysis, conceptions of open data are clustered into three main categories: economic objectives, bureaucratic and technological objectives, and civic objectives that are directed toward increasing transparency, accountability, and participation (Table 1). Above all, researchers highlight the importance of balancing different objectives against the risk of “the primacy

TABLE 1 | Objectives of open data discussed in research literature.

	Economic objectives	Bureaucracy and technology		Civic objectives
Huijboom and van den Broek (2011)	Service and product innovation	Law enforcement		Democratic control and political participation
Jetzek et al. (2013)	Innovation mechanisms	Efficiency mechanisms		Transparency mechanisms and participation mechanisms
Gonzalez-Zapata and Heeks (2015)	Economic value through new products, services, revenue, profits, and jobs	Efficiency of public services	Improved government data infrastructure	Increased transparency, accountability, participation, and empowerment
Sieber and Johnson (2015)	Economic development through innovation	Efficiency in administration	Effectiveness in decision-making	Ethics of transparency, accountability and participation

Adopted from Slobodova (forthcoming).

of markets over social provision” (Bates, 2012, p. 7; Sieber and Johnson, 2015). Important for us, most of the ecosystem literature lacks clarity on how these conflicting objectives are being moderated and prioritized among different actors.

Taking into account the role of interlocked human and material agencies unfolding around open data policies (Kuk and Davies, 2011; also Kitchin, 2014), we also integrate technological and design aspects of the open data platforms. Accordingly, our analysis rests on three dimensions for understanding the development processes of open data initiatives and platforms:

- the urban governance context made up of the evolving institutional frames for both urban politics and open data. It functions as a selective structure, defining barriers, and windows of opportunity for agency;
- the agency of single actors that flows from their conceptions of open data, but also their general individual interests and their orientation toward shaping initiatives of urban data provision; and
- the open data initiatives and platforms, which are contingent on the agency and potential conflicts between different sets of actors, as well as on the structural constraints of the urban governance context. The initiative’s concrete form and design is, hence, just one of the possible configurations and represents a co-produced outcome of local processes and circumstances.

Our approach is dynamic, seeking to understand the relations between these three fields and their development over time. It advances current understandings of agency in open data ecosystems by considering context conditions and zooming into the social and political processes at stake. Fleshing out in greater detail the strategies of single actors and putting greater emphasis on the urban governance context, we shift the focus of analysis from the functions and needs of the ecosystem as such to the political dynamics between actors and their quest to shape open data initiatives.

RESEARCH METHODS

The cases of Lyon and Berlin were chosen for their long history of open data development, characterized by different turning points. Both cities were early movers in the field of open data platforms, drawing from a strong civil society in

the field of digital technologies and innovation. Both cities reveal a complex multi-level administrative structure, though differently shaped national regulatory contexts. However, as both cities are situated in the European Union, both are affected by European regulation; in particular, by the EU directive INSPIRE (Infrastructure for Spatial Information in European Community) on the publication of geospatial and environmental data.

Our overall approach for studying the open data dynamics is an inductive exploration in order to generate a deeper understanding of agency in open data ecosystems (Flyvbjerg, 2006). Our aim was to reconstruct the specific processes and their outcomes in a form of process tracing (Beach and Pedersen, 2013). This approach identifies turning points and main lines of development that are explained as the outcome of agency in a specific context. According to our research interest, we identified decisive moments in open data development and studied the main actors with their specific conceptions of open data and strategies against the backdrop of the local governance context. Considering accounts that highlight the assembled social and technical character of open data (Kuk and Davies, 2011; Kitchin, 2014), we also assessed the layout, structure and technical features of the final open data portals both as a technical artifact of these shifts and as a selective mediator for actors’ potential influence on urban governance.

Data were gathered through semi-structured interviews and content analysis of the platform, as well as through document research. Interviews were focused on those actors identified as shaping the goals of the open data initiative and platform and directly involved in their development. Therefore, no interviewees were recruited among platform users (that are also more difficult to identify). Instead, interviews were conducted with elected officials and decision-makers, platform developers and managers, as well as members of civil society associations working with the topic of open data (Table 2). Interviews were held during January and October 2019 in Lyon. In Berlin, initial interviews were conducted in early 2018 and updated in summer 2019. Interview questions were addressing the actors’ conceptions of open data and how they relate to the open data initiative, both in terms of their influence and potential divergence.

TABLE 2 | List of Interviews conducted (section Research Methods).

City	Organization	Number of interviews	Date	Interview code in the text
Lyon	GrandLyon, Smart City Unit	1	Mar 2019	L-SCU
	GrandLyon, Open Data Unit	2	Jan 2019 Mar 2019	L-OD1-2
	City of Lyon, Department of Territorial Development	1	May 2019	L-CL
	Tubà	1	Jan 2019	L-T
	Altercarto	2	May 2019 Oct 2019	L-AC1-2
	Berlin	Administration for Economy, Energy, Utilities (SenWEB)	3	Mar 2018 Sep 2019
Open Knowledge Lab		2	Dec 2017 Feb 2018	B-OKL1-2
Research Institution (anonymized)		1	Aug 2019	B-RI

Document analysis focused on core policy documents, such as strategy papers and practical guidelines, websites, reports and promotion materials edited by city departments, consultancies, and members of civil society. We also included press articles, legal acts and other administrative documents. This corpus consists of documents covering the publication and use of open data, as well as economic development and smart city strategies. Open data platforms were analyzed by their traceable evolution over time, structure, functional possibilities, available datasets, as well as data contributors and users. The information from these sources was ordered chronologically and according to the concerned actors. Interviews, as well as open data editorial entries were coded using the following main categories: structure (context, barriers, windows of opportunity), agency (strategies, projects), conceptions (visions of open data, objectives) and relationship toward other actors (references to the “ecosystem,” cooperation and rivalries). According to these aims, our empirical analysis on both cities is structured as follows: first, we provide short insights into the context conditions relevant for open data development, followed by the discussion of the dynamics that unfolded around open data. Then, we turn to open data conceptions of different actors. Finally, we analyse the open data platforms as an outcome of these developments.

BERLIN: FROM OPEN GOVERNMENT TO EFFECTIVE ADMINISTRATION

Setting Open Data as a Stepping Stone for Transparency

In Berlin, Germany’s capital and largest city with about 3.65 million inhabitants, the topic of open data came to the rise toward the end of the 2000s. The European Directive INSPIRE together with a set of other European and Federal German policies, plus a rising civil society movement for more government transparency, created traction around urban data policies.

Yet, the topic of open data was staged in alignment with Berlin’s specific features of that time. First of all, Berlin holds the legal status of a Federal State within the German political

system, granting the city legislative power in many fields, but also resulting in a multi-layered, and very complex administrative structure that was prone to cases of corruption in the 1990s, and rendering citizens’ interaction with the administration rather difficult (Krätke, 2004). Second, at that time the city was still grappling with the failure of post-reunification hopes for growing into an economically prosperous global city, centering its economic strategies on clusters of biosciences and the creative economy, and more recently focusing on the ICT economy (Krätke, 2004; Konstantynova and Lehmann, 2017). Later, Berlin’s Smart City Strategy was developed through a network of local businesses, utilities and administrations, though mainly with the aim of attracting European funding for experimental lighthouse projects (Becker, 2018). Beyond these more general trends, Berlin grew into a hub of the open software and open information scene, consisting of various local hacker spaces, in part dating back to the 1990s, and major institutions moving their German offices to the city, such as Wikimedia and the Open Knowledge Foundation.

The ambition to “open up” government data was first expressed as part of ambitions for administrative modernization by the Social-Democrat-Left coalition government that came to power in 2006 (see Friedt and Luckhardt, 2014, p. 271). The first official project working toward open data, however, was only initiated in late 2010, when the Administration for Economy, Technology, and Science (SenWTF) commissioned a study on the implementation of open data for Berlin’s administration. This study was carried out by Fraunhofer FOKUS—a large public research institution dedicated to developing technologies for open communication systems. In fact, this 9-month project laid important cornerstones for open data development in Berlin, condensed in a document called “Open Data Strategy” (SenWTF and Fraunhofer FOKUS, 2012). Based on previous research by the institution and interviews with relevant actors inside and outside the administration, it developed recommendations for organizational requirements, such as a central coordination and defined responsibilities for open data within the administration. The project also included the development of a prototype of the open data platform that was published and tested toward

TABLE 3 | Development of Open Data in Berlin (section Setting Open Data as a Stepping Stone for Transparency).

(Supra-)National Legislation	Urban context	Development of Open Data	Demonstration project (selection, with initiator)
2007: European Directive INSPIRE 2017: Federal Open Data Law (only relevant for federal bodies)	2006: Open Administration set on the agenda by new urban government 2011: Open Knowledge Foundation Germany founded in Berlin 2015: Smart City Strategy for Berlin 2016: eGovernment Law for the publication of government data	2010/11: Project Open Data Strategy (Fraunhofer FOKUS, issued by SenWTF) 2011: First Berlin Open Data Day (BODDy) 2012: Inter-administrative working group established 2014: Report "Digital Gold: Benefits and Value Creation by Open Data for Berlin" 2014: Formation of Open Knowledge Lab Berlin 2017: Project ODIS for supporting the publication of administration data 2019: Open Data Handbook	2011: First prototype platform online (SenWTF and Fraunhofer FOKUS) 2011: First app on Christmas markets (private, later Open Knowledge Lab) 2013: Official geo-data published under CC license (Statistics Administration) 2013: First open mapping tool on the results of the German General Election (by newspaper Berliner Morgenpost) 2015: Data on water quality in Berlin's swimming lakes (by Administration for Public Health) 2018: Berlin Crime Atlas (by Berlin Police Department)

the project's end, meaning that Berlin's first open data portal went online already in 2011. Moreover, the process leading to this conception included networking with other local actors, culminating in the first Berlin Open Data Day (BODDy) in May 2011.

Subsequently, the open data agenda was pursued by individuals and civil society organizations developing apps and demonstrators (Table 3), until Berlin's eGovernment Law was passed in 2016. The law states that Berlin's administrations are to publish data concerning their fields of responsibility on a central platform in machine-readable format (§13). Since then, efforts were made across the administration to implement this requirement, resulting in several supportive projects. After the eGovernment Law came into effect, there has been a surge in data sets uploaded on the platform. However, some uncertainty remained among the administration about which data to publish, epitomized in the Open Data Handbook recently issued in November 2019 (SenWEB, 2019). Lately, the topic of open data has been trickling through different institutions, resulting in the engagement of some branches and agencies in their own open data projects, such as the Berlin Police Department hosting a frequently updated "Crime Atlas" since late 2018. Further hopes for collaboration between the state and civil society are invested in the City Lab opened in mid-2019, a state-sponsored space for events and co-working, offering its professional staff and own funding scheme for projects.

Toward a Focus on Data for the Administration

Open data in Berlin was advanced by three interlinked dynamics involving various sets of actors: the creation of knowledge and legitimation through expertise reports and studies by such actors as the public research institution Fraunhofer FOKUS, the creation of demonstrator projects like "Crime Atlas," and the creation of organizational resources both in terms of personnel and legal basis. Each of these dynamics involves different actors with different motivations, skills, and resources, coproducing the development of open data in Berlin.

First, there is a set of individuals within several branches of the administration, such as SenWEB and the Office for Statistics. It is an amorphous group consisting of technical experts, i.e., in the field of statistics and geo-information, and agents from across the administrations with personal interest in or the responsibility for pushing the field of open data in their branch. Exchange is organized in an informal working group on open data across different administrations, formed in 2012 in the framework of the Open Data Strategy (B-SW2). They work in the direction of exchanging practices and knowledge on open data, as far as drafting legal texts to be included in the policy processes concerning Berlin's eGovernment Law and the subsequent guidelines in its implementation (B-SW2). The strategic lead on the topic was shared between the Administration for Economy, Technology, and Science (and its successor departments, where the Officer for Open Data, a part-time responsibility is located) and the First Mayor's Office. Accordingly, the orientation moved away from early days' interest in technology and information, toward ensuring administrative efficiency and economic potential through open data: "If there is a solution, then I am mainly interested when it refers to the administration or a potential economic value-added. Value-added for society is nice, but it is not my playground. We are pushing the agenda of open data, not open government" (B-SW3). Beyond internal lobbying and expert work, the administration is of key importance for the field as they devise resources for projects to research institutions and consultancies and organize events in collaboration with civil society actors.

The second group of actors is made up of research institutions. Vested in the field for their expert reputation, they are issuing written reports, as well as implementing projects, thereby shaping the political debate around open data. In the early development phase, the main actor was the Fraunhofer FOKUS research center. Then, the interest in open data turned from defining technical options to issues of economic potential, and the Berlin Technology Foundation came to the fore, issuing different studies on open data, among them a report framing open data as "Digital Gold" (Berlin Technology Foundation, 2014). In 2017,

the Foundation gained a large project (ODIS) to support the implementation of open data across all the branches of the administration according to the eGovernment Law. This project provides a knowledge database as well as organizational and personnel resources to provide advice for administrations to implement open data.

The third group includes civil society organizations and think tanks with a focus on lobbying, as well spaces for hacking and coding, where activists work on the practical development of open data applications and projects. In the case of the Open Knowledge Lab and Foundation both functions are paired under the same umbrella. Whereas, the Foundation is focused on influencing policy and distributing technical solutions for open data, mainly through informal networks and events, the Lab founded in early 2014 is a space for experiments, projects, and software development. Obviously, their activity very much is motivated by civic conceptions of open data. The apps and programs developed by the Lab are based on the data published by the city—i.e., informing on construction projects, Christmas markets, public transport data, providing information for refugees, or listing the most popular given names—serving as demonstrators for “open knowledge, open data, transparency, and civil participation” according to their webpage. OKL members were issuing applications on specific topics before the official authorities, as in the case of several apps on water quality in the city’s lakes. Beyond displaying data, members also work on programs that “scrape” information from datasets that have not yet been treated to satisfy open data standards. Before the opening of the City Lab as an institutionalized forum between the administration and civil society, connections with the administration were established on a personal level. As one interviewee described, “we show you what we can do with your data; we will show the advantages, and we will work for free with your data” (B-OK1). Such collaborations did result in access to datasets hitherto hidden, but also produced personal networks while relying on the goodwill of administration officials on different levels.

Fourthly, in terms of economic actors, there appears a split between start-up businesses, often portrayed as the addressee of open data policies, and the major utilities, as data providers who are reluctantly sharing parts of their operational data. The position of start-ups in this field is weak in different ways: small businesses presumably do not have the capacity for lobbying and political work beyond their own interest, they have little resources to offer services for free, and they are affected by a shift in the administration strategy regarding open data (B-RI). As expressed by a consultant, the city has “undergone a learning process in recent years. In the beginning, the open data strategy was stating: the administration is to publish the data, and then many different start-ups do innovation on its basis. This has only worked in a limited way. We had some five start-ups doing this and sitting in all the public events, but nothing beyond that. Therefore, the focus now is the administration [itself], their digital competency, their digital sovereignty. That means the main beneficiary of open data will be the administration itself [...], it is making their day-to-day business much easier, just think of reports and requests from Parliament” (B-RI). However, regarding the fields

of real estate and mobility, interviewees noted the emergence of more entrepreneurial dynamics involving data published by the city and utilities.

These dynamics indicate that the administration plays a central role in shaping the development of open data, both in terms of the objectives and the implementation of open data in Berlin. This may be due to their ability to produce large amounts of data, but equally so, to their capacity to distribute resources for projects. While the collaborative activities between the administration and civil society still exist, prominently the Berlin Open Data Day, the recent focus on open data for a more efficient administration implies turn in the dynamics. The focal point has shifted, and competition for projects and funding increased as this quote of an administration official shows: “It is less peaceful [Friede, Freude, Eierkuchen—Engl.: peace, happiness and pancakes] recently, one has to say. In the end it is also about getting a piece of the cake, not just for the just cause” (B-SW3).

A Growing Stock of Data: Berlin’s Open Data Platform

The central role of the administration and the existing links with civil society and research actors are mirrored in Berlin’s open data webpage *daten.berlin.de*, which is subcontracted to an external provider. As of September 2019, more than 1,700 data sets (most of them of public origin) are accessible on Berlin’s Data Portal, covering such diverse topics as kindergarten placements, a catalog of destroyed premises after World War II and recent figures on public finance, under standard licenses guaranteeing completely open access and use (SenWEB, 2019). The backend of the portal is organized with the software CKAN that was initially developed by the Open Knowledge Foundation and today is used globally for the publication and arrangement of data.

With more and more administrative branches publishing their data, the webpage provides a growing, albeit sometimes confusing system. Currently, the supportive project ODIS is helping different branches of the administration in feeding their data into the platform. Data sets are published by branches of the administration on different levels (boroughs and city), as well as by some of the utilities. Interestingly, the site also depicts “applications” providing treated data (Figure 1), for example in form of maps detailing issues of public interest, many of which were developed within the Open Knowledge Lab. Applications can be uploaded by everyone, though there will be a check by platform managers before publication. The resulting platform reads like a somewhat wild collection of data consisting of both data from government pools and applications developed by individuals or in civil society projects—an appearance that has come out of Berlin’s specific developments around open data.

Datasets are ordered by their date of publication, and a search engine based on meta-data such as keywords and topics (e.g., “transport and traffic”) is to help navigating the amount of data; beyond there are no tools making the page more accessible for non-experts, but a feedback forum indicates that some of the visits can be traced back to Open Knowledge Lab members seeking to improve datasets and webpage functions.

The screenshot shows the Berlin Open Data Portal with a navigation bar at the top containing: Startseite, Datensätze, Dokumente, **Anwendungen**, Datenbereitsteller, and Interaktion. The 'Anwendungen' section is highlighted in blue. Below the navigation bar, there is a home icon and a sidebar with 'Anwendungen' and 'Anwendung hinzufügen'. The main content area is titled 'Anwendungen und Mashups' and features three featured applications:

- Großstadtbäume in Berlin**: A photo of trees with text describing a data application by Thomas Tursics that explores Berlin's tree inventory.
- Kriminalitätsatlas App**: A screenshot of a crime map application with text explaining its use for visualizing crime trends in Berlin.
- Weihnachtsmärkte beim rbb**: A map of Berlin with red dots representing Christmas markets, with text describing a small application built by rbb.

On the right side, there are two vertical panels:

- Die neusten Datensätze**: A list of recent datasets including winter sports, university courses, VBB train schedules, e-mobility charging stations, and public toilets.
- Die neusten Dokumente**: A list of recent documents including participation data, senate proposals, a framework contract for an electronic city information system, camera monthly data, and coalition agreements.

FIGURE 1 | A Screenshot of Berlin's Open Data Portal depicting apps on trees, crime and Christmas markets in Berlin.

According to the published statistics on the webpage, the data portal registered between 6,000 and 17,000 visits per month. However, there is no data available on the background of users, while impressions from the webpage underline an expert audience and its general usage as demonstrator for data and possible use cases.

LYON: TWO OPEN DATA PLATFORMS FOR ECONOMIC AND CIVIC OBJECTIVES

Governance Restructuring and Two Open Data Platforms

The Lyon urban zone is the second largest agglomeration in France. Its economy is mainly based on ICT, life sciences and heavy industries. Administratively, *Métropole GrandLyon* is comprised of 59 communities, including the *City of Lyon* with a population of 516,000 and surrounding communities with a population of 870,000 in 2017 (INSEE, 2020). For understanding urban governance in Lyon, it is important to consider different processes of rescaling the institutional context in the past years. In 2015, the previous *urban community of*

GrandLyon (an administrative entity comprising the City of Lyon and a number of the surrounding municipalities) was merged with a part of the *Rhône County Council* administration, eventually forming *Métropole GrandLyon* (interchangeably called *Lyon Métropole*). The name "GrandLyon" and its territorial perimeter did not change, but its administrative status did, as GrandLyon took over the responsibilities of the County within the territory of GrandLyon. An official press statement motivates this merger by "strengthening the effectiveness of local administration [... and Lyon's] role on the international scene." While continuing longer-standing policies on urban competitiveness (Le Galès, 1995), underlying reasons for this fusion were the desire to overcome a political left-wing/right-wing split between the metropolitan area and the County Council. Supported by the centrist president of the latter, this consensus helped to avoid tipping the Council majority toward the left. Additional motives for the County were financial, such as the prospect of decreasing its overall debt and ceding the significant costs associated with the Confluence Museum in Lyon's "smart district" (Subra, 2016). With the creation of Lyon Métropole, the City of Lyon along with the other member

TABLE 4 | Development of Open Data in Lyon (section Metropolitan Hub for Economic Innovation: Data GrandLyon).

(Supra-)National Legislation	Urban context	Development of Open Data		Demonstration project (selection, with initiator)
		Métropole GrandLyon	City of Lyon	
2007: European Directive INSPIRE 2011: Creation of the interministerial department working on open data, Etalab 2016: French Digital Republic Act	2010: Foundation of Altercarto 2010: Discussions on the formation of GrandLyon Metropolitan Region started 2012: Official announcement of the creation of Lyon Métropole 2012: First smart city project in Confluence neighborhood 2015: Lyon Métropole created	2011: GrandLyon started hiring employees to address the challenge of open data 2013: Tubà Lab opened (officially inaugurated the following year) 2013: GrandLyon Smart Data - open data platform 1.0 2014: Association Lyon Urban Data registered 2015: Position of Chief Data Officer created 2015: Data GrandLyon - open data platform 2.0 2016: Position Data Platform Product Manager created 2019: Data GrandLyon - open data platform 3.0 in beta version	2009: Foundation of the VLKO observatory 2013: Launch of the VLKO data platform 2014: City of Lyon becomes member of Altercarto 2014: Start of discussions of integrating VLKO into Data GrandLyon 2018: Position of open Data Programme Manager recruited for the City of Lyon	2014: ForCity start-up developing models for city optimization is created (incubated in Tubà) 2015: Launch of the new version of Onlymoov', a trajectory calculation platform, incorporating real-time and predictive traffic information (by Smart City Unit) 2019: Launch of Toodego platform with practical information on the city services (by Smart City Unit)

communities found itself in a different power relationship facing a stronger counterpart administrative body on a higher level of administration (L-CL).

Owing to this administrative restructuring, the topic of open data in Lyon has unfolded on two different levels (Table 4). The most visible development revolves around the collaboration between state and business actors on the level of the newly established Métropole GrandLyon. Since 2012, its development strategy features a prominent smart city program, which provides a policy framing for the development of open data. Administratively, both the Smart City Unit and the Unit for Data Dissemination and Geo-Services (further referred to as Data Unit) are attached to the Delegation for Economy, Employment and Knowledge of GrandLyon (L-SM, L-OD2). The metropolitan open data platform is linked to GrandLyon's strategies for becoming a smart city and for its overall economic development, pursuing an agenda of digital innovation. A second, less prominent process involves the City of Lyon and civil society organizations. It aims at empowering neighborhood citizen councils, associations, and departments of the local administration, by providing information on social issues and public health through open data and open-source software. On both levels, the pace of building up professional resources and political support were crucial factors in their development. Therefore in Lyon, there are two separate open data platforms with different underlying visions and target audience.

Metropolitan Hub for Economic Innovation: Data GrandLyon

Building Resources and Collaborations

On the level of GrandLyon Métropole, open data became an important topic at the impulse of the European directive INSPIRE and subsequent national policies, including an interministerial department for open data "Etalab" created in 2011

(L-T). In 2016, the Digital Republic Act required French municipalities of more than 3,500 inhabitants to publish public data that "present economic, social, health, or environmental interest." The open data platform "GrandLyon Smart Data" was already launched in 2013 to publish local government data. Interestingly, these activities were initiated before the administrative merger was complete, as the formation of the new administrative structure was opening opportunities to establish open data as a new topic (see Table 4).

The platform has substantially changed since then, reflecting an adaptation strategy. After the data was first published, the management observed that "the ecosystem of either entrepreneurs or corporations was not so much taking hold of these data to create services" (L-T). In 2014, the association "Lyon Urban Data" was established to address this issue. This public-private partnership consists of 45 partners, including GrandLyon, infrastructure corporations, such as public transport operator Keolis, electricity provider EDF, telecom operator SFR, as well as local business clusters, start-ups and the University of Lyon (Tubà, 2019). The main objective of this cooperation is twofold: to enrich governmental data with the data collected by private infrastructure operators and, on this basis, to co-create new services for citizens through innovative business models (L-T). Supporting this network approach, the association founded the living lab "Tubà" as an arms-length agency for fostering economic collaboration: "Sometimes, large corporations working with us, ask: 'Do you have an excel file of start-ups?' - Well no, it doesn't work like this. We create this alchemy, [...] the idea is that we can create a synergy and animate it" (L-T). The association Lyon Urban Data and its physical space Tubà are acting as intermediaries in the ecosystem of local economic actors, specifically supporting start-ups in the field of smart city (L-T). One of the most featured showcases of Tubà was ForCity, a start-up developing 3D-modeling software for urban development scenarios. In total, Tubà has contacts with

150 start-ups and 15 of them have been accommodated in its incubator (Tubà, 2019).

This demonstrates how the shifts in urban governance created ground for new organizational structures to arise, improving the administration's leverage in negotiating public-private partnerships, and enabling it to build up personnel, both internally and subcontracted, with skills and expertise outside classical bureaucratic training, namely in business, technology, and ICT (L-OD1, L-T). Thus, Lyon was the first French city to recruit a Chief Data Officer in 2015 (Januel, 2018), and the same year, the GrandLyon Smart Data platform was remodeled under the name Data GrandLyon, since then publishing data from both public and private actors involved in the collaboration mentioned above. Further on, in 2016, GrandLyon hired a Data Platform Product Manager, responsible for web development. He was one of the actors behind the third version of the platform, based on a more flexible code that enables to continuously add new functions, enhancing the platform's interaction features (L-OD2).

Priority on Open Data for Innovation

Of the four main groups of actors involved in open data in Lyon—(a) public officials and employees from different departments of GrandLyon, (b) their counterparts from the City of Lyon and other member communes, (c) businesses from large infrastructure firms to start-ups, and (d) civil society groups including think-tanks, citizen associations, and neighborhood citizen councils—most prominent open data projects are driven by the Data Unit of the metropolitan administration in cooperation with different private stakeholders, resulting in foregrounding economic motives around open data. The alignment of open data development with smart city and digital economy strategies (Grand Lyon SmartData, 2013, para. 4) concurs with the objectives expressed by the Data Unit: “Attached to the Delegation of Economy, Employment, and Knowledge Development [...] there is return on investment, ROI that is required. [...] The goal is value creation on the territory, creation of jobs and a real benefit for the users, and of course [...] without fiscal return, we cannot feed this virtuous circle” (L-OD1). An interviewee from civil society explained the lower weight of civic transparency in the metropolitan open data program by “the fact that it is [just] neither their priority nor a politically supported initiative; rather than an intentional will not to treat these data. However, certain departments of Lyon Métropole do not want to share their data on the Active Solidarity Income [minimum income for people with limited resources] and on other social issues” (L-AC2). For this reason, civil society actors report not being able to make use of Data GrandLyon, instead resorting to other sources (L-AC1).

Data Platform for Economic Value and Public Services

The platform Data GrandLyon mirrors the economic orientation of the actors behind it, but even more, the collaboration between the administration and infrastructure providers (see **Table 4**). The three versions of the platform, described above, reflect three underlying processes. First, the consolidation of resources enabled by the administrative reorganization in 2015. Second,

while the first steps targeted the publication of “low hanging fruit” datasets, further adjustments aimed at widening the pool of data contributors, especially from the members of the Lyon Urban Data network. As of April 2020, there are 27 public and private data providers listed on the platform with, however, only two civil society associations, involved in environmental issues. Third, the demand for more interactivity was recognized for users to engage with the data. In the current version, the underlying open-source code enables to add new functions over time, permitting to introduce more interactive tools, and, potentially, more communication with the platform managers and between the users (L-OD2). In fact, the latest version of the platform launched in April 2019 was in a beta-testing phase until May 2020, which permitted user feedback and the incorporation of new features.

Today, the platform features 773 datasets that range from 3D-maps and a 1-h traffic forecast to rainfall measurements and street markets, searchable by meta-data and filtered by types, themes, and dates. From the beginning, the platform offered data under three different licenses. The Open License, created by Etalab and compatible with most standard open licenses, covers 94% of Data GrandLyon datasets. For sharing the rest of the data, until recently, Lyon Métropole was using its own legal framework under the so called “engaged license” and “associated license.” The first required user authentication and a declaration of the objectives of data use, while the second required all of the above and a fee, depending on the user's market share. But the Chief Data Officer claimed that by November 2018 no use case fell under the conditions requiring a fee (Ouvre-boîte, 2020). However, this licensing framework came into contradiction with laws subsequently passed both on the national level in 2016 and the European level in 2017. Thus, GrandLyon substituted these two licenses by the “license for reuse of data of general interest” that requires authentication and declaration of data use objectives, but no fee (Extrait du Régistre des Délibérations du Conseil, 2019). It is mostly applied to real time traffic data, which is seen to have a higher economic value, as well as the potential to be used against public interests (L-OD2, L-OD1). Here, despite openness of the data, its ownership is an important issue: “Google and Facebook have created their wealth on data. Therefore, we want to safeguard the data to prevent massive data capture by large corporations. [...] We will have a case-by-case approach. If we can support economic growth, we will be more flexible” (Vice-President of GrandLyon as cited in Blanc, 2014; also see Courmont, 2018).

The website mainly targets an expert public. A “Documentation” page briefly explains the technical principles of the platform and provides a link to a GitHub-powered page, where Data GrandLyon provides documentation for developers. Apart from a general explainer video, there are no tutorials for users less technically skilled, although the platform management has considered creating a forum for questions (L-OD2). There is no possibility to submit datasets for publication directly on the website, but a new page “Contribution” has been recently added encouraging those who would like to contribute their data to follow a conventional “Contact us” form, which is still the only interaction channel apart from an email address and an opinion

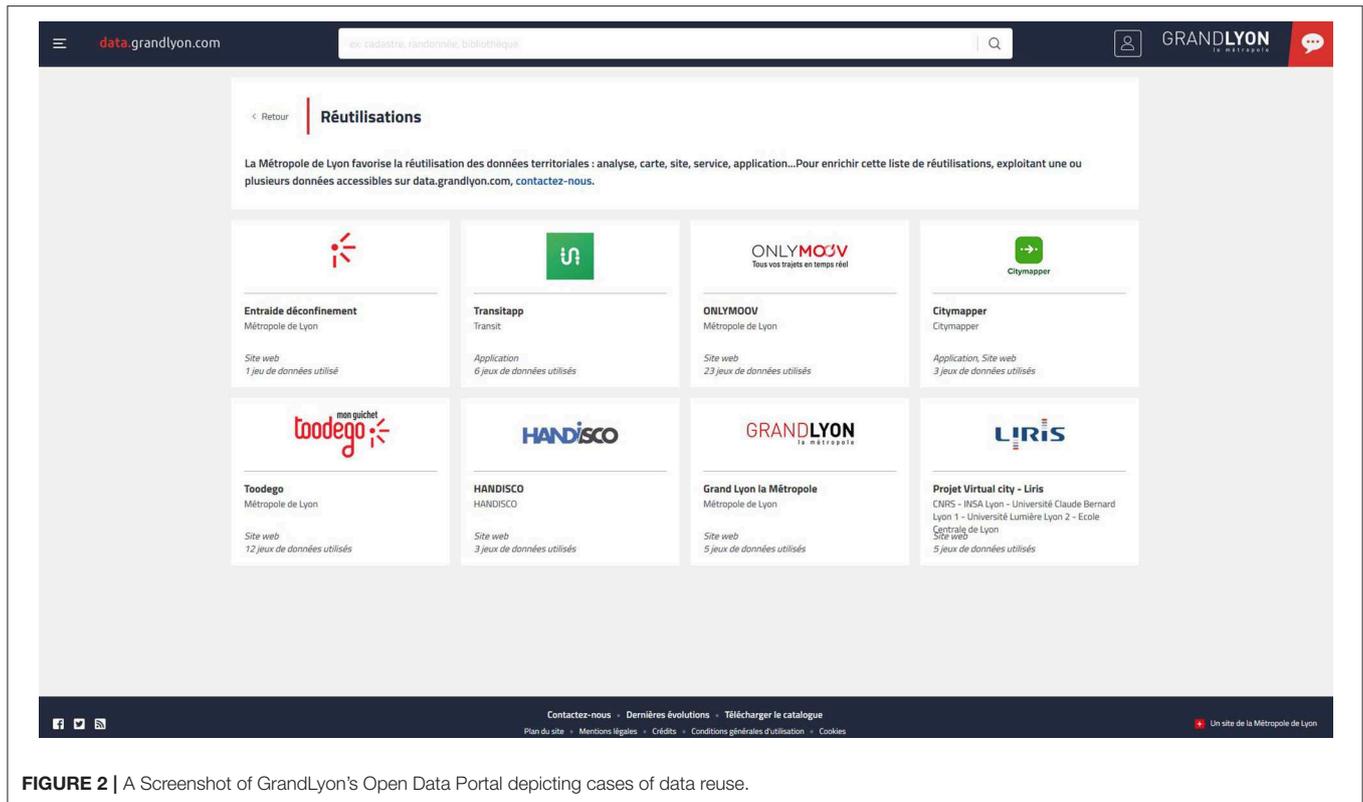


FIGURE 2 | A Screenshot of GrandLyon's Open Data Portal depicting cases of data reuse.

poll that is deliberately left on the website after the beta version, according to the corresponding news entry. Recently, a new page “Reuse” was added, containing applications that were developed on the basis of data provided by the platform (Figure 2). This depicts eight projects with the datasets they use, among which four are operated by GrandLyon itself, like Toodego helping to find various urban services (libraries, waste facilities, mutual aid during the COVID-19 pandemic, etc.), three by private companies, for example, Handisco producing intelligent sticks for visually impaired citizens helping them to navigate using local data, and one by a university consortium developing a 3D city simulation. Until now, no projects by journalists, citizen associations or other third parties were published in this category.

VLKO: A Civic-Administrative Coproduction Collaboration With Limits

On the level of the City of Lyon, the Department of Territorial Development (DDT) launched its data observatory “VLKO” already in 2009, publishing data and software on various pages of the DDT website, as well as sharing requested files by email before the current website was set up in 2013 (L-CL). VLKO, standing for Cartography Observatory of the City of Lyon, was formed as an R&D collaboration between the DDT and two think tanks—consultancy Cité Publique, and later its sister association Altercarto—providing expertise in cartography, territorial data analysis, and participatory methodology. In addition to data, the

platform offers interactive cartography tools developed under an open source license. In fact, the platform’s management was not using the term “open data” before 2012, when the expression was brought forward by national regulation: “It was rather a response to user demand [both from the City departments and civil society], but in the end, open data was created” (L-CL).

The VLKO platform has received less political support, financial and personnel resources than Data GrandLyon, and its platform is more volatile to the support of individual politicians. It was created at the initiative of a city official to gain higher priority of housing policy, by analyzing and mapping data with input from citizens. Since then, the VLKO team had been frequently working with civil society actors, such as neighborhood citizen councils (participatory bodies advising the city hall) and citizen associations to support their discussions with statistical data, analytical software, and participatory methodology. However, the cooperation between VLKO and citizens has recently been limited by the skepticism of current officials in power about the role of neighborhood representatives growing too strong: “There is an implicit limit that should not be crossed. The Principle Elected Official has made it quite clear that he represents the citizens” (L-CL). At the same time, the “Health Observatory” working group, supported by the Deputy Mayor in charge of public health, is actively using both VLKO cartography tools and its participation methods, publishing health related data and analysis on the platform (L-CL).

The technical development of the platform was slowed down by the lack of full-time personnel dedicated to open data at the

City of Lyon, as the position of Open Data Project Manager was created in 2018, but soon after assuming the post, the person retired and has not been replaced yet (L-CL). This is one of the reasons, for which VLKO is operating under an R&D contract with external partners.

The administrative restructuring of GrandLyon also impacted the development of VLKO. Back in 2014, GrandLyon and the City of Lyon started exploring possibilities for incorporating VLKO into the Data GrandLyon platform, serving as a special tool for accessing and visualizing demographic and socio-economic data. However, soon after the formation of Métropole GrandLyon, these discussions were paused for the lack of time, due to an overflow of tasks related to the reorganization, and were never resumed as a result of a political power struggle between the two territorial entities. Another window of opportunity closed with the termination of an administrative unit for acquiring European project funding; this unit was shared between the City of Lyon and Lyon Métropole. Its closure resulted in a vacuum of communication channels for the topic of open data, limiting the possibilities for collaboration, even though VLKO management claims to have continuously pushed the agenda of platform integration. Today, the communication between the two administrations on the topic of open data only occurs through the Smart City Unit of GrandLyon and the events they organize. Thus, VLKO still exists as a parallel open data platform (L-CL).

A Civic Conception of Open Data

Owing to its collaboration with civil society organizations, VLKO largely shares the latter's conceptions of open data. The VLKO website is dedicated to opening data on social issues such as pollution and health, employment and education, housing and social benefits, children and elderly people. In addition to data, the platform offers online cartography tools developed by Cité Publique in open domain enabling visualization of different local and national datasets with geographical distribution by such socio-demographical characteristics as age, level of education, professional occupation, household size, vehicle ownership and even library subscription. Apart from the data produced by the City of Lyon, some datasets come from open public sources like the national statistics bureau INSEE, others from public organizations, obtained through mutual cooperation or data requests. Analysis reports and data visualizations created during past participatory projects on specific neighborhoods or subjects like "Senior citizens and digital technologies" or "Facilitating access to healthcare" can also be found here.

According to the VLKO platform, it claims to complement the top-down approach of Lyon Métropole choosing which data to publish, with its bottom-up or demand-driven approach. As stated on the Altercarto website, there is a need for such intermediation: "Between, on the one hand, the prospect of new markets, and, on the other hand, the investment of minimal resources toward using data in the service of democracy and collective intelligence, it is the market that has been favored in Europe and France [...] However, like most users in civil society pursuing the objective of citizens to use public data, Altercarto had to engage in [data] accessibility."

A distinctive feature of VLKO is its participatory approach toward using datasets on relevant societal issues like public health and environment. The citizen workshops they are running start with identifying questions that are of most interest to the participants. Then, the relevant datasets are selected (or found in external sources if they are not yet present on the platform), combined and visualized with the help of VLKO's cartography open-source software to support an informed discussion (L-CL). Thus, open data are not regarded as the end goal, but rather as a side-product of the VLKO initiative, as will become apparent in the next section looking at the platform interface and content.

Civic Data for an Expert Audience

Datasets published on the VLKO platform are not exhaustive and tightly up-to-date, but they are collected and published as "support tools to strengthen the deliberation capacities, both within the municipal organization, as well as with the non-profit partners of the City and with the inhabitants," according to the platform. In this logic, the online platform itself is more oriented toward professional (or activist) users than "ordinary" citizens, owing to the fact that the demand for data comes from within the municipality or from citizen workshops, which are conducted by experts who know how to use it (Figure 3). The platform is not referenced on the central website of the City of Lyon, but promoted on the website of the DDT, rendering it more difficult to find for those not involved as workshop participants. The VLKO platform managers recognize the limited usability of the website, but besides developing a Twitter account, a Youtube blog and a few tutorial videos, the redevelopment of the website has presented a task too complex to be undertaken in face of human resource shortages. As a possible solution the VLKO platform management was considering a reciprocity-based cooperation with the municipal library that has a successful communication strategy (L-CL). Recently, VLKO has had a few navigation improvements and opened an editorial blog.

DISCUSSION AND CONCLUSION

Agency and Governance of Open Data

Inspired by the ACID model on urban governance (Moulaert et al., 2016), our analysis seeks to advance the debate on open data ecosystems in two ways: first, by fleshing out in greater detail the strategies of single actors in establishing open data initiatives and their potentially conflicting visions of open data; and second, by putting greater emphasis on urban governance contexts defining barriers and opportunities for actors to contribute to the development of open data initiatives. Accordingly, our approach interpreted the development of open data initiatives in Lyon and Berlin through three interrelated dimensions: urban governance contexts, agency based on different conceptions of open data, as well as the content and functions of open data platforms as an outcome of these processes.

Our findings show that the development of open data initiatives is contingent on both urban development strategies and administrative structures. First, both in Lyon and Berlin, the open data agenda is linked to longer standing policies of fostering innovation and competitiveness in global markets.

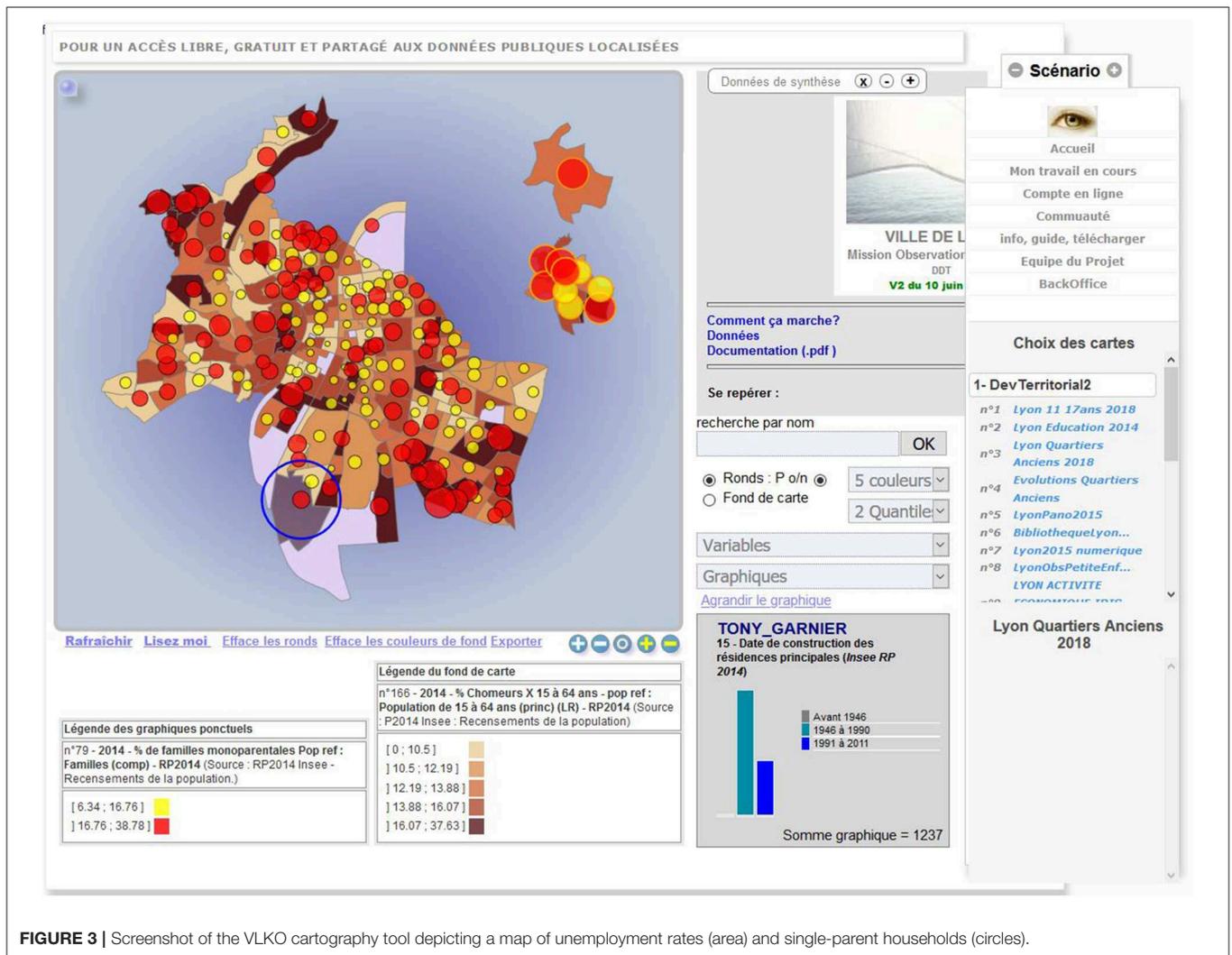


FIGURE 3 | Screenshot of the VLKO cartography tool depicting a map of unemployment rates (area) and single-parent households (circles).

Recent smart city strategies provided an entry point for open data initiators to create traction around the issue (Viitanen and Kingston, 2014). The development open data was mediated by the manner how the topic was located within existing administrative structures and the field of actors. The task of developing open data was assigned to administrative branches responsible for economic development, paving the way for specific objectives of open data, namely those of reducing bureaucratic costs, creating monetary value and fostering economic growth. In Berlin, experience with corruption and an overly complex administrative structure motivated claims for higher transparency and improved accessibility of the administration. Second, in the case of Lyon, the centralization of the administration for metropolitan competitiveness prompted new dynamics directing resources into new networks and demonstrator projects on the metropolitan scale. This resulted in the duplication of open data structures and in the marginalization of attempts to use data for social policy. Finally, the shifts in administrative structures resulted in new selective barriers, as

well as windows of opportunity, upon which actors devised their strategies.

Against this background, the impact of different actors in shaping the development of open data initiatives was uneven. First, even though our interviewees expressed a wide range of perceptions and objectives, including innovation and economic aims, an efficient administration and civic values for transparency or social policy, open data in both cities was mainly framed as data published by governments or relating to urban services. It became clear that, specifically, a coupling of goals of effective administration and economic development gained more salience than those revolving around transparency and empowerment (for an overview see Table 5). Particularly, while less powerful organizations, such as start-ups and civil society actors, were integrated for improving technical issues around data quality and for enabling economic innovation and new services, original issues of transparency and empowerment were side-lined. Hence, bureaucratic and economic perspectives trumped civic objectives (Gonzalez-Zapata and Heeks, 2015).

TABLE 5 | Main actors, their strategies and conception of open data in Berlin and Lyon.

Actors	Conception of Open Data	Strategies and engagement in projects
Administration for Economy (SenWTF, SenWEB)	Administrative efficiency and economic development	Issuing projects and demonstrators; managing working groups
Other parts of administration	Administrative efficiency, partly improved service provision	Providing data, working on technical features for data publication
Berlin Technology Foundation	Economic development and Administrative efficiency	Framing open data for policy discourse, nurturing contacts with key administration officials
Open Knowledge Lab	Civic transparency and citizen empowerment	Gathering data, lobbying the administration, providing software
GrandLyon Unit for Data Dissemination and Geo-services	Administrative efficiency and economic development	Developing Data GrandLyon platform, supporting data contributors in producing standardized datasets
Lyon Urban Data network and Tubà	Economic development and new services for citizen	Nurturing cooperation between established and young economic actors, supporting start-ups, advising them on available datasets
Other administration departments (Smart City Unit, Delegation for Economy, Employment and Knowledge)	Economic development	Cooperating with other actors in projects and demonstrators
City of Lyon Department of Territorial Development	Administrative efficiency and civic transparency	Managing VLKO platform and surrounding projects (e.g. Health Observatory), acting as a point of contact for neighborhood councils and associations
Altercarto and Cité Publique	Civic transparency	Working on VLKO platform as subcontractors, gathering data, producing open source mapping software, animating citizen workshops and neighborhood citizen councils

This can be traced back to the defining role of administrations as “keystone” actors in these developments (Harrison et al., 2012, p. 922). Administrations do not only provide data, they also define the rules and aims for open data development, and importantly, they distribute financial and other resources, i.e., through hiring personnel or devising projects for the implementation of open data and building the necessary know-how. The creation of new structural forms by administrations—organizing events, framing the direction of research studies, and creating new organizations and physical spaces—made them gatekeepers for potential participants in the ecosystems. In both cities, these dynamics resulted in specific actor groups getting involved in the development of open data, those best adapted to the focus of the entire ecosystem: administrative efficiency in Berlin and economic development in Lyon.

The open data platforms in both cities can be read as a reflection of these developments. We found strong relationships between actors defining the platform objectives and those issuing data, but less to those targeted to use data resources. Data were generally published by the government and infrastructure corporations, but rarely third parties. The portals in both cities were complemented with a few applications developed by civil society groups, businesses, or the administration itself. In Lyon, this was the result of a formalized cooperation in a networked association; in Berlin collaboration between potential data providers remained more informal. More so, even though users were not the focus of our study, the navigation of the data platforms, and the lack of introductory tools therein, indicate advantages for expert and professional users. However, data can create visibility for social issues as figured in the VLKO platform, illuminating a broader potential of open data. First, open data platforms make an increasing number of datasets accessible to the public, partially based on open software running in the backend of urban portals. Second, data portals may provide information

to disadvantaged groups, for example the places for registration and consultancy of refugees in Berlin. The objectives of open data remain contested, but the existence of the data platforms may provide information potentially enabling agency to transform urban governance.

Moving Beyond the Ecosystem Metaphor

How do these reflections relate to understanding the development of open data initiatives from an ecosystem perspective? Some of our findings confirm aspects theorized under the ecosystem metaphor. We found a diversity of actors with varying skills and conceptions of open data, cooperating sometimes on a formalized basis, but often relying on informal ties. Our analysis confirmed the importance of “key-stone actors,” a role taken by public administrations, but also the importance of intermediaries translating information and facilitating cooperation across different groups of actors (Harrison et al., 2012; Gonzalez-Zapata and Heeks, 2015; Sieber and Johnson, 2015). The observation that the importance of actors varies during different phases of the development process supports the notion of thin boundaries and loose long-term binding forces within such a system of actors (Moore, 1993). However, our analysis based on context and agency indicates that the development of an open data ecosystem strongly depends on the structural background against which it unfolds. Therefore, caution should be in place regarding some assumptions carried with the ecosystem metaphor.

First, the notion of an open data ecosystem thriving toward resilience and stability may obscure conflicts and frictions within the ecosystem, regarding different conceptions of open data, in our cases running along the fault-lines of economic development and administrative efficiency vs. civic aspirations to transparency and empowerment. The way how actors adopt

dominant conceptions conveys their position and impacts their influence in the overall process.

Second, even though research under the ecosystem metaphor stresses different skills and resources, we find it crucial to highlight that actors within one ecosystem should not be assumed equal regarding their importance to the system. While technical expertise may be an asset for civil society groups in the early stages of open data roll-out, their influence seems to decline once the sector professionalizes. Our analysis shows that the role of local administrations as “keystone” actors must not be underestimated, as they define both the main objectives of open data and the processes of its roll-out.

Third, this leads to questioning the expected neutrality and benevolence of central actors steering ecosystems. Following our evidence, ecosystem governance and the role of keystone actors should not be assumed as directed toward cultivating a resilient or sustainable ecosystem per se. Rather, specific conceptions of open data defined by the main actors are nurtured; in our cases those of the economic branches of administration. This process might act as a selective filter for datasets to get uploaded, which, especially in Lyon, resulted in side-lining data addressing civic and social issues on the metropolitan platform. Local governments pushing their agenda too narrowly might leave civic actors unwilling to consider themselves part of an ecosystem that, in their view, is not likely to pursue civic conceptions of open data. More than that, local governments distribute physical, financial and personnel resources into projects to create thrust corresponding with their agenda for developing open data.

Our analysis underlines that grasping the governance contexts, the resource distribution, as well as the strategies of the most powerful actors is a stronger predictor for the development of open data initiatives than the assumption of a benevolent and self-regulating evolution of open data ecosystems. Instead, a focus on actor strategies and how they may effectively reshape governance structures appears a better tool to grasp collaboration, competition and conflict in developing urban data initiatives. This implies to be cautious toward a top-down understanding of open data developments, and calls for further research into cases with a potentially higher impact of civil society organizations.

For practitioners, our study underlines the importance of accounting not only for the complementarity of actors pursuing open data initiatives, but also for their conceptions, that could be potentially conflicting and, therefore, for the power relations

in the ecosystem of actors. These factors can be illuminated by strategically reflecting on past and present dynamics among actors and the opportunities and barriers provided by local governance contexts. The participation of users and citizens at the conceptualization stage and, continuously, through interaction tools on the platform could motivate demand-driven data provision and a more active data use. This could, in turn, contribute to the diversity and the quality of data, and to the attractiveness of open data initiatives for a non-expert audience. Open data platforms enabling access to information and potentially facilitating transparency, present a crucial stepping stone for citizen participation in urban governance.

DATA AVAILABILITY STATEMENT

The datasets generated for this study are available in anonymized form on request to the corresponding author.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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