Introducing the concept of open data mediated transparency: An empirical analysis of the datasets of Italian municipalities available on the Italian National Open Data portal

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Abstract

Open data policies, as well as e-government policies, are usually associated with many promises that range from transparency to efficiency gains for the public administration. However, how effective these policies are in meeting the (high) expectations of practitioners, politicians, and citizens is a topic of debate. In this thesis we focus on the Italian case, in which transparency is often evoked as a solution to many societal problems, to investigate the relationship between transparency and institutional and organizational features of local governments. The thesis also introduces the concept of open data mediated transparency as a way to complement the concept of open government. Open data mediated transparency aims at capturing how open data sharing through the Italian National Open data portal translates into transparency. To measure this concept, this study uses the four dimensions of governmental transparency developed by the Pew Institute and adapts them to the Italian case. The following question is central in this thesis: *what are the institutional and organizational factors that influence open data mediated transparency in Italian local governments?*

Objectives: This thesis has three research objectives. First, the thesis aims to assess the implementation of open data initiatives in Italian municipalities through the attainment of transparency goals. Second, the study wishes to improve our understanding of the open data phenomenon in the context of Italian local administration. The final goal of this thesis is to investigate institutional and organizational factors that might influence how transparent Italian local administrations are and, therefore, how open data policies are implemented in Italy.

Methods: The study is based on a quantitative deductive approach. A Poisson regression is used to test the different hypotheses.

Key findings: The results of the analysis show that there is no support for population size, level of education of the personnel of the public administration, organizational resistance, and political affiliation as factors that affects open data mediated transparency. Overall, open data mediated transparency varies greatly among municipalities with few local administrations sharing transparent and relevant datasets. The results are discussed and lead to suggestions for future research and policy recommendations.

Keywords: transparency, e-government, open data, open government

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Introduction

Over the last ten years, open data have increasingly attracted the attention of both academics and practitioners in the field of public administration (Gil-Garcia et al., 2020). Lying at the intersection between the digitalization of the public administration, and how the public administration operates internally, and interacts with the citizens, open data are a complicated phenomenon.

Although often succinctly defined as data that can be *"used, modified, and shared"* (Open Knowledge International, n.d.) in any circumstance, in the context of the governmental intervention open data come with a lot of promises as well as challenges. While many agree on the potential advantage that "opening" the government may have, such as gains in efficiency, transparency, and increased trust in governmental action (Matheus & Janssen, 2020), there is growing attention on the fact that these objectives are not easily attainable (van Loenen, 2018). Moreover, opening the government has practical implications that are often overlooked. Open data sharing creates a sort of "window" that allows to see (and check) what the government does (Matheus & Janssen, 2020, p. 504). However, the public administration may not be particularly inclined to open this window as it can breach the information asymmetry that constitutes one of the aspects that characterizes the relationship with the citizens (Matheus & Janssen, 2020). Finally, when this Pandora's box is opened, there is also the possibility that those same citizens may realize how poorly informed by data decision-making actually is within their government (Bannister & Connolly, 2011; Grimmelikhuijsen et al., 2013). In other words, citizens may suddenly discover that the policy-making process that impact their lives is not informed by data or evidence.

With the objective of getting to know more about this phenomenon, this thesis takes a closer look at one jurisdiction, Italy, which exemplifies the tension between the benefits that open data are supposed to deliver and the reality of the implementation. According to two international assessments, Italy is among the EU countries that are well placed with regards to the implementation of open data policies (Open Government Partnership & Genna, 2021, p. 7). Nevertheless, this view of Italy as a "fast-tracker"(Publications Office of the European Union. & Capgemini Invent., 2020, p. 6) in this field is not unanimous. Open data activists highlight that open data in Italy are highly fragmented, with a few public administrations leading the trend of sharing data and others that do not implement policies for sharing them (Brunati, 2018). Additionally, the data that are shared are substantially low quality and often

cannot be re-used and, *de facto*, do not fall into the category of open data at all (Open Government Partnership & Genna, 2021, p. 7).

As we can see, the choice of the Italian public administration as the subject of this study was not haphazard, but rather intentional. The Italian context, in fact, seems to represent a puzzling situation in which is not clear if there are reasons to be happy or despair. While some indexes place Italy in a good position in the race to open data, a closer look at open data implementation may paint a less rosy picture. How can we explain this mismatch? Also, what is a good measure of open data implementation?

It should be noted that measuring how a country fares in the implementation of open data policies is not an easy task. Firstly, open data is a relatively new phenomenon, and, for this reason, it is hard to capture the progress and the results achieved by different administrations. Secondly, open data assessments are mostly based on the national governments performances (Zuiderwijk et al., 2021). This means that the assessments of open data policies do not target local administrations. The focus on central government is, therefore, not particularly apt for analyzing countries that, like Italy, are characterized by different level of government and in which the role of local administrations is supposed to be relevant in the e-government policies implementation (AGID, 2020). Thirdly, it is not possible to assess open data implementation if we do not tie this concept to a goal that the open data policies are expected to achieve (Howlett et al., 2020, p. 247). In other words, the assessment of the open data policies requires that we adopt a policy goal against which we should measure implementation.

Considering all these shortcomings, this study focuses on Italian local administrations analyzing the datasets of municipalities that share open data through the Italian National portal. The achievement of transparency through open data sharing, conceptualized as “open data mediated transparency”, is used as proxy for the implementation of open data policies. The more an administration share transparent open data, the more it is considered to be successful in open government implementation. Different institutional and organizational factors are hypothesized to influence how transparent municipalities are.

Research Objectives

This thesis has three research objectives. First, the thesis aims at assessing the implementation of open data initiatives through the attainment of transparency goals. Second, the study wishes to improve our understanding of the open data phenomenon in the context of Italian local administrations. The final goal of this thesis is to investigate institutional and organizational factors that might influence how transparent Italian local administrations are and, as a consequence, how open data policies are implemented in Italy.

Research Question

In this thesis, the institutional and organizational features of the Italian municipalities will be analyzed to draw conclusions on the factors that may influence how transparency goals are reached through open data sharing. The following research question is formulated.

What are the institutional and organizational factors that influence open data mediated transparency in Italian local governments?

As will be further explained in this thesis, the research question has been further divided into three sub-questions.

1) *What is an appropriate measure of transparency?*
2) *How do the Italian municipalities score in terms of transparency?*
3) *What are the institutional and organizational factors that influence open data mediated transparency?*

The first sub-question will be answered through a literature review. The second sub-question will be answered in the first part of the analysis, through the descriptive statistics. Finally, the last sub-question will be answered through inferential statistics.

Scientific Relevance

To date, there are few studies that address the implementation of open data policies at the local level (municipalities) in Italy. The analysis of innovation in the Public Administration in Italy mainly focused on implementing projects in single municipalities via local web portals, or compliance with legal requirements (Viscusi et al., 2014), or transparency of the public administration at large (Galetta, 2014). In contrast, institutional, and organizational aspects of the Public Administration responsible for the management of the datasets did not constitute a major line of research. Also, the literature on the open data in

Italy did not approach the phenomenon from a policy goal perspective. This is surprising, considering that, according to theory, the success of a policy is, among other things, associated with the achievement of the to the goal pursued by the same policy (Howlett et al., 2020, p. 247). Nevertheless, the goal of the e-government initiatives is not always the focus of the public administration literature on open data implementation (Matheus & Janssen, 2020).

The approach of this thesis is to combine the study of one of the goals pursued by open data initiatives, transparency, with institutional and organizational factors that may determine the success of the initiative. The thesis suggests that there is another concept, open data mediated transparency, that could capture the successful implementation of open data initiatives. Open data mediated transparency means, in essence, to what extent the data shared by the public administration (in this case the Italian municipalities) allowed the citizens to inspect the activity of the same administrations.

It is also suggested that this study has possible implications for the literature on the digitalization of the public administration in other contexts. Transparency epitomizes the core values of open data sharing (Matheus & Janssen, 2020). It follows that expanding our understanding of transparency, even in the context of an analysis that focuses on a single country, may help to broaden our knowledge on open data in general. Therefore, while the thesis first aims to enhance our knowledge of open data as a phenomenon in the Italian context, there are possible implications for future studies in other contexts.

Societal relevance

The potential role that open data may have in Italy is not to be underestimated. In a country in which the fight against corruption is still a priority, digital-mediated transparency has been suggested as a possible weapon in the armory of the government to counteract this phenomenon (Datta et al., 2020). Also, Italian citizens have a low level of trust in the national government (OECD, 2021). One way in which governments establish a new – transparent - relationships with their citizens is through e-government policies in the form of open data sharing (OECD, 2021). According to this view, openness, as a proxy of transparency, could be a critical factor for improving the relationship between citizens and the Italian Public Administration.

Getting to know how transparent a local government really is important for many different reasons. First, it is what it come closer to the concept of open data (Matheus & Janssen, 2020). The main goal of the Open Government Data movement was to allow the citizens in as a process of enhanced democracy. Second, we cannot claim that data sharing without an actual potential benefit for the citizens (or the user) is valuable. To get the most from open data, we should link them with one (or multiple) values that they are supposed to achieve. If the citizens cannot retrieve meaningful information on what their representatives knew before making decisions, can we say that open data truly enhanced transparency?

The digitalization of public administration at large is also a very salient topic in Italy today. A relevant quota of the Next Generation EU funds allocated to Italy to help with recovery from the Covid-19 crisis are meant to be spent on the public administration in general, with digitalization being a top priority (MITD, 2021).

Relevance for practitioners

As highlighted by the OECD, open government data is not only a policy area, but also a philosophy that is expressed as follows: *"by making their datasets available, public institutions become more transparent and accountable to citizens"(OECD, n.d.).* This study, on the contrary, is developed under the assumption that pure and simple data sharing is not enough. One of the overreaching goals of this thesis is to interrupt the association between data (or information) sharing and transparency. This association, far from serving the interests of society, may keep reinforcing the identification of open government initiatives as a synonym with (any type of) data sharing. For instance, portraying Italy as a country leader in open data implementation may create the illusion that public administrations (centrals and locals) are being more transparent. Positive feedbacks from external benchmarks may create a reinforcing mechanism in which prevent a critical discussion on what can be improved at both national and local levels (Skocpol & Pierson, 2002). Policymakers, as highlighted by Zuiderwijk et al. (2021), can cherry-pick benchmarks in which their country scored high as evidence that there is no need to invest in open data policies. Therefore, practitioners may benefit from a *"more nuanced approach on open data"* (Thorsby et al., 2017, p. 60) as a tool for evaluating open data implementation.

Structure of the thesis

The first chapter includes a literature review that aims at identifying what is known regarding open data, transparency, factors influencing the implementation of open data policies, and what the major areas of discussion and consensus are. Then key assumptions are laid out and hypotheses formulated. The second chapter fleshes out the research methods. The sampling strategy, the data sources, the operationalization, and the modelling strategy are detailed. The third chapter discusses the results of the analysis. The final chapter presents the conclusions, along with the limitations of the study, policy recommendations, and a possible future research agenda.

Summary of the findings

The results of the analysis show that there is no support for population size (as proxy of organizational capacity), level of education of the personnel of the public administration, organizational resistance, and political affiliation as factors that affects open data mediated transparency. Overall, open data mediated transparency varies greatly among municipalities with few local administrations sharing transparent and relevant datasets. The results are discussed and lead to suggestions for future research and policy recommendations.

Theory

When approaching the use of open data, the literature usually focuses on four aspects: the definition of open data, transparency as a driver for open data adoption, e-government strategies, and their implementation. In accordance with this, first a definition of the open data is given and deconstructed. Then the literature review focuses on transparency as one of the leading reasons for adopting open data. The concept of e-government is then then discussed, and it is followed by an analysis of the implementation phase in the context. The last paragraphs address the gap in the literature and detail the concepts that will be used in this study.

Open data: combining and deconstructing the definition

The adoption and the implementation of open data policies are accompanied by many promises (Janssen et al., 2012; Zuiderwijk & Janssen, 2014b). Before discussing why open data are such a strategic asset, it is important to understand what open data are and, most importantly, what open data are not.

The definition of open data most commonly found in literature (Altayar, 2018; Barry & Bannister, 2014; van Loenen et al., 2018; Vetrò et al., 2016) is the one of the Open Knowledge Foundation (Open Knowledge International, n.d.) according to which open data are those that can be *"freely used, modified, and shared by anyone for any purpose"*. Other attempts to define open data put the emphasis on the public sector as the only supplier and tie open data sharing with the public interest and the possibility of sharing them (Zuiderwijk, Janssen and Choenni 2012 as cited by Barry & Bannister, 2014).

Combining and deconstructing the definitions, we can see that four different elements characterize open data. First, open data should be freely usable. This means that open data are not just those that one can access, as they must allow the possibility of being used. Second, open data can be modified. In other words, they have the potential to be an ingredient in a more ample context in which they could be employed. Third, anyone can share this ingredient. Open data is something that everyone can freely share for any possible recipe. In addition, not all the data is sharable, as limits (e.g., privacy law) can restrict this possibility. Also, when shared by the public sector, open data are be made available to satisfy a public interest.

When open data are used by the government, their definition is also integrated by the by the literature on e-government (Altayar, 2018; Yang et al., 2015). Several definitions of e-government exist, and they put the emphasis on different aspects (and values). Moon (2002, p. 425) in defining e-government makes reference only to the production and delivery of government services through IT applications. The United Nations and American Society for Public Administration (2001) defines e-government as a complex concept primarily aimed at improving public governance through a *"cost-effective and efficient delivery of services, information and knowledge"* (p.1).

E-government can, thus, be narrowly defined as a mere use of technology in the production and provision of public services or have a broader, normative, meaning characterized by the values pursued by the public administration in the adoption of e-government initiatives. The combination of different definition of open data with the concept of e-government also accounts for the different strands of the literature on open data. As it will be explained in the following paragraphs, scholars usually focus their attention on the supply-side (i.e., the actors that share open data), on the demand-side (i.e., the actors that use those data), on the factors limiting open data sharing, and on the public sector interest connected to all that (i.e., transparency, efficiency, etc.).

Open Government: transparency as driver and goal

One of the public interests that justifies (and drives) the adoption and implementation of open data is transparency. Transparency as an intuitive concept did not change much from the famous tale of Livio Druso in which the Roman public official decides to live in a house "glass house" so that any citizen could see how he lived (Original work Plutarch, 96-120, Trans. Traglia & Magnino, 2013). Transparency essentially boils down to the *"the ability to see what is happening in the government by the public"* (Janssen et al., 2017, p. 4).

Transparency is also at the core of the Open Government movement. The use of the term Open Government is commonly traced back to the Memorandum of Transparency that the Obama administration issued in 2009 aimed at, as the name of the memorandum reveals, reaching the goal of a transparent administration. (White House, 2009). The US government was then followed by many other states that decided to adopt open government initiatives mainly aimed at fostering transparency and citizen participation (Veljković et al., 2014) and releasing social and commercial value (Attard et al., 2015).

Although the meaning of transparency may seem intuitive, pure and simple data sharing does not automatically result in increased transparency (Matheus & Janssen, 2020). However, what exactly transparency means in the context of e-government is not always defined and investigated.

Michener & Bersch (2013) investigate the meaning of the transparency and provide a framework for defining it. They identify two criteria for evaluating transparency according to which transparency is achieved when the content of the information is visible (visibility), and it allows to draw meaningful conclusions (inferability). These two criteria, according to the Authors, help to fill the gap in the literature that did not engage enough with the assessment of transparency. In other words, while transparency is often evoked, it is not clear how it can be achieved (and measured).

Bearfield & Bowman (2017) define (and measure) transparency based as the possibility for a citizen to fully inspect the activity of the government. This methodology draws a line between information (or data) sharing and provision of qualitative, and value-oriented information.

Recent studies focused on factors enabling or limiting transparency in open data adoption. One key concept when investigating transparency in the public sector is the one of transparency-by -design. (Janssen et al., 2017). Transparency-by-design is the recognition that transparency, in the complex public sector ecosystem, cannot occur only in the last mile of information sharing. Therefore, transparency requires the design (and orientation) of all the phases that ultimately lead to information sharing based on this value. The concept of transparency-by-design reflects an interest in how information systems are designed (Matheus & Janssen, 2020). According to Lnenicka & Nikiforova (2021), transparency-by-design is enabled by open data portals and suggest a list of features that an open data portal should have to foster transparency.

However, information system design is not the only possible factor playing a role in achieving transparency. Both institutional and organizational design may contribute to the adoption and the implementation of transparency policies. The institutional setting of a country has been suggested as a determinant of the amount of data sharing, and, as a consequence, as enabler of transparency (Williams, 2009). At the institutional level, transparency is found to be a motivation for open data adoption (Altayar, 2018).

Grimmelikhuijsen & Welch (2012) investigated the determinants of transparency in local government. Distinguishing between different dimensions of transparency, they found that three factors are associated with them. Organizational capacity is associated with transparency in the policy outcomes, while political influence is associated with transparency in the decision-making process and group influence influences both policy information transparency and policy outcome transparency. Political influence, such as the one of the party governing the local administration, is also suggested as determinant of transparency (Gandía et al., 2016; Grimmelikhuijsen et al., 2013; Ríos et al., 2016; Sol, 2013).

Matheus & Janssen (2020) investigated the factors that favour or limit transparency through the adoption of open government data. Based on a systematic literature review, Matheus & Janssen (2020) the key determinants of transparency through open data adoption in data quality, system quality, organizational characteristics, and individual (users) characteristics. A possible determinant of transparency is also organizational capacity, as resourceful administrations are supposed to have the capability to share more datasets (Grimmelikhuijsen & Feeney, 2017; Moon, 2002; Rodríguez Bolívar et al., 2019; Sol, 2013; Thorsby et al., 2017; Yavuz & Welch, 2014).

However, the relationship between some of the above mentioned factors and transparency is not linear as they can also act as a condition for open data sharing or as a limiting feature (Matheus & Janssen, 2020). The importance of these (possible) determinants is context dependent. In particular, the intention of the administration, the type of open data, the policies and the institutions play a major role in determining whether a factor will enable or limit transparency (Matheus & Janssen, 2020).

Transparency in e-government and open data literature is often treated as an instrumental value that serve for reaching other goals (Piotrowski et al., 2019). Fostering transparency through e-government policies was initially suggested in order to increase the trust of the citizens towards the government (Tolbert & Mossberger, 2006). Nevertheless, transparency can also have a negative effect on trust as the citizens may realize how badly informed their government really is (Bannister & Connolly, 2011; Grimmelikhuijsen et al., 2013)

The relationship between goals and implementation is particularly important. When multiple objectives, such as transparency and efficiency, are pursued in the context of an e-

government strategy, the degree of goal ambiguity may determine the successful attainment of these goals (Chen, 2012). It follows that the role of the public managers is pivotal in the implementation phase. The more they are aware of the policy goals, the higher are the chances that e-government policies will be implemented and fulfil the policy objectives (such as transparency).

The attempt of achieving transparency may conflict with other democratic values, such as privacy. However, the relationship between transparency and privacy is not as simple as it may seem. Both transparency and privacy are intended to be intended complex constructs that are the result of relationships with other factors (Janssen & van den Hoven, 2015). In other words, they are not to be pitted against one other. According to the Authors, the policy-maker should be aware that what transparency and privacy are the by-product of many different factors that include, among others, societal values, culture, policies, legislation and the architecture of information sharing.

Open data adoption and implementation

While the promise of e-governance is to deliver innovation in the public sector, the expectations do not always meet the reality. Moon (2002) found that at the municipal level, the innovative effect of e-government was weak as none of the goals (i.e., cost savings) were met. Moon & Norris (2005) investigated the factors leading to an effective implementation of e-government initiatives, identifying the innovation orientation of cities as a key component, with a relevant role of both financial and technical capabilities.

Different barriers have been identified with regard to open data adoption, although this topic received less attention compared to the promises of open data (Barry & Bannister, 2014). Those barriers range from among institutional, organizational, economic, technical, legal, and cultural. (Attard et al., 2015; Conradie & Choenni, 2012; Janssen et al., 2012; Zuiderwijk & Janssen, 2014a).

The innovation that open data bring in the public sector is the result of interaction between open data policies and the existing policies of the government on information sharing. Open data alter the normal functioning of the process of information sharing by the government (Matheus & Janssen, 2020; Young, 2020). In the past, public administrations responded to specific inputs from the citizens who asked for specific data, through online or

physical forms (Matheus & Janssen, 2020). The first difference, therefore, is between the sharing of single-purpose data and the "massive" sharing of data in the context of open data policies.

Most importantly, before the adoption of open data policies (besides the cases in which citizens asked for specific data) the governments shared data in the form of information, without the underlying raw data that formed the background for adopting such decisions (Young, 2020). Open data sharing results, in essence, in providing access also to the what the government already processed and transformed into information (Ackoff, 1989). The relationship between citizens and the government has long been characterized by information asymmetry (Matheus & Janssen, 2020). Therefore, providing access to the raw data in an open format has the potential to alter the relationship between the citizens and the government (Young, 2020). The administrative discretion can be scrutinized and all the processes of making the decisions can be made available. Open data create a window (Matheus & Janssen, 2020) that give access to which data the government decided to use or not, and, also, the narratives that the government created through filtering data and obtaining information (Piotrowski et al., 2019). As a consequence, the possibility to observe the administrative activity of the government transforms the interaction that the citizens have with the government (Jakobsen et al., 2019).

The implementation of open data in practice also translates into intra-organizational change (Young, 2020). Implementing open data platforms requires a change to the *status quo* as it entails that the public administrators ceding their control of the data that are stored and owned by their departments (Young, 2020). The adoption of open data could be in contrast to patterns of bureaucratic behavior, such as the tendency of complex administrations to retain data (Posner 2010) and, therefore, hard to implement.

Even though e-government policies involve an implementation stage, the characteristics of the bureaucrats, which are among the main actors of this phase of the policy cycle (Howlett et al., 2009, p. 13), do not always constitute the object of the studies.

Regarding the barriers to open data adoption, (Conradie & Choenni, 2014), find out that different indicators can determine the successful implementation of open data policies. Data generation (i.e., the way data are formed and obtained) and their use (i.e., the way the public administration departments integrate data in their activities) can determine the success

of open data implementation. Grimmelikhuijsen & Feeney (2017) investigates how different dimensions of open data, such as transparency and participation, are realized through the implementation of open data policies. The authors find out that there is no “one-size-fits-all solution” as different dimensions of open data can be the result of different organizational and institutional characteristics.

Another important strand of research with regard to open data readiness or open data uptake is that of open data assessment. Different benchmarks have been designed to measure open data adoption by the academic and institutional actors (Zuiderwijk et al., 2021). Authors today tend to problematize the assessment as a difficult exercise (Charalabidis et al., 2016; Hossain et al., 2016; Thorsby et al., 2017; Yang et al., 2015; Zuiderwijk et al., 2021). De Juana-Espinosa & Luján-Mora (2019) investigated open data portals in the EU countries and analyzed the relationship between possible goals (and the success of open data initiatives). Their analysis finds that EU open data portals shows a certain degree of homogenization in Europe into two different clusters of open data development. However, benchmarks tend to focus only on open data sharing or the possibility for data exploitation (i.e., potential use) (Zuiderwijk et al., 2021). This translates into the fact that these assessments do not provide actual information about the impact of the data (Zuiderwijk et al., 2021), although this is considered a key factor for the achievement of the open government objectives.

Governmental open data initiatives resulted in a trend of data sharing from the public administrations in the forms of open government data platforms (Bonina & Eaton, 2020). Open data platforms are treated as a separate object of investigation due to their increasing implementation by the government and their potential effects with regard to public service delivery (Davies et al., 2019). However, it is the object of a debate in literature what open governmental platforms entail. While for Thorsby et al. (2017) the concept of an open governmental data platform is limited to the portal itself, Danneels et al. (2017) propose a broader definition. Starting from the definition of Gawer (2014) that points out how platforms are not only the data portal itself, but also the network in which the data are used, Danneels et al. (2017) perform an explanatory study aimed at defining the different types of platforms. Three platforms are identified. Cognitivist platforms are characterized by a one-way sharing of data and a cognitivist relationship between the supply and the use of data. Connectionist platforms are those an interaction occurs between different actors re-using open data in cooperation with each other. In autopoietic platforms, each actor enriches the ecosystem

through their use of the platform. In the opinion of the Authors, different definitions of open data platforms do shape the research agenda on the open data platforms. In particular, research on open data ecosystems was not matched with similar interest with regard to what differentiates various platforms. In other words, different expectations are connected to different database types.

Scholarly work in the United States has investigated possible factors that could help explain differences in implementing open data policies. Thorsby (2017) and Young (2020) move beyond descriptive aspects of open data adoption. Thorsby (2017) focuses on the contents and the features of open data portals in American cities. Young (2020), moving from the assumption that open data constitute a disruptive innovation in public administration, investigates the institutional factors that could influence open data implementation.

Open data platforms have been initially analyzed with regard to their number of data-sets shared and their contents, while analyses of their governance and their ecosystem have just started to emerge (Bonina & Eaton, 2020). The analysis of open data portals from an open data ecosystem perspective focuses on creating a governance infrastructure that could allow citizens to get actual value from the data (Bonina & Eaton, 2020).

Wilson & Cong (2021) investigate the user-side in order to get an understanding of different purpose open data are used and what is their impact at the municipal level. The Authors found out that the open data ecosystem had a transformative effect with regards to the services offered by the local government, as well as the tasks performed by the public officials. The absence of a monitoring mechanism, however, does not allow one to fully capture the effects of open data. Recent studies also focus on the user experience with regard to open data portals. Open data portals are not all the same and their usability can differ significantly (Nikiforova & McBride, 2021).

Open data use

Despite the many promises of open data, open data are underused. One common opening line for many articles regarding open data is that both the quantity and the typologies of data shared by the public administration are continuing to increase (Danneels et al., 2017). The increase in data sharing is not, however, matched by an increase in data use. The underuse of governmental open data has been the object of many investigations in Literature

(Barry & Bannister, 2014; Beno et al., 2017; van Loenen et al., 2018; Zuiderwijk & Janssen, 2014).

Most of the Literature seems to deal with the supply-side (i.e., the government), rather than the user-side (Safarov et al., 2017). Nevertheless, while the Literature initially devoted its attention to open data publication (Zuiderwijk-van Eijk, 2015), there has been a gradual shift towards the importance of open data use (van Loenen et al., 2018). Although scholars have identified many barriers to the uptake of open data, the lack of attention to the role of the users is a common thread in the literature (Janssen et al., 2012). However, despite the several articles that call for attention to the users-side, the role of the actors in the open data ecosystem has not been thoroughly investigated (Wouters et al., 2021). While the concept of open data ecosystem assumes a flux in which data are shared and re-used, not all the actors involved in this process are fully examined. The government is usually investigated under the lens of the hoarder of data, while other roles, such as the role of open data user, are usually under-studied (Ubaldi, 2019).

The growing importance of the open data use (demand-side) has been accompanied by an interest in open data ecosystems (Dawes et al., 2016). Zuiderwijk et al., (2015) investigated potential barriers to the intention to use open data. The Authors found that performance expectancy, social influence, effort expectancy, and voluntariness of use are associated with the intention to use open data.

Safarov et al., (2017) suggest that to investigate open data one should adopt a multi-dimensional framework that takes into account users of open data and the effects of data use in open government data initiatives outcomes. With regard to the role of the actors as potential enablers of open data adoption, Chatfield & Reddick (2018) found that policy entrepreneurs, intended also as departments or agencies that took the lead on the open data projects, contribute to open data sharing effectiveness.

Open data and public values

A recent strand of literature (Chantillon et al., 2018, 2020) started investigating the transformative effect that e-governments have on public values. According to this nascent strand of literature, the underuse of open data could be considered a public value failure. A public value failure occurs when neither the market nor the public sector provides goods and

services that achieve or create public values (Bozeman, 2002). Given that value creation and achievement is the aim of the public sector (Tantalo & Priem, 2016), it is paramount to understand the effect that open data have in this context. The main puzzle investigated by these authors is to what extent it is possible to implement e-government policies (including open data policies) without considering public values. In other words, it is questioned whether it is possible, and which consequences it has, to adopt e-government policies that might not combine the public values of the citizens (e.g., the quest for transparency), with the ones of the public administration (e.g., efficiency in the delivery of the services) (Chantillon et al., 2018, 2020). This is particularly relevant in situations in which, as mentioned before, different values are associated with open data, such as transparency (Tolbert and Mossberger 2006), efficiency (Petychakis et al. 2014; Thorsby et al. 2017; Zuiderwijk and Janssen 2014) and privacy (Janssen & van den Hoven, 2015). Scarce attention to public values may also have practical implications. Zuiderwijk & Janssen (2014c) highlight that public values are relevant for the implementation open data policies aligned with the policy objectives. The Authors mention, for instance, a situation in which the policy aims at countering corruption, but the implementation results in datasets that are hard to find or use.

While there is still a substantial gap in the literature about public values in the adoption of e-government policies, the public values perspective contributes to sheds light on relevant factors that could contribute to the (non)implementation of open data policies. For instance, it is expected that an efficiency-oriented administration will probably prioritize cost-effective service delivery at the expenses of other values, such as transparency. Nevertheless, the relationship between public values, related governance approaches and open data ecosystems remains largely neglected, both from a theoretical and empirical point of view (Chantillon et al., 2018, 2020).

Summary

This chapter provided an account of the literature on open data in public administration. It investigated the main concepts and tried to understand the main areas of consensus, disagreement, and the gap in the literature.

While transparency may seem an intuitive concept, how transparency can be obtained through open data sharing poses different problems that encompass conflict with other public interests (e.g., privacy) and organizational barriers (i.e., the tendency of the public

administration to keep data secret). In addition, transparency is not understood in the same way by all the stakeholders (Matheus & Janssen, 2020). For this reason, conceptualizing transparency can prove a particularly daunting task. Bearfield & Bowman (2017) look at the data that must be in the possession of the citizen (or other actors) to evaluate the government. What emerges is that transparency is a multi-dimensional concept that is a sort of by-product (and counter-intuitive to) of the data needed for a comprehensive assessment of the governmental intervention.

Open data is also discussed in the context of e-government initiatives. However, different definitions of e-government may lead to different considerations regarding the successful implementation of an open data strategy. A narrow definition of e-government will result in low expectations, as the only interest is the adoption of the technological instrument itself. In contrast, broader definitions call for deeper investigations into how the policy fared in reality under the question: were the policy goals (and public values) reached?

The literature suggests that different aspects may help explain differences in open data portals implementation, but that more empirical research is needed (Thorsby, 2017). Also, it should be noted that empirical analysis on open data portals in local municipalities have primarily been done in the American context (Thorsby et al., 2017; Young, 2020). In addition, open data portals are not all the same, as the expectations that the users (or beneficiaries) may have from them greatly vary from simple data-retrieving to in-depth interaction (Danneels et al., 2017).

Most of the literature seems to deal with the supply-side, rather than the user-side. Nevertheless, there has been a gradual shift towards the importance of open data use (van Loenen et al., 2018). The relationship between public values, related governance approaches and open data ecosystem remains largely neglected, from both theoretical and empirical points of view (Wouters et al., 2021).

Different measures of the implementation of open data policies have been designed over the years. (Zuiderwijk et al., 2021). However, the different benchmarks on open data implementation that have been designed so far tend to focus on only a few aspects that do not always answer what factors determined (or did not) the outcome. Therefore, the assessment of open data initiatives is not always satisfactory (Thorsby et al., 2017; Yang et al., 2015). The literature suggests that different institutional and organizational factors may be

associated with the implementation of open data policies (Thorsby et al., 2017; Young, 2020). Overall, the literature suggests that there is still a substantial lack of empirical studies that investigate, from a user perspective, what value a user can derive from open data and if any value has been accomplished.

Conceptualizing open data mediated transparency

The research objective of this study is to examine open data in Italy investigating institutional and organizational factors that might influence how transparency goals are reached through open data sharing. Following the analysis of the literature, we can try to conceptualize the outcome of interest in this study as the possibility for the citizen (or different stakeholder) to observe and evaluate the activity of the government through data sharing. According to this definition, transparency is only achieved only when characteristics of the data shared *de facto* allows this investigation. This concept is defined in this study as open data mediated transparency.

Hypotheses formulation

The literature suggests that there are different institutional and organizational features that might be associated with both the implementation of open data policies and transparency. However, when we critically assess the concept of transparency, we see that it is not equated with open data implementation. When open data policies are implemented, it is not expected that the local administrations will automatically become more transparent (Matheus & Janssen, 2020, p. 504). For instance, a municipality might share a good amount of open data and score high in open data implementation, while sharing a range of datasets that are not immediately associated with transparency. Different administrations may also interpret open data implementation in different ways. Some administrations might tend to interpret open data policies as related to the amount of data that they share (e.g., data on traffic, tourism, etc.), while not making available data that are good indicators of transparency (e.g., data on expenditures, personnel, etc.).

Different hypotheses have been formulated to understand whether some factors known for being relevant in open data implementation and transparency initiatives also contribute to enhancing open data mediated transparency.

Population

In literature population size is commonly associated with the adoption of e-government policies (Moon, 2002). The city size is correlated with slack resources, intended as investments in IT, larger budgets, more staff, etc., and is a used in different studies as a proxy variable for latent capacity (Grimmelikhuijsen & Feeney, 2017; Moon, 2002; Rodríguez Bolívar et al., 2019; Sol, 2013; Thorsby et al., 2017; Yavuz & Welch, 2014). In this case, the main goal is to understand whether this assumption also holds in relation with open data mediated transparency or whether we can notice deviations from this prediction.

Hypothesis 1: Population is positively related with open data mediated transparency

Level of education

Different levels of professionalism and managerial competence may characterize a local administration. The educational background of the manager and officials working in the local administration may have an impact on their readiness to implement new technologies (Bearfield & Bowman, 2017). One possible assumption is that employees with more years of formal education will contribute more to the implementation of e-government and open data policies. Therefore, in this case, the expectation is that the level of education of the municipalities' officials is positively related with open data mediated transparency.

Hypothesis 2: The level of education of municipalities' officials is positively related with open data mediated transparency

Organizational resistance

Organizational charcteristics in general may be a determinant of the adoption of open data policies orientated towards transparency (Matheus & Janssen, 2020). However, one aspect that may doom the implementation of a policy to failure is organizational resistance (Rainey, 2014, p. 422-424). Organizational resistance can be defined as an open or subtle environment that is hostile to innovation. This factor has been already considered by the literature as a possible determinant of absence of support for new iniatives by the same people that are entrusted with their implementation (Zeemering as cited by Bearfield & Bowman, 2017; Bertot et al., 2010; Jaeger & Bertot, 2010). In accordance with these findings, it is

hypothesized that organizational resistance may have a negative effect on open data mediated transparency.

Hypothesis 3: Organizational resistance is negatively related with open data mediated transparency

Open data may not just be the implementation of a national policy, but rather the way to keep a promise with the constituency. In other words, political factors may be associated with open data implementation. Grimmelikhuijsen & Welch (2012) investigated the determinants of transparency in local government. Distinguishing between different dimensions of transparency, they found political influence is associated with transparency in the decision-making process. Gandía et al., (2016) and Sol (2013), and Grimmelikhuijsen & Welch (2012) found evidence that suggests left-wing parties as more inclined towards transparency and data sharing, while Ríos et al. (2016) reached different conclusions. In this thesis it is assumed that the political agenda of the parties leading the city council will influence the implementation of open data policies. The assumption in this case is that left-wing parties will be keener to share transparent datasets.

Hypothesis 4: Leftist parties' leadership in local administration is positively related with open data mediated transparency

Table 1 summarizes the relationship between the research questions and the hypotheses, how hypotheses are theoretically grounded, and the predictions laid out in this thesis. Open data mediated transparency is predicted to be associated with population, the level of education, organizational resistance, and the political party governing the municipality.

Table 1

Summary of the research questions, the hypotheses, the conceptual frameworks, and the expected outcome

Research question	**Hypotheses**	**Conceptual framework**	**Expected outcome**
What are the institutional and organizational factors that influence open data mediated transparency in Italian local governments?	H1: Population	(Grimmelikhuijsen & Feeney, 2017; Moon, 2002; Rodríguez Bolívar et al., 2019; Sol, 2013; Thorsby et al., 2017; Yavuz & Welch, 2014)	Positive
	H2: Level of education	(Bearfield & Bowman, 2017)	Positive
	H3: Organizational resistance to change	(Bearfield & Bowman, 2017; Bertot et al., 2010; Young, 2020)	Negative
	H4: Political party	(Gandía et al., 2016; Grimmelikhuijsen et al., 2013; Sol, 2013)	Positive

Empirical Design

The empirical design of this study has been defined based on the characteristics of the case, the sources of data and the characteristics of the variables. The thesis is designed based on the quantitative deductive approach that it is considered appropriate in relation to the research objective. The main reason for using this type of research design is to try to "identify weak and heterogeneous causal relationships" (Toshkov, 2016, p. 200) in a sample composed of many observations. In the case at hand, the research objective is to explain which institutional and organizational factors may explain transparency through open data sharing in Italian local administrations. In order to do so, the research is designed to investigate if some factors, emerging from the literature review, are aligned with the expectations (Toshkov, 2016, p. 201). In this chapter the research design, the case selection, the data, and the variables will be laid out, along with the methodology and a discussion on the validity and the reliability of the study. Table 2 summarizes all the different steps that lead to the quantitative analysis and the different phases that will be discussed in the next paragraphs.

Table 2

Steps of the research

Steps	Activity	Output
Step 0	Defining the research strategy	Research design
Step 1	Case selection	Case definition
Step 2	Data and data collection	Creation of a dataset
Step 3	Operationalization of the variables	Translation of the concepts of the study into measurable values
Step 4	Coding	Measurement of the outcome variable
Step 5	Descriptive statistics	Description of the phenomenon
Step 6	Inferential statistics	Hypotheses testing through a Poisson regression
Step 7	Analysis of the results	Analysis and discussion
Step 8	Contextualization of the Analysis	Research Agenda, policy discussion, and conclusions

Case selection

Case selection, in the context of (large-N) quantitative studies it is important to establish both internal and external validity (Toshkov, 2016, p. 248). The first aspect is, therefore, to define, which case to select. This thesis wishes to investigate open data mediated transparency in Italian local administrations. As we explained in the Introduction (see p. 6) the choice of the Italian public administration as the subject of this study was not haphazard,

but rather intentional This context, in fact, seems to represent a puzzling situation in which it is not clear what the actual level of implementation of open data policies.

Based on the vertical multi-levelness that characterize Italy, the first aspect to investigate is at which level we should perform our analysis. The target population of the study are the 7,904 municipalities (comuni) that compose the constellation of the Italian local administrations (enti locali). The term constellation is not casual as an overwhelming majority of Italian municipalities (seven out of ten) has a population of less than 5,000 residents(ISTAT, 2022). The small nature of the local government, however, does not lessen their transparency obligations. Overall, Italian municipalities are required to release data in open data formats. Different obligations apply based on the contents of open data as provided by the Legislative Decree n. 33 of March 2013 (the so called "Transparency Law")(Transparency Law, 2013). The Legislative Decrees of 2016 further expanded the list of information that should be made available by the public administrations (including the municipalities) (AgID, 2016). Local administrations that do not comply with information release in open format have a term in which to fulfil their obligations before being fined. Transparency obligations under the Transparency Law are often associated with open data, although the two concepts are not identical. For instance, the information listed by the Transparency Law are released for a bounded period of time (three to five years) and within a specific timeframe (after 180 days or years after the data have been collected by the local administrations)(AgID, 2016). In addition, it is worth noticing that the information of the Transparency Law should be made available through the municipalities' website. No reference is made to the Italian National Open data portal, in which the datasets are uploaded by the same municipalities or by regions that collect the datasets of municipalities (as in the case of Lombardia and Veneto) (AgID, 2021). Implementation of open data policies in this study is, therefore, not to be intended as open data sharing through the municipalities' website, but rather the effort (through coordination with the Regions or independent) to share datasets in the Italian National Open Data portal, that constitutes the most accessible datapoint and the one that is assessed in benchmarks on open data implementation.

Also, according to the Transparency Law there are minor simplification in place for small municipalities that, as a matter of principle, are required to share almost the same level of information required for larger municipalities. This is not to say that small municipalities are expected to share the same amount (or quality) of datasets of information that cities or

larger municipalities share. The only implication is that all the municipalities, regardless of their size, are subject to a common set of obligations regarding transparency. However, the fact that all municipalities, regardless of their population, suffer from the same obligations, allows us to conclude that the population is somehow homogenous with regards to the presence of a common set of information to be released in open data format.

With open data being the phenomenon of interest of this study, the unit of analysis can be defined as the municipalities that share open data through the Italian National open data portals.

Data

Methods of data collection

The research is characterized by data collection through secondary data desk research. In the first phase, data are collected by retrieving information on the dependent variable. Then qualitative information collected is *quantitatized* through coding. Finally, data for the independent variables are gathered through secondary sources from two different open databases.

Sources of the Data

The source of data of this research includes the Italian national open data portal (https://www.dati.gov.it/), the database of the Italian National Institute of Statistics (ISTAT) and the database of the Minister of the Interior.

The Italian National Open Data portal is a database that collect datasets of different administrations that aims to aggregate the open data of both national and local administrations(AgID, 2022). The portal harvests open data through catalogues made available by the public administrations (national and local)(AgID, 2021). Open data are published in units that are called datasets. Each dataset contains data that on different thematic areas. The different categories of datasets of the Italian national portal are 13 and range between agriculture and transportation as showed in Figure 1.

Figure 1

Italian National Open data portal - thematic areas

The data of the national open data portal were collected by filtering the categories for data of interest. Reading the description of different categories of catalogues "Governo e settore pubblico" (Government and public sector), highlighted in Figure 1, seemed the most appropriate collection of datasets as its definition explicitly refers to "transparency in the public sector" (AgID, 2017, p. 70).

After the selection of the category, the description of each dataset available with regard to the municipalities of the sample (*see* p. 30) was manually entered in an Excel file. Different attempts have been made to try to retrieve data without imputing them manually, however, as it will be further explained in the limitations (*see* p. 54), the only possibility of retrieving them automatically was through API on CKAN (the database management software). The description of each dataset was then used as a basis for the analysis of the outcome variable, as further explained in the next paragraph. The matrix used for the analysis is available in Appendix A.

Data on the independent variables were sourced from the Italian National Institute of Statistics (ISTAT) and the Minister of the Interior. ISTAT is a public research organization that a large amount produces and share statistics on Italy that can be retrieved from different databases and datasets (ISTAT, 2020). In this study we used information retrieved from the ISTAT's database on the public administration.

Data on the political affiliation of the municipalities were collected through the database of the Minister of the Interior. The Minister of the Interior is, among other competences, responsible for the regular unfolding of the elections. It also manages, maintain, and share information on the administrators (mayors) elected in Italian municipalities, as well as other open data on electoral bodies.

Description of Dataset and Sample

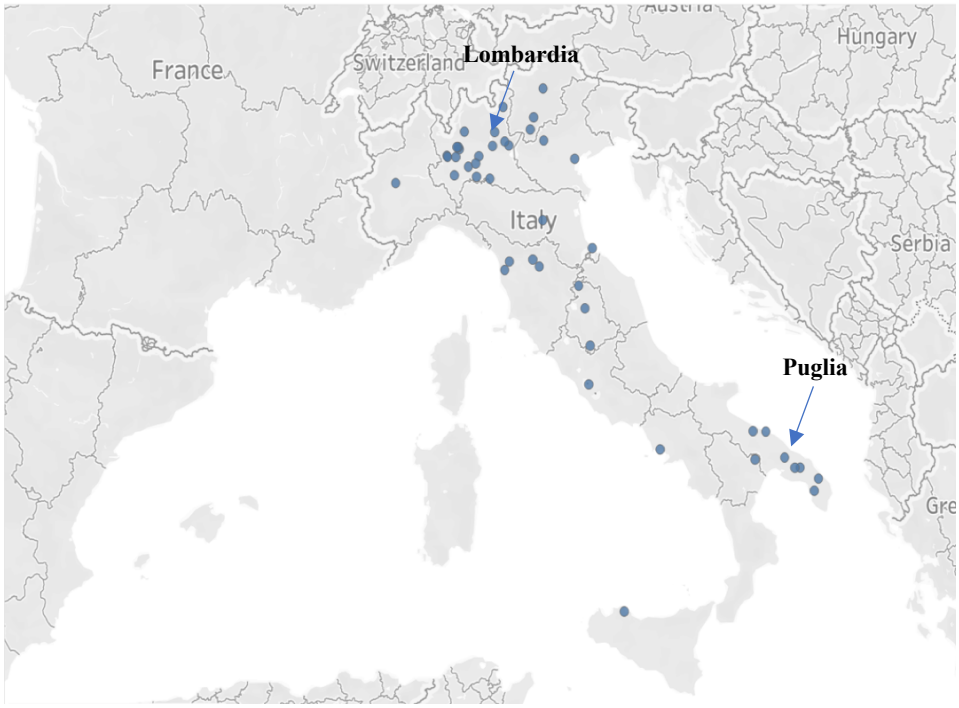
The dataset for the analysis was compiled based on secondary, cross-sectional, data retrieved from the Italian national open data portal. The datasets included in the analysis are those that were available on the portal as of November 26, 2021.

The sampling activity was the result of filters applied on the Italian National open data portal combined with manual searches. As of November 26, 2021, the Italian National open data portal included of 6,791 datasets in the category of the Government and Public sector thematic area. This section harvested the contents of 45 catalogues, including catalogues of regions (e.g., Lombardia), metropolitan cities (e.g., Napoli), and municipalities (e.g., Francavilla Fontana), as well as national agencies. The regional catalogues were checked one-by-one to obtain information on municipalities that shared information on municipalities, although harvested in aggregate catalogues. The manual review led to a final sample that was further refined to only include, in a first stage, municipalities with more than 5 datasets. The final sample resulted in 49 Italian municipalities that shared 2,677 datasets under the category Government and Public sector. The sampling process is described step-by-step in the Appendix A.

The 49 Italian municipalities that constitute the sample are spread across the Italian territory, although, as we can see in Figure 2, most of them are in the north of the country. Two regions, Lombardia and Puglia seem to lead in terms of open datasets sharing.

Figure 2

Italian municipalities sharing datasets on government and public sector



Variables

Outcome variable: Transparency

The outcome that must be observed is open data mediated transparency. The question to answer is: *what is an appropriate measure of transparency?*

The literature review suggested that open data sharing through open data implementation does not necessarily translate into transparency. While often the implementation of open data policies at the local level can be operationalized as the number of datasets the administration shares (Young, 2020), this assessment does not offer the best measure of the quality of the implementation nor whether data sharing achieved any of the public values associated with open data, such as transparency (Matheus & Janssen, 2020). Considering the limitations of previous assessments of transparency, in this study transparency is operationalized as a multi-dimensional concept that can be measured by evaluating whether the information shared (in this case datasets) can help the citizens to assess what the government is actually doing. In accordance, one possible way to measure transparency is to look at each of different sets of information (*rectius* data) that it is assumed

to display a value for citizens who are interested in analyzing the performance of their government. To this end, Bearfield & Bowman (2017, p. 173) use the framework developed by the Pew Institute in the Government Performance Project (GPP). Transparency is operationalized by the Authors as a composite of four different dimensions. First, a transparent administration will provide information on "money". The process of approval of budgets, as well as financial statements are information (*rectius*, data) that fall into the money dimension. The second dimension is "people". Public administrations may share different data that are valuable to citizen on the human resources, such as the headcounts, personnel performances, as well as their training programs. Third, "information" on general administration, such as performance when answering to citizens' requests responding to issues within city services are considered key to a transparent administration. The last dimension is "infrastructure". Local governments have a role in different activities that go from maintenance to new projects as well as the management of their own physical assets. This study, in order to identify whether or not a dataset released by Italian municipalities can fall into of the four dimensions, uses these four indicators of transparency. The choice to use these indicators is motivated by the suggestion made by Bearfield & Bowman (2017, p. 183) that the same framework could have explanatory value in other contexts. The indicators, however, were further adapted to the Italian context through a fitness analysis that considered the legal framework in place for sharing information, such as privacy concerns, and the capability of each indicator to capture each of the dimensions associated with transparency in Italian municipalities.

With regards to the first dimension, money, according to the Transparency Law, Italian local administrations are required to share information financial information that consists of a budget forecast and a financial statement. Local administrations are also required to release information on real estate ownership and rental. Other financial aspects that form the mix of information that the administration should provide to the citizens are the access to the participatory budget, when the same is adopted by the municipality, and information on public contracting on purchasing. Different levels of transparency apply based on the nature and the value of the contract, but transparency is a common characteristic of contracting and purchasing information.

The second dimension, people is assessed using as indicators in three categories of datasets that municipalities are required to share according to the Transparency Law. This

information includes hiring, information on absenteeism and characteristics of the workforce (permanent or temporary contracts). The people dimension also includes information on training and development programs for the employees of the local administration, not required by the Transparency Law.

The third dimension, infrastructure is mostly related to capital planning, maintenance and work in progress, and project monitoring. Capital planning includes all the information regarding infrastructures planning, while work-in-progress reports datasets report on the unfolding of the works, and, finally, project monitoring has to do with the monitoring of the objectives of the infrastructural planning. This information, with the exclusion of the monitoring of the work-in-progress, have to be released in accordance with the Transparency Law.

The fourth dimension is generally defined as information and includes datasets on digital services, digital democracy, and performance assessment. Digital services are composed by all the information regarding digital service provision, such as web applications. Digital democracy is composed by information from open data release (list of datasets), as well as information on open data use. Most of the information on digital democracy are required by the Transparency Law, as modified by the Legislative Degree of 2016. Performance assessment comprises all the indicators for quality assessment, as well as statistics on performance of the services and general activities of municipalities. Data on performance are to be provided according to the Transparency Law since 2013, while performance on digital services are required by the Legislative Decree of 2016. Data on performances include also the PEG (Piano esecutivo di gestione), a document that summarizes the objectives and the performances of the municipalities and the different actors involved in the achievement of these goals.

For each dimension of transparency (money, people, information, and infrastructure) each municipality will be assessed based on the presence of datasets regarding the following indicators. Table 3 summarizes the dimensions and key indicators of transparency along with the keywords used for identifying the datasets. An English translation of the keywords is provided in Appendix A (coding strategy).

Table 3

Dimensions and indicators of transparency

Dimensions	Indicators	Keywords (ITA)
Money	Participatory budget	Bilancio partecipativo
	Contract/purchasing	Concessione, Gare, Consulenze, Affidamento, Autorizzazioni, Consulenti, Collaboratori, Bandi, Concessioni, Forniture, Contratti di fornitura, Beneficiari, Contributi
	Financial controls/reporting	Bilancio, Bilancio Consuntivo, Rendiconto, Costi, Pagamenti
	Budget of forecast - Forecasting	Bilancio di previsione, Budget
	Real estate (ownership/rental)	Immobili, Locazione
People	Hiring	Bando di concorso
	Information on Human Capital	Assenze, Personale, Lavoro, Incarichi
	Training and development	Formazione
Infrastructure	Capital planning	Interventi, progettazione, opere pubbliche, piano urbanistico, OO.PP., Edilizia, Appalti, Progetti, PTCP (Piani territoriali di coordinamento provinciale)
	Maintenance and work in progress	Lavori in corso, Cantieri
	Project monitoring	Interventi non avviati, Interventi avviati
Information	Digital services	Accessi, App, Segnalazioni, Canale, Tempi medi, Affluenza serviz, Portale, Utilizzo, Rilascio, Servizi, Indice, Sondaggio, Cadenza, Profilo, Pagina, Richieste informazioni
	Digital democracy	Accesso agli atti, FOIA, Comunicazioni, Sondaggio, Open data, Datasets, Comunicazioni, Segnalazioni, Utilizzo, Banche dati, Cadenza, Petizione, Popular financial report
	Performance assessment	Qualità servizio, monitoraggio, Piano esecutivo gestione, Programmazione, Indicatori di performance, Indice, Customer satisfaction, Piano obiettivi gestione
Adapted from: Bearfield, D. A., & Bowman, A. O. (2017). Can You Find It on the Web? An Assessment of Municipal E-Government Transparency. The American Review of Public Administration, 47(2), 172–188.		

Each point of the scale is associated to the presence of one indicator, while not all the dimensions contribute in the same way to the final score (with the money dimension being more represented). In the case of the datasets, the points are assigned based on the availability of one or more datasets that could be associated with one of the four dimensions, while neither the quality of the dataset, nor the abundance of different datasets of the same indicator is assessed. Therefore, if one administration showcases three or more datasets on hiring

(associated to transparency in people management), it will get a maximum of two points. Transparency is then measured on a 0-10 scale that is the result of a process of translating the points (0-28) and converting them with a scale. The conversion of the points on a scale allows clarity of interpretation. The same considerations are valid due to the fact that a scale allows one to cluster municipalities with similar performance in a same score value.

Independent variables

Different independent variables have been selected for this study. The first independent variable is population. Population is – purely and simply – operationalized as the number of Italian citizens resident in a certain city or municipality. Data on population are based on quantitative collections of data from the database of the Italian Institute of Statistics (ISTAT). By positing that population influences transparency the underlying assumption is that the more residents a local government has, the more it will be pushed towards some sort of accountability.

The second independent variable is the level of education of the officials working in the local administrations, which has been operationalized as the percentage of employees of the public administration who hold a bachelor's or master's degree. The assumption, in this case, is that employees with higher levels of education will contribute to a more transparent local administration.

The third independent variable is the organizational resistance. In the case at hand, it is assumed that organizational characteristics might result in some form of resistance to change. Organizational resistance is measured by the percentage of employees who have worked for less than 20 years in the local administration. The higher is the percentage of people that are "new" to the local administration, the more (transparent) open data the same administration is expected to share. The fourth independent variable is related to the political features of the local governments. Since the hypothesis is that parties of the left-wing political spectrum will bring more transparency, the political features are operationalized as a categorical variable. To the purpose of this study, municipalities were categorized as governed by a leftist party when the list of parties supporting the election of the mayor was one of the left-wing, such as the Democratic Party, or the communist and socialist parties. The municipalities in which the mayor could not be considered of left-wing were labelled as "other".

All the data on the independent variables are from December 31, 2018 (*see* p. 54 for Limitations).

Summary of the variables

Table 4 provides summary information on the outcome variable and the independent variables.

Table 4

Summary of the variables

Outcome variable	**Operationalization**	**Source of data**	**Measurement**	**Type**
Transparency	Presence of datasets associated with money, people, infrastructure, and information	Italian National Open data portal	Indicators (0-28) transformed in a Score (0-10)	Count
Independent variable	**Operationalization**	**Source of data**	**Measurement**	**Type**
Population	Number of residents	Istat	Absolute number of residents	Continuous
Level of education	Bachelor Degree or Master's Degree	Istat	Percentage of personnel with a bachelor or master's degree	Continuous
Organizational resistance	Worked less then 20 years in the local administration	Istat	Percentage of personnel who worked for less than 20 years in the municipality	Continuous
Political features	Administrator party	Minister of the Interior	1=left wing party 0=other parties	Categorical

Methods of analysis

The first part of the analysis will be devoted to descriptive statistics with the aim of exploring and describing the phenomenon of open data in Italy. The different thematic areas of open data, that the organizations share them, where these organizations are located; these

are some of the aspects that the descriptive analysis will cover. The aim of the first part is to get an understanding of the sample studied and uncover trends that are not consistent with general expectations (Nishishiba, 2014). Following the first part of descriptive statistics will be a second part in which inferential statistics analysis will assess the influence that the independent variables (may) have on the dependent variable *(H1-H4)*. To this end, the analysis will be conducted through a Poisson model. This model allows to assess how a one-unit change in each of the independent variables (e.g., administrative capacity) affects whether the municipalities provide access to transparent open data or not.

Model selection

To establish whether the independent variables influence the level of transparency of Italian municipalities, the use of a Poisson regression model is suggested. A Poisson model allows to assess how a one-unit change in each of the independent variables (e.g., organizational resistance) affects whether the municipalities provide access to transparent open data.

The Poisson regression model is based on various assumptions (Hilbe, 2014, p. 37).

- The first assumption of the Poisson model is that the dependent variable is a count variable. Count variables are those in the form of integer, non-negative values (that can also include zero). The outcome variable in this case fully complies with this assumption, transparency being measured on a 0-10 scale.
- The second assumption of the Poisson model is that there are one or more independent variables expressed as continuous or categorical measures (Hilbe, 2014, p. 37). In this case, as mentioned in the descriptive section, the independent variables are either continuous or categorical.
- The third assumption of the Poisson model is related to the independence of the observations, meaning that none of the observations can provide information on other observations (Hilbe, 2014, p. 37). In this case, none of the municipalities can provide information on other municipalities.
- The fourth assumption is that the counts (the outcome variable) follow a Poisson distribution as a reference distribution (Hilbe, 2014, p. 37). The assessment of whether in our case the outcome variable follows a Poisson

distribution is conditional on the model and this will be verified in the analysis.

- The last assumption of the Poisson model is equidispersion. This refers to the absence of overdispersion (i.e., a condition where the mean and variance are as close as possible and possibly be the same) (Hilbe, 2014, p. 37).

The model will then determine if the fourth and the fifth assumptions are satisfied.

Validity and reliability

The aim of the thesis is to conduct a reliable analysis that displays high internal and external validity. A reliable study is one in which the results of the analysis do not vary if the same methodology is followed by a different researcher (Toshkov, 2016, p. 117).

The study is based on a first phase of qualitative data collection, *quantitized* through coding, and a second phase of quantitative analysis. To enhance reliability, intended as replicability of the analysis, the process of deriving information for qualitative and quantitative analysis is summarized step-by-step in Appendix A, together with a link for retrieving the data analyzed. The possibility of deriving different results through the analysis of the same data is mitigated by a clear process of coding in which keywords are assigned to each indicator. A good strategy for achieving a higher level of reliability would have been to analyze the qualitative data collected with other coders. Different coders may allow to establish this if different people assign the same dataset. However, due to the scope and the structure of the thesis, it was not possible to assign this task to multiple researchers and achieve inter-coder reliability (Neuman & Neuman, 2014).

The precision of the measurement, the internal validity, is enhanced through the use of several indicators for measuring transparency (Neuman & Neuman, 2014, p. 214). In this case both the dimensions of transparency and the indicators have been thoroughly analyzed and adapted to the Italian case. Each dimension and indicator have been reviewed and the process for incorporating them in order to measure transparency has been fully traced. Appendix A contains the link to the coding strategy.

In respect to external validity, intended as generalizability of the result beyond the analysis of this study, this thesis is designed for the analysis of Italian municipalities and, as

such, the potential for generalization is limited. However, although the conclusions of the study might not hold in other cases (i.e., local level of governments in different states), this is not to say that the study does not contribute to a better understanding of the open data phenomenon. First, the study may provide information on which theoretical assumptions made in other studies are not generalizable to the Italian context. Also, the study might help in questioning whether other measures of transparency applied in different studies or benchmark regarding open data may be improved. Finally, the study may contribute to extending the framework used by Bearfield & Bowman (2017, p. 183) beyond the scope of their research, which was exclusively focused on transparency in municipalities' websites.

Analysis

This chapter discusses the results of the analysis. First the characteristics of the set are described, then the multivariate model will investigate the hypotheses on the influence of institutional and organizational factors on open data mediated transparency in Italian municipalities.

Appendix A contains the links to the dataset, the coding strategy, the syntax, and the outcome of the software used for the statistical analysis.

Descriptive Analysis

Table 5 and Table 6 present the descriptive statistics of the continuous variables. From these tables, it is observed that the number of observations is 48, as one of the 49 municipalities of the sample (Spineda) was excluded based on the absence of information regarding two out of four independent variables.

Table 5

Descriptive statistics of the continuous variables

Variable	N	M	Med	SD	Min	Max
Files (datasets)	2677	55.77	10.00	139.15	4.00	799.00
Transparency	48	2,38	2.00	1.66	0	8.00
Population (Thousands)	48	202.56	43.19	474.70	0.37	2.820.22
Level of education	48	29%	32%	12%	0%	67%
Organizational resistance	48	50%	49%	13%	25%	100%

Notes: Population is log-transformed (natural log) for analysis.

Table 6

Descriptive Statistics on the Categorical Variable

Variable	Description	N.	%
Party	Left parties	26	54%
	Other parties	22	46%
	Total	48	

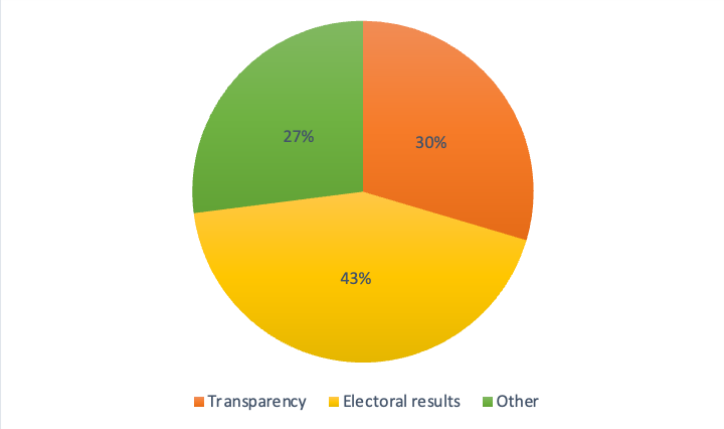
There is a mean of 55.77 among the datasets obtained from the municipalities, a median value of 10 and a standard deviation of 139.15, as observed on Table 5. This implies that the there is a great variation on the number of datasets published by the municipalities This is

corroborated with the fact that some municipalities release as few as 4 datasets, while others release up to 799 datasets.

With regards to the contents of the datasets, as presented in Figure 3, 30% of the datasets have been coded as indicator of transparency, while 43% of datasets shared by the municipalities (over 1,000 datasets out of the 2,677 datasets) concern data on elections, and a residual 27% does not follow in any category.

Figure 3

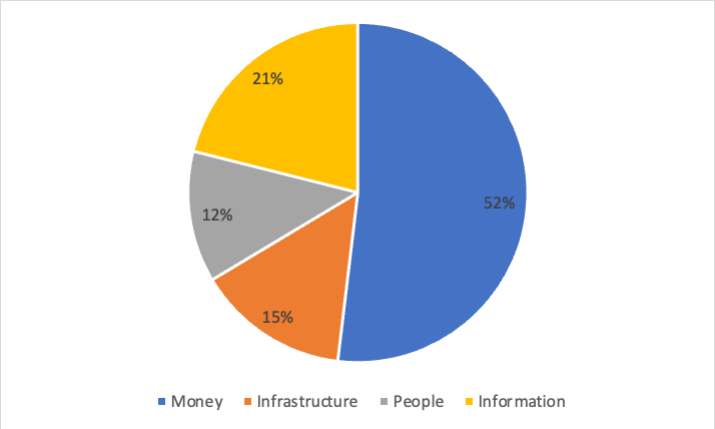
Content of the datasets



As detailed in the previous chapter, transparency has been operationalized as a multidimensional concept that is a compound of the availability of open data in four different dimensions. Figure 4 summarizes the point assigned based on each of the indicators. We see that a vast majority of open data falls into the money dimension, with comparably lower importance placed on information, infrastructure, and people dimensions. The prevalence of the money dimension is not surprising, being more represented in the measurement of transparency (*see* p. 34) with 5 out of the 14 indicators assigned to this dimension. However, even considering the effect of intrinsic measurement characteristics, municipalities seem more inclined to share financial information.

Figure 4

Transparency per different dimension in the sample



The breakdown of the dimensions and indicator, presented in Table 7, shows that there is a prevalence of datasets on financial control and reporting, followed by long-term outlook, and capital planning. We also notice that no information on training and development were available.

Table 7

Datasets per dimension and indicator

Dimensions	Indicators	Datasets
Money	Budgeting process	2
	Contracting/purchasing	66
	Financial controls/reporting	170
	Long-term outlook / Budget / Forecast	112
	Real estate (ownership/rental).	61
People	Hiring	2
	Information on Human Capital	97
	Training and development	0
Infrastructure	Capital planning	108
	Maintenance and work in progress	6
	Project monitoring	1
Information	Digital services	81
	Digital democracy	24
	Performance assessment	82
	Total	792

As mentioned before (*see* p. 36), transparency (or open data mediated transparency) is expressed in a scale that results from the conversion on the points assigned to the presence of one or more indicator in a 0-10 score. Looking at Table 5 (*see* p. 40) we see that that the transparency score in our dataset ranges between 0 and 8. This means that the maximum score achieved by an Italian municipality in terms of transparency is 8. Furthermore, a great number of municipalities are far from this result, with a mean value of 2.37 and a standard deviation of 1.66.

Table 8 presents the result of the ranking of the municipalities based on the transparency scale. As we can see, only two municipalities, Milan and Bologna, achieve what we consider to be sufficient score, while only a few municipalities score more than 2 and 14 out of the 48 municipalities are assigned a score of 0 and 1.

With reference to the first independent variable, population, we can also note that the size of the municipalities included in the sample varies greatly from municipalities with a few residents (as low as 346 as minimum value) to most populous municipalities with over 2 million residents. The municipality that reached the higher transparency score is the municipality of Milan followed by those of Bologna, Lecce, Monza, Napoli, and Torino. Even though many of these municipalities are amongst the larger in size, we see that other highly populated municipalities, such as Bari and Rome with scores of 0 and 1.

The second independent variable, education, indicates the percentage of FTE of the municipalities with higher degrees. On average, almost 30% of the human resources hold a higher degree. Regarding the third independent variable, organizational resistance, we see that on average half of the human resources of municipalities have been in service for less than 20 years (mean value of 50.33%). Concerning the fourth variable, political party, we see in Table 6 (*see* p. 40) that there is an almost even distribution in the sample, with 26 out of the 48 municipalities of the sample falling into the category of left-wing parties.

The possible implications that can be derived from the observation of the characteristics of the sample are further discussed in the following paragraphs.

Table 8

Ranking of municipalities per transparency score (0-10 scale)

Municipality	Transparency	Municipality	Transparency	Municipality	Transparency
Milano	8	Bagolino	2	Vobarno	2
Bologna	6	Berzo Inferiore	2	Zone	2
Lecce	5	Bolzano	2	Bari	1
Monza	5	Crema	2	Città di Castello	1
Napoli	5	Mira	2	Desio	1
Torino	5	Firenze	2	Francavilla Fontana	1
Codogno	4	Galatone	2	Lecco	1
Cremona	4	Incudine	2	Lissone	1
Matera	4	Isso	2	Pavia	1
Trento	4	Latiano	2	Rovereto	1
Arese	3	Lodi	2	Sedriano	1
Lucca	3	Monticelli Brusati	2	Terlizzi	1
Martina Franca	3	Perugia	2	Bareggio	0
Palermo	3	Pian Camuno	2	Narni	0
Prato	3	Pisa	2	Roma	0
Rimini	3	Vestone	2	Schio	0

Inferential Analysis

Before modelling the Poisson regression, a first analysis of the variables allowed this study to identify an issue of over dispersion with regard to the independent variable population. As noticed in the previous paragraph, the municipalities of the sample display a high variance between the least populated municipalities and the highest populated. In order to mitigate the effect that the over dispersion of this variable could have on the regression, for the analysis we will use the natural logarithm of population.

The first question to answer, based on the model assumptions (*see* p. 37), is if the model fits the data or, in other words, if the data follow a Poisson distribution. Table 9 presents the Goodness-of-fit table which informs on how well the data fits the Poisson regression model. The value/df of the Pearson Chi-Square gives .939. A value of 1 shows that there implies that there is an equidispersion whereas a value below 1 like in this case relates under-dispersion but this does not provide serious violation due to the small sample size. The Omnibus test/likelihood ratio chi-square which is a likelihood ratio test that tells if the independent variables perform better collectively than the when the independents variables are not in the model, returns a value of 8.506 (p =0.075) which is not statistically significant implying that the model is not statistically significant.

Table 9

Goodness of fit

Chi square tests	Value	df	Value/df	Sig.
Pearson Chi-Square	40.386	43	.939	
Likelihood Ratio Chi-Square	8.506	4		0.075
Number of cases	48			

The Poisson regression analysis used to predict the influence of the predictors (political party, population, level of education and organizational resistance) on the outcome (transparency) as presented in Table 10, shows that there is no statistically significant relationship/influence of the independent variables “population”, “political party”, “level of

education" and "organizational resistance" on transparency since the p-values (sig.) of each of these variables is greater than 0.05.

Table 10

Results of the multivariate analysis

Independent variables	Sig.	Wald Chi Square	SE	Exp(B)
Political party	0.85	0.35	0.55	0.70
Population	0.06	3.55	0.30	1.78
Level of Education	0.15	2.03	0.20	0.97
Organizational resistance	0.29	1.08	0.17	1.02
Observations	48	48	48	

Discussion

The first aspect (and question) to discuss is: *how do the Italian cities and municipalities score in terms of transparency?*

Overall, the descriptive analysis of the datasets released by Italian municipalities on the National Open data portal seems to confirm that there are different trends worth noticing. First, only a few administrations reach a sufficient score. Also, many Italian municipalities, even those that seem to share a great deal of datasets, in essence, do not provide relevant, transparent, datasets. This is particularly surprising for large municipalities like Roma in which we see a lack of information in all the different dimensions associated with transparency. While some big municipalities perform poorly in terms of transparency, medium-sized local administration, such as Arese and Martina Franca, outperform other by providing relevant information on financial statements, budget, and procurement. Closely examining the case of Martina Franca, for instance, we see elements of meta-transparency that is reached through publishing datasets on the human resources responsible for sharing the datasets per area. Although it cannot be assessed whether the attribution of responsibilities on releasing datasets influence the quality of the data shared, it is certainly worth highlighting that this municipality displays a fair degree of transparency.

Another aspect worth mentioning is that transparency through open data sharing seems to be interpreted as something being related to electoral results. More than 40% of the datasets examined reported electoral results per electoral section. One telling example is that that of Palermo. With its 799 datasets shared (the maximum, as reported in Table 5) it may

appear as most open and transparent municipality of the sample. However, the analysis shows that most of the datasets are redundant data on electoral results (i.e., one dataset per district), while the municipality overall reaches a transparency score of 3 out of 10. The main implication is that, although there is an interest in releasing datasets on electoral results, it is questionable if it is useful to put them in a bundle with data on personnel, financial statements, and infrastructure.

In terms of prevalence of one dimension over the others, we see that the municipalities are more inclined to share financial information. This can ben be the result of the fact that the obligation of sharing financial information traces back to 2013 and that this information is probably already built-in formats (such as xls and csv formats) that allows for an easy release. Most importantly, the main implication is that transparency through open data sharing through the Italian National Open data portal may just follow legal obligations for information sharing, such as the ones laid out by the Transparency Decree of 2013 (and subsequent modifications in 2016). It is interesting to note, also, that some municipalities share only share information regarding their rental agreements or property owned, while omitting information on financial statements and budgets, despite the fact this information is supposed to be part of the same list of financial data to be shared according to the Transparency Decree. This odd trend may suggest that decisions on open data sharing in municipalities are the result of uncoordinated efforts between different departments.

Also, there are reasons to suspect a relationship between legal obligations and open data mediated transparency. In particular, it seems that the older the obligation for sharing data, the higher the number of datasets shared will be. For instance, we see a greater amount of datasets on money (with a legal obligation to share information on them enacted in 2013) than on digital democracy (with a legal obligation of share information on them enacted in 2016). This relationship, if established, could further suggest that there is not a culture of open data sharing in municipalities, and that open data sharing is not considered the implementation of an e-government practice, but rather the fulfillment of a legal obligation. Therefore, the first consideration is that open data sharing by municipalities it is at an early stage of development, with only a few administrations providing data that could help the citizens to inspect the governmental activities through a search in the Italian National Open Data portal.

The second aspect to discuss is the result of the inferential analysis. What *are the institutional and organizational factors that influence open data mediated transparency?*

The first hypothesis posited population as a factor that influences open data mediated transparency. The regression analysis did not support population as leading to more open data mediated transparency. This is surprising, as it is not in line with the robust support of the theoretical framework towards this hypothesis (Grimmelikhuijsen & Feeney, 2017; Moon, 2002; Rodríguez Bolívar et al., 2019; Sol, 2013; Thorsby et al., 2017; Yavuz & Welch, 2014). Therefore, in Italian case, the resources at the disposal of the administration are not a key determinant of how transparent the same administration is. The main implication is that municipalities with higher resources will also not necessarily be more prone to share datasets that are relevant for the citizen to inspect the activities of the local government. This result suggests that much of the discussion on the funds needed for the digital transition in Italy, as in the case of the Next Generation EU funds (*see* p. 9) should also be complemented with an analysis of the factors that determine a more successful implementation of e-government and open data policies. Population size, in fact, is only one possible proxy used for organizational capacity. Insights from qualitative analysis may help corroborate the conclusion that, at the municipal level, more resources do not automatically translate in open data sharing. However, these preliminary findings indicate that much attention devoted on the resources side must be coupled with an understanding of organizational studies on "success stories" of small-medium sized municipalities that reach a fair degree of transparency (such as Codogno, with a transparency score of 4 and 15,419 residents). Once established that open data implementation is not resource-dependent, these studies may investigate possible intra-organizational factors that lead to these results, such as strategical hiring, strategical consultancy, or leadership by one particular department, as found by Chatfield & Reddick (2018).

The second hypothesis postulated that the level of education of the personnel of the municipalities influenced open data mediated transparency. The model shows that there is no support for this hypothesis. One main implication could be that we fail short in assessing what the effects of level of education of the officials are, as the focus on the degree earned may not be the most telling characteristic of the local governmental officials. In other words, although the hypothesis that the level of education of the officials has an impact was rejected, it is hard to understand weather this hypothesis should be ruled out or simply approached in a

different way (e.g., through more granular data on the type of degree earned or a qualitative study on training activities of the personnel of the public administration). The absence of relevance of education may also be an indicator of the fact that, when it comes to open data policies, transparency is not a value acquired by professionalism (or study), but it more likely to be, as suggested by the OECD, a "philosophy"(OECD, n.d.). In other words, if open data sharing is a philosophy that inspires the action of the national and local administrators, it is not necessarily related to the level of education of the employees of the public administrators.

The third hypothesis postulated was that organizational resistance is negatively related with open data mediated transparency**.** With regard to organizational resistance, we do not see the expected outcome that more years in service were expected to have on open data mediated transparency. In this case, the possible implications are related to measurement of organizational resistance and to the role that the public officials have in the context of the implementation of open data policies. Due to the absence of more segmented data on years in services, we cannot exclude the importance of this kind of factor on open data mediated transparency. As suggested for education, the assessment of organizational resistance would benefit from insights from more granular data that could help determine if there is, for instance, a difference between local administration composed of newly hired and local administration with a low turnover.

The fourth hypothesis of the study theorized that open data sharing is positively related with a left-wing administration. Leftist parties, under this hypothesis, would have favored a transparency-oriented agenda. In this case, the hypothesis is not supported. One possible implication could be that the hypothesized effect is not visible as local politics differ greatly differs from national wide politics (and political agendas differ too). Also, along the same lines, it can be argued that leftist area is a spectrum in which more progressive (and transparency-driven) ideas co-exist with more conservative principles. As such, the question to be answered before investigating the impact of political parties is: what dominates their political agenda at the local level?

Conclusion

This study was motivated by the puzzling situation of the different assessments of Italian open data readiness in which, in summary, is not clear how Italy performs. The thesis investigated open data sharing in Italian municipalities to uncover possible factors that influence open data mediated transparency. Open data mediated transparency is the achievement, through open data sharing in the form of datasets, of the ideals of the open government. Far from being a mechanical act that just follows the mere sharing of data via web portals, transparency was operationalized as a combination of four different dimensions closely related to the value that data sharing has for citizens. Transparency through open data sharing is reached by giving citizens (or other stakeholders) access to data regarding human resources, money, infrastructure, and a mix of general information on digital democracy, digital services, and performances. The data that can, based on their content, fall into these categories, however, are however, not easily identifiable. Starting from the analysis of the dimensions and indicators designed by the Pew Institute and further developed by Bearfield & Bowman (2017), a list of indicators that were considered apt for capturing the concept of transparency in Italian municipalities was developed. The analysis of the different dimensions and the development of indicators and keywords was based on a legal analysis and a desk search.

The analysis of the variegated datasets shared by the Italian public administration confirmed that there are different trends worth noticing. First, only a few administrations reach a sufficient score. Also, municipalities that do share open data often share data that are already part of what they are already legally obliged to share. This could suggest that there is no perceived difference in open data sharing and information sharing, although data and information are different concepts. The descriptive analysis concluded that that the culture of open data sharing in municipalities is still in its infancy.

Following the (enhanced)description of transparency in Italian municipalities, an inferential quantitative analysis was conducted in order to understand if any of the hypothesized organizational and institutional factors were influential to open data mediated transparency. The inferential analysis aimed at answering the research question, which is:

What are the institutional and organizational factors that influence open data mediated transparency in Italian local governments?

The regression analysis showed that open data mediated transparency is not influenced by the population size (as a proxy of organizational capacity), level of education, organizational resistance, nor political parties governing the municipalities. Open data mediated transparency does not appear to be resources dependent. Municipalities with higher population sizes, and supposedly, higher slack resources, are not more inclined to share transparent datasets, in contrast with a solid body of literature. This result has various implications as it suggests that more attention should be devoted to other organizational factors that contribute to the success of open data policies. The findings suggest, also, that the level of education may not be significant as the willingness to share data may not be acquired through professionalism. Also, while organizational resistance does not appear to limit open data sharing, more granular data on this phenomenon may help to support this conclusion. The lack of support for political affiliation as a factor influencing open data sharing may also mean that what dominates the political agenda at the local level is not necessarily aligned with the party orientation. A close analysis of the local political agenda (e.g., how transparency is part of the agenda) may help support this conclusion. These results lead to suggestions for future research and policy recommendations.

Research Agenda

This thesis suggests possible areas of inquiries for future research. In the first place, from the analysis of the literature and the analysis conducted in this study it is corroborated the view that that *"a more nuanced approach to evaluate open data is needed"* (Thorsby et al. 2017, p. 60). Among the nuances missing today, we can notice the vertical level of analysis (intended as local administrations), as well as the values that open data are supposed to achieve. Today there is not an indicator that could allow citizens, practitioners, and politicians to understand how their municipality performs in open data implementation in local administrations. Indicators usually rely on the number of datasets shared by the administrations. However, as this study attempted to show, there is a difference between the number of datasets shared and their adherence to the policy objective (in this case - transparency). Therefore, the first possible area of inquiry for the next future is the definition of dimensions and indicators, adapted per country and local administrations, to assess transparency at different levels of government. The same methodology can then be applied for assessing other values that are supposed to be at the base of the decision for implementing open data policies, such as efficiency or privacy. The adoption of indicators that tie open data

sharing to public values (such as transparency) has a great potential as it can also shed light on how – somehow – superficial the assessment of e-government may be by only focusing on the sheer number of the data shared or processed.

Academia can also attempt to address one of the limitations of this study, the methodology for data collection (*see* next paragraph), through the development of applications that automatically code the data entered in open data portals. Today, the Italian National Open Data portal, paradoxically, does not allow one to easily retrieve information on the datasets available and, therefore, the analysis of the data shared can be done either by manual search or through developing application on CKAN. The analysis of datasets from a public administration standpoint using application developed with information technology scholars can effectively contribute to the cross-fertilization of the disciplines and most importantly can also link public values to the user-side. For the local administration it could be easier to meet the demand for open data once an unbiased assessment of how open data implementation fare is available.

Another possible area of investigation could be, at the national level, the analysis of how the Italian agency for digital innovation conceptualizes transparency and if their interpretation of the concept of transparency influences the features of the Open Data Portal. For example, in the process of conducting this research, I requested a list of open data per administration and category, and I received a prompt, yet unsatisfactory answer on the availability of a list of the datasets and local administrations (i.e., they are only able to provide only a non-exhaustive cvs format file). This simple interaction during the research phase suggests that cooperation, as well as the way transparency is intended by the public officials, can reveal interesting aspects linked to e-government initiatives, their implementation, and their likelihood of success and effectiveness.

In addition, research in the area of law and regulation can also investigate the expansive effects that regulations may have in opening up the government. We see, in fact, that local municipalities seem inclined to share open data of the categories of information that they are already required by the law to share (such as information on financial statements).

Finally, a qualitative analysis might complement the results of this study. For instance, some factors, as meta-transparency in one municipality (intended in this thesis as the availability of information on how the official in charge of sharing certain categories of

datasets is doing so) suggest that a qualitative analysis may help to uncover factors that could be key determinant in open data mediated transparency. A qualitative study may also help to unpack organizational factors that cannot be captured through a quantitative study, such as the influence of training and development policies or managerial capacity on transparency.

Policy recommendations

This thesis suggests that the effort towards a (local) open government did not reach the policy objective of a more transparent public administrations when it comes to datasets provided by municipalities in the Italian National Open Data portal. Different policy recommendations may be formulated based on the analysis presented in this study.

First, it is suggested that policymakers change their focus from organizational capacity to public management. The evidence from this study, in fact, suggests that organizational capacity (assessed through population size) is not the only critical factor that determines the success of these policies. Indeed, while financial resources to be invested in human resources and information technologies are supposed to be an important factor in innovation policies, it emerges that other elements, such as "meta-transparency" through coordination in data sharing, might enhance open data mediated transparency. The great variety of number of datasets and information shared by the municipality suggests that there is no a common culture of open data sharing. It seems, in fact, that in some small municipalities the choices made on the variety and quantity of datasets shared are left to the uncoordinated initiative of some departments. Therefore, the first recommendation is to create common strategies for open data sharing, ideally with clear guidelines for departments in charge of data sharing, and a list of datasets that match the interest of the citizen with regard to governmental activities (money, infrastructure, people, and information).

In addition, it is suggested that the policymakers review the regulation on transparency and open data sharing (Transparency Law). While the objective of information transparency is to release it for a bounded period of time (three years and five years) and within a specific timeframe (after 180 days or years), open data have different policy goals and the two concepts, although similar, are not identical. The overlapping of the two concepts may not help the local administrations to have a clear picture of the opportunities of open data sharing.

Limitations

The major limitations of the study are related to the operationalization technique used for the outcome variables, the measurement of the independent variables, the generalizability of the results, and the size of the sample. Regarding the operationalization of transparency, the methodology adopted appeared particularly apt for capturing (and monitoring) the progress made by municipalities that are already implementing open data policies, but it may need refinement for capturing the progress made by local administrations that are starting to adopt open data policies. In other words, the measurement of transparency does not go as far as creating differences among municipalities that "just started" (e.g., in 2020) sharing open data and municipalities that have consolidated procedures and practices, and, as a consequence, a higher number of datasets. Also, as highlighted in the previous paragraph, open data mediated transparency seems to overlap with the concept of transparent information sharing as set out by the Transparency Law. This possible overlapping suggests that the operationalization of open data mediated transparency should be further calibrated making a clear distinction between legally required information, and other datasets that, although non formally required, can be useful for inspecting the activity of the government. Also, the quality of the dataset, intended as adherence to the requisites of open data (reusable format, license, etc.) was not assessed in this study.

With regards to the measurement of the independent variables, the data collected report information on 2018. This is a major limitation, as, due to scope of the analysis, it was not possible to assess at which point in time the local administrations released the datasets and, therefore, to link data release to a precise electoral mandate. This limitation was mitigated by an analysis on the electoral mandate that showed low variance in political party affiliation (pre and post 2018) as reported in Appendix B, with more changes occurred after 2021.

Regarding inferential analysis, the - relatively - small dimensions of the sample of this study is not ideal for Poisson regression analysis. In particular, there is still the risk that such a small sample was not able to identify the effect that the institutional, organizational, and political factor have on open data mediated transparency (Toshkov, p. 243)

The study is also affected by a limited generalizability of the results. However, although the conclusions of the study might not hold in other cases (i.e., local level o

governments in different states), that is not to say that the study does not contribute to a better understanding of the open data phenomenon. First, the study may extend the application of the framework used by Bearfield & Bowman (2017, p. 183) beyond the scope of their research, which was exclusively focused on transparency in municipalities websites. Also, the study may suggest an approach to open data evaluation in countries characterized by multi-level governance.

Another limitation is the one related to the methodology adopted for data collection and coding. Due to limitations of the Italian National catalogue, data were manually retrieved, and all the 2,677 datasets examined are the result of an extensive data entry process. Manual data entry exposes the study to the risk of typos and material errors. This limitation was addressed and mitigated using automated formulas in the analysis spreadsheet.

Finally, the study is limited by the scarce availability of information for formulating alternative hypotheses on open data mediated transparency. For instance, information on training and development of the human resources, as well as the department that are responsible for sharing information (meta open data) limit the possibility of formulating hypotheses on organizational and institutional factors that may influence open data mediated transparency. This can be defined as a sort of circular reference that studies on open data may encounter. As it was suggested before, limitations concerning the availability of data, as well as other limitations, may be addressed by future studies.

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Appendix A

- Process of data collection - .xls file explaining the process of data collection
- Data File - .xls file containing the coding strategy and the dataset
- SPSS syntax and output - .spss file and file word with the screenshot and the script

https://drive.google.com/drive/folders/1plbtP0BdFfkIJHOLHWSgcb4lm33zFaxq?usp=sharing

Appendix B

Variance (pre and post electoral mandate) of municipalities' political affiliation

N	Municipality	Political party (ante 2018 - if different)	Political party (0;1) – 31 December, 2018	Political party (after 2018 – if different)
1	Arese		1	
2	Bagolino		0	
3	Bareggio	Left parties from 2013 to 2018	0	
4	Bari		1	
5	Berzo Inferiore		0	
6	Bologna		1	
7	Bolzano		1	
8	Città di Castello		1	
9	Codogno		0	
10	Crema		1	
11	Cremona		1	
12	Desio		1	Change in 2021
13	Mira		1	
14	Firenze		1	
15	Francavilla Fontana	Left parties from 2014 to 2018	0	
16	Galatone		1	
17	Incudine		0	
18	Isso		0	
19	Latiano		0	
20	Lecce		1	
21	Lecco		1	
22	Lissone		1	

N	Municipality	Political party (ante 2018 - if different)	Political party (0;1) – 31 December, 2018	Political party (after 2018 – if different)
23	Lodi	Left parties from 2013 to 2017	0	
24	Lucca		1	
25	Martina Franca		1	
26	Matera		1	Change 2021
27	Milano		1	
28	Monticelli Brusati		0	
29	Monza		0	
30	Napoli		1	Change in 2021
31	Narni		1	
32	Palermo		1	
33	Pavia		1	Change in 2019
34	Perugia		0	
35	Pian Camuno		0	
36	Pisa	Left parties from 2013 to 2018	0	
37	Prato		1	
38	Rimini		1	
39	Roma		0	Change in 2021
40	Rovereto		1	
41	Schio		0	
42	Sedriano		0	Change 2021
43	Terlizzi		0	
44	Torino		0	Change in 2021
45	Trento		1	Change in 2020
46	Vestone		0	
47	Vobarno		0	Change 2019
48	Zone		0	