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# A logit model to assess the transparency of Italian public administration websites☆

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ABSTRACT

The reform of Italian public administration, which started in the 1990s, shifted the consolidated paradigm towards a results-oriented management of the *res publica*. The new regulatory framework emphasised the role of the evaluation process carried out by the designated audit authorities (OIV or NDV); legislators provided a new information system principally making accessible the audit-related data and other information via the institutional websites of Italian cities. In this context, the Minister of Public Administration promoted the platform called *'Bussola della Trasparenza'*, the goal of which is to ensure easy access to institutional data of the municipalities and to evaluate the available information. However, we found that the results provided by this platform were unreliable. Our study of 525 municipalities showed severe discrepancies with *Bussola's* evaluation, suggesting a lack of transparency. We therefore propose a logit model as an alternative framework to evaluate the probability that a municipal website is compliant with the new regulations using a set of predictors to consider a broader and more complete definition of transparency. This model is thought to be a practical tool to correctly evaluate the compliance of municipal websites.

## 1. Introduction

The process of public administration reform arose from legislators' need to measure performance in accordance with information transparency. The internal and external audit system adopted by firms enables them to understand their customers and to evaluate the resources available, thus achieving, effectively, the programmed targets and remodelling, when necessary, the strategy to comply with their stakeholders' needs. In the same way, public administration (PA) needs control mechanisms to evaluate and manage its performance in order to meet the needs of citizens. However, performance measurement in PA presents many challenges when compared with private companies (Rubbettino, 2006). For example, public administrators often operate in the absence of a market (Smith, 1995), have multiple responsibilities and targets in relation to the provision of high-quality services to users, and must demonstrate democratic and transparent behaviour. We can say that PA and citizens operate in a regime of information asymmetries (Mayston, 1993; Mulgan, 2000; Sinclair, 1995), since the actions of the 'agent' (public administration) are not always verifiable by the 'principal' (citizens). To reduce this asymmetry, information transparency in PA becomes crucial: it guarantees democratic control of institutions and favours trust in administrative governance (Bovens, 2005). These considerations motivated the Italian reform that started in 2008, as this paper will discuss.

In their book *Transparency: The Key to Better Governance*? Hood and Heald (2006), and Heald in his paper of 2012, defined transparency in public administration as a situation in which the results of the 'rulers' can be observed by the 'ruled', in other words, voters. This definition of transparency has been used in this study to assess the problem of finding an adequate dependent variable. In Italy, the need to make visible to citizens the results of rulers was met by increasing the information requirements for PA websites, a result realised through the introduction of a new regulatory framework in 2009. This led us to use as an outcome variable, a dummy variable that takes the value of 1 when the website of a municipality is compliant with the current regulations, 0 otherwise. Indeed, as da Cruz et al. have pointed out (2016, p. 3), '*official websites [...] have fundamentally changed the relationship between citizens and their governments by facilitating access to massive amounts of data'*, a phenomenon named 'e-government', which this paper investigates in relation to website transparency.

The aim of this paper is to build a model capable of providing information on the compliance of Italian PA with the current normative

☆ All the sections are attributable to both the authors. The dataset and the sample design are attributable to Benedetto Torrisi.

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regarding transparency standards of institutional websites. We are interested in the transparency of Italian PA because this concept inspired the entire PA reform, given the importance of the existing relationship between transparency and citizens' trust in government actions (Welch, Hinnant, & Moon, 2005); the respect of the new framework means that municipalities offer high transparency standards. This model could represent a useful tool for audit authorities in verifying whether a municipality is compliant with the current standards. To our knowledge, the present study represents the first attempt to elaborate a quantitative model of the discussed issue, at least for Italy. The objective was achieved through a survey conducted on 525 Italian municipalities to understand how the 'Brunetta Decree'[1] (Legislative Decree 150/2009) and the Freedom of Information Act (introduced with Legislative Decree no. 97/2016[2]) were received and transposed by Italian PA (for a discussion on the Italian Freedom of Information Act, see Bisio, 2017).

The reform responded partly to the widespread perception of inadequate public sector performance. Such a perception is derived from a condition of opacity (Piotrowski & Bertelli, 2010) and of a partial or incorrect knowledge of the results that PA produces. Furthermore, this opacity makes it difficult to recognise and reward those public managers who contribute, more than others, to achieving important results.

The remainder of this paper is organised as follows. Section II focuses on the concept of PA performance in Italy and its evolution over three decades. Section III briefly describes the principal characteristics of Italian reform. In section IV, we reveal the aim of the present study and some of the economic implications of better government transparency. In section V, using previous studies, we define the concepts of transparency and e-government, the link between these notions, and how transparency can be measured. Section VI describes the variables used for the econometric model and the sample designed for the study, composed of Italian municipalities representative of every region. Section VII discusses the collected data and some results of the statistical analysis implemented, comparing these findings with the evaluation made by the *'Bussola della Trasparenza'* ('Compass of Transparency').[3] Section VIII illustrates an econometric model to assess the relationship between websites' transparency with respect to the sampled cities and a set of predictors to obtain a practical tool for detecting anomalies. The final section concludes the paper.

## 2. The Italian regulatory framework

The need to guide the practice of PA towards measurable and evaluable results is one of the cornerstones of the vast process of PA reform, which started in the 1990s in Italy, under the name of 'New Public Management' (Barzelay, 1999). This systemic change aimed to achieve governance principles aligned with the other Western economies, following the precept of 'government by measurement' (Bird, 2004; Bird et al., 2005).

The paradigm of 'formal control' was replaced by 'substantive control', that is, a control focused on results, matching the estimated targets with the obtained results (Peta, 2016). State bureaucracy is therefore considered to be an organisation that produces goods and services (Gallo, Giusti, Ladu, Lupò, & Sambucci, 2013), in which the mechanisms of supervision are conceived to ensure a rational and efficient functioning of the public apparatus. The final goal of this process was the renewal of the public sector, limiting self-interested and inefficient behaviours.

Three great moments have characterised the concept of performance over the decades that we can summarise in the following three points.

- *Performance as regulatory compliance* characterised the 1980s, and it considered public performance as the implementation of imperative rules (Perez, 2010). Only in the early 1990s was there a trend reversal: from the figure of the citizen as a passive subject to the idea of the citizen as a 'customer' of the administration.
- *Performance as managerial efficiency* characterised the 1990s (Perez, 2010): performance was measured in terms of resources (inputs) and goods and services (outputs). To better understand the impact of public administration choices on the community, the concept of *value for money* has been introduced (Glendinning, 1988). The new target was the creation of the best output for the community.
- *Performance as the creation of public value* (for a discussion, see Rutgers, 2014) is the paradigm of the new millennium; performance is measured in terms of results and in terms of the ability of PA to respond to citizens' problems (Moore, 1995; Perez, 2010). A positive evaluation means being able to maintain social capital in order to strengthen territorial competitiveness through better public services (Andrews, 2012). The Italian reform aimed to involve citizens in increasing the degree of transparency.

In line with the evolution of the concept of performance, the regulatory scheme has been consequently adapted; the law commonly known as the 'Brunetta Reform' (Legislative Decree no. 150/2009) is now particularly important. Legislative Decree no. 150/2009 is a regulatory intervention designed to strongly reform the PA model developed in previous years, reaffirming that the central role of the evaluation process is to improve the performance of PA. The reform focused on transparency: higher standards of transparency would favour meritocracy and make visible the decisional process of PA to citizens. The reform represented a step forward respect to the previous system. A fundamental improvement is represented by the abandonment of the 'self-referential' conception of PA. As pointed out by Hinna and Lasalvia (2011), one of the major flaws of the previous normative system was the marginal role attributed to citizens. The new reform involves citizens in the evaluation process in order to obtain an immediate feedback. This purpose was accomplished defining new standards of transparency and a detailed 'performance cycle' regulated by article 4 of the Brunetta Reform. Public administrators must ensure the 'maximum transparency' during all stages of the performance cycle (article 3 and article 11). The link between transparency and performance provided by the reform is clear: citizens are now able to monitor the actions of PA and directly evaluate the performance of their administrators. This should reduce the likelihood of inefficient behaviours by PA; furthermore, PA must ensure that citizens have access to all the needed documentation. A more detailed discussion on the role of transparency and performance in the reform can be found in Hinna and Lasalvia (2011).

A qualifying element of the reform is the selective attribution of economic and career incentives to the most deserving individuals (for a discussion on the theory of incentives, see Dixit, 2002). Thus, recognising the effort of virtuous PA provides a strict link between remuneration and performance, given that short-run target measures are only weakly related to long-run efficiency (Heckman, Heinrich, & Smith, 2002). This purpose (better performance, article 1 of the decree) is reached, providing a new system of transparency and accessibility of information related to various organisational and managerial aspects of PA. The Independent Performance Evaluation Bodies (in Italy, 'O.I.V.' or simply 'OIV') under article 14 of the law are entrusted with control functions and new monitoring tasks.

## 3. The new reform

The Brunetta Decree aimed to '*ensure high quality and economic*

[1] The Decree takes the name of its creator Renato Brunetta, the then Italian Minister of Public Administration. The juridical path of the law started in 2008 with Decree 112/2008 proposed by Brunetta; the process ended with Decree 150/2009 promoted by the same Minister, which was, for simplicity's sake, named after him.

[2] http://www.funzionepubblica.gov.it/foia-7.

[3] The '*Bussola della Trasparenza*' is an open web system that allows public authorities and citizens to automatically analyse and monitor the transparency of institutional sites in compliance with law 'D.lgs 33/2013'.

**Table 1**
Chronology and content of the principal reforms. Detailed information can be found in Section II, III and V.

| Law | Year | Content |
|---|---|---|
| Legislative Decree no. 150/2009 (Brunetta Decree) | 2009 | The Brunetta Decree introduced the idea of transparency as 'total accessibility'. |
| Legislative Decree no. 33/2013 | 2013 | Legislative Decree no. 33/2013 regulates the notion of civic access improving the understanding of the Brunetta Decree. This decree extended accessibility to all information related to the public functions of administrations. |
| Legislative Decree no. 97/2016 | 2016 | This decree introduced the Freedom of Information Act (FOIA). The FOIA, differently from Legislative Decree no. 33/2013, regulates the 'generalized' civic access: citizens have access to all the information of PA, with the only exception of peculiar cases established by law. |

*standards of the service [of PA] valorising the results and the performance of individuals and of the organisation*' (article 2, '*Object and purposes*') making transparency one of its inspiring principles (article 3, '*General principles*'). In brief, the system predisposed by the new reform is centralised by two independent authorities. The older evaluation team (NDV) is an independent body that is responsible for the direct evaluation of the performance and the results of the individuals in charge of organisational positions. A fundamental task of this authority is to ensure the correct implementation of the internal control system. In addition, it collaborates with the administration and with managers for organisational and managerial improvement of the local authority. The new 'OIV' covers similar tasks: it is primarily called upon to ensure the correctness of the evaluation process and of the annual assessment on the performance of each administrative structure. It also submits a proposal to evaluate the performance of the senior executive and evaluates the price system. Local PA can continue to use the NDV or it can institute the new OIV (Bertagna, 2010). Members of the two authorities should respect several requisites: for example, members of the NDV must have experience in related fields and possess juridical, economic, managerial, or organisational skills, whereas members of the OIV cannot be in a conflict of interest, even potential, in relation to the administration. The Brunetta Decree also establishes that the composition of OIV must ensure equal opportunities for both men and women.

The most important novelty of the law (enforced later by Legislative Decree no. 33/2013, then amended by Legislative Decree no. 97/2016, known as the Freedom of Information Act) is the emphasis given to the idea of 'civic access': all citizens have access to data and any denial must be properly justified. In addition, citizens can request further data and documents that PA is not obliged to publish pursuant to Legislative Decree no. 33/2013, with no costs except for the costs of reproduction. PA websites must provide a section (named 'Transparent Administration') dedicated to transparency where acts, curricula, and remunerations of members of the authorities are made accessible to users. The idea of promoting transparency by law is intended to achieve 'total accessibility' (article 11, Brunetta Decree), by providing information on the websites of PA institutions. Table 1 synthesises the legislative process of the reform.

## 4. Aim and economic relevance of the study

Public sector transparency is a way to improve general welfare and promote efficient and effective governments. It is an instrument that allows every citizen to monitor, directly and personally, how public resources are allocated and how the supervision process is carried out. It affects economic efficiency in several ways.

In Italy, legislators made great efforts to improve the transparency standards of municipalities. This process culminated in a mechanism for supervising the compliance of municipalities attributed to the 'Compass of Transparency'. The results of these inspections are published in theCompass. Unfortunately, this methodology lacks both consistency of evaluation and rigour. During the process of data gathering, we discovered that in many of the websites declared 'transparent' by the Compass, several pieces of information were missed. We therefore ideated this model to improve the process of supervision and to favour the correct application of the law. Given the impossibility of the audit authority inspecting in detail each Italian municipality, our model, through a fast algorithm, assesses the probability that a website is transparent or not. Using this metric, the authority may decide to strengthen its control of that website in order to avoid evaluation mistakes. The correct classification of transparent websites is essential to make the new law concrete and useful for citizens and to avoid PA engaging in distorted behaviours. Our model is statistically robust and has a high predictive power, as will be shown in section VIII. This approach, albeit conceived for the Italian case, could also be adopted by other countries with the same normative principles or spirit, making the model relevant also for international literature. Several variables validated in the present work via our econometric framework could be used in other studies to test the degree of transparency of municipalities in different countries.[4] Furthermore, the discussed topic is a hot topic at the international level, and the Italian case is interesting given Italy's status as a G7 member.

Several studies have shown the economic relevance of the problem. Information transparency affects public administration in several ways (Otenyo & Lind, 2004). In public personnel administration, it influences the process of hiring and promotion because qualitative information allows economic agents to improve their decision-making process (Islam, 2003). It influences the accountability of PA and the actions of public financial managers; it represents an important solution to problems associated with a deficit of fairness and equity. Furthermore, Mikesell (2000) referred to transparency as a central standard for evaluating revenue systems. Vicente, Benito, and Bastida (2013), in studying the effect of municipal financial transparency on the magnitude of political budget cycles, found that total spending increases in election years in low-transparent municipalities, whereas the same effect is not present in municipalities with high transparency standards. In Italy, the need for transparency emerged since many municipalities experienced a default or a situation of financial distress caused by questionable decisions by their administrators, generating a sense of mistrust in institutions. To avoid the occurrence of similar events that cost communities relevant resources, the decisional process of municipalities was made externally observable, and the role of evaluation authorities was better defined. Other economic reasons also drove the reform, such as the need to reward virtuous administrations and the need to answer the ancient question 'Who Watches the Watchmen?' (Cappelletti, 1983). With our study, we not only investigate the effectiveness of these measures in Italy but also propose a quantitative model to evaluate the transparency and compliance of an institutional website. This framework could be implemented in other countries

[4] Discussing national cases is commonplace in the international literature because it could offer benchmarks and comparisons for other countries, as Svensson (2007, p. 128) wrote in his paper on the Swedish system: 'Although the Swedish system might, perhaps, be a benchmark for transparency in appointments and promotions in higher-education institutions, there is potential for further research in exploring the degree of transparency that is required in other countries. It would be interesting to make comparisons among various countries with regard to their legal requirements for transparency and their procedures for ensuring that such transparency is achieved.'

(adapting the model to the normative context), and because it is computationally fast, it represents a concrete tool for audit authorities to inspect the regularity of PA websites, with a noteworthy saving of time and resources. This synthetic overview of the phenomenon of transparency highlights its importance and why we put effort into this empirical analysis.

## 5. Literature review

The present study contributes to expanding the e-government framework in two directions: first, presenting the Italian case and how the new Italian regulatory framework addressed the problem of transparency of PA improving accessibility to institutional websites; second, providing an econometric model that links the probability that a website is compliant with the current norms to a set of explanatory variables, which were validated in the present study based on previous studies and the Italian normative requirements. To achieve these purposes, it is important to define the concepts investigated and to understand how other researchers have approached the issue.

### 5.1. Notion of e-government

With the development of information and communication technologies (ICTs), citizens now have infrastructure for accessing information easily, but the dimension of the information system is directly related to the size of government organisations (Kim & Cho, 2005). In order to simplify access to this great quantity of data, governments prefer the Internet as a channel for information, and institutional websites have become the favoured platform to provide information to citizens. Open-government initiatives (data portals, websites for public monitoring, etc.) have become fundamental for the promotion of government transparency, participation, and collaboration (Cullier & Piotrowski, 2009; Da Cruz, Tavares, Marques, Jorge, & De Sousa, 2016; Jaeger & Bertot, 2010), and most of these initiatives have been realised via the Internet. Indeed, e-government could be defined, *tout court*, as '*the use of information and communication technologies, particularly the Internet, in government.*'[5] Nevertheless, there is no widely accepted definition in the literature because several definitions are too normative, others are too narrow or imprecise, and others are too vague (López-López, Iglesias-Antelo, Vázquez-Sanmartín, Connolly, & Bannister, 2018; Yildiz, 2007). The OECD (2003, p. 63) defined e-government as '*the use of ICTs, and particularly the Internet, as a tool to achieve better government*', whereas Dawes (2009, p. 36) provided a longer definition by which '*[e]-governance*[6]*comprises the use of information and communication technologies (ICTs) to support public services, government administration, democratic processes, and relationships among citizens, civil society, the private sector, and the state.*' This definition is satisfactory for our work since the purpose of the Italian reform was the use of the Internet to support government administration, as well as to promote the democratic process and the relationships between citizens and the state. In Italy, e-government was the instrument used by legislators to increase the transparency of PA decisional processes. For the purposes of this article, there is no need for a more in-depth analysis of the concept, and interested readers are referred to other studies (Yildiz, 2007; Palvia & Sharma, 2010; Bannister and Connolly, 2012).

### 5.2. Notion of transparency

The important role that transparency and the right to access government information play in favouring the good functioning of democracy, such as trust in institutions, participation, informed decision-making, and the provision of reliable data to government stakeholders, is internationally recognised (Bertot, Jaeger, & Grimes, 2012; Cullier & Piotrowski, 2009; Quinn, 2003; Reylea, 2009; Shuler, Jaeger, & Bertot, 2010). Providing unanimously accepted definitions of transparency and e-government is a difficult task. A general definition related to information systems refers to transparency as the flow of information amongst stakeholders to take informed decisions and actions (Hosseini, Shahri, Phalp, & Ali, 2018). In general, transparency concerns the provision of information from one agent to another (Grigorescu, 2007); however, this definition is problematic because it neglects the importance of the willingness to provide such information (López-López et al., 2018). As pointed out in the introduction, Hood and Heald (2006) and Heald (2012) defined transparency, with respect to public administration, as a situation in which the results of the 'rulers' can be observed by the 'ruled', in other words, voters. This definition is very important, and it certainly inspired the present work, but it can be expanded to include an understanding of why the idea of transparency is strictly linked with e-government. Transparency serves to provide information to citizens, allowing them to monitor the actions of their government (Grimmelikhuijsen & Meijer, 2014; Meijer, 2012; Meijer, 2013). For this to be possible, paraphrasing Kim et al. (2005, p. 649), information should be freely available and directly accessible to those who will be affected by decisions. Furthermore, sufficient information should be provided in understandable forms and media (Kim et al., 2005), and it should be reliable (Armstrong, 2005). Even though this definition creates other problems (López-López et al., 2018), it is very close to the spirit of the Italian reform: the new norms, indeed, aimed to make the notion of 'civic access' effective via the free and direct access of users to institutional data made available on PA websites. This first challenge, as we will show, was only partly overcome by Italian PA. The second challenge was to provide information via 'understandable forms and media'. Unfortunately, although many compliant websites provided the needed information, accessing this information was not simple (see section IX). For the purpose of our study, transparency is defined by the degree to which the information required by the Italian law is publicly accessible online. Other dimensions of transparency (such as intelligibility, reliability, or quality of the information disclosed) are excluded from this operational definition.

Finally, we have to conceptually link e-government with the notion of transparency. Many scholars have shed light on the beneficial role of transparency in increasing trust in governments (Bovens, 2005; Etzioni, 2010; Grimmelikhuijsen, 2012; Hood & Heald, 2006; Kjaer, 2004; Welch et al., 2005) and improving the quality of decision-making and accountability (Ferry & Eckersley, 2015; Islam, 2003; Jaeger, 2005; Kardan & Sadeghiani, 2011), and it is believed that when ICTs are applied by governments, transparency and efficiency are improved as a result of the increasing efficiency in information delivery (Andersen et al., 2010; López-López et al., 2018; Moon, 2003; Ruano de La Fuente, 2014).[7] Consequently, many countries (like Italy) have used e-government to provide better and easily accessible information in order to increase transparency.

### 5.3. Measuring local government online transparency

As Da Cruz et al. (2016) point out, scarce attention has been dedicated to measuring local government transparency, and most studies have focused more on the usability and comprehensiveness of websites than on proposing new methods to quantify PA transparency. A largely diffused methodology consists of computing indices to measure

[5] https://www.britannica.com/topic/e-government.

[6] As pointed out by one of the referees, e-government and e-governance are often used interchangeably, but e-government should be properly considered as the system that delivers e-governance.

[7] Transparency may also have negative effects resulting, for example, from public disappointment with information overload and confusion (Da Cruz et al., 2016; Fung, Graham, & Weil, 2007), but these issues are not covered in this paper.

transparency. For example, Dowley (2006) gathered data relative to Romania, Hungary, Poland, Slovakia, Bulgaria, Estonia, and Latvia, and developed an additive index of decision-making transparency by local governments that ranges from 0 to 7, where these scores represent the number of actions taken by the respondents. Piotrowski and Bertelli (2010) measured the transparency of the New Jersey local PA using item response theory to build a transparency index. Da Cruz et al. (2016) developed a municipal transparency index to measure the quality of the democratic local government in Portugal based on information available on official websites.

The approach followed in this paper is more complex because we aimed to build a quantitative model to gauge the probability that institutional websites were compliant with the Italian regulatory framework. Our analysis is based on the logit model (see section VIII) in line with other studies that aimed to measure transparency in open-government initiatives adopting a similar framework (Grimmelikhuijsen & Welch, 2012; Ingrams, 2018). The choice of adequate explanatory variables to build the model was difficult. These variables (see section VI.II) derive mainly from the Italian normative framework, but we tried, when possible, to validate the choice of the Italian legislators using the existing literature. Several studies seem to confirm that ensuring gender balance can positively affect the transparency of an administration. The quality of information was improved in private sector boards of directors when gender balance was ensured, perhaps because women are more ethically minded than men (Ittonen, Miettinen, & Vähämaa, 2010; Khazanchi, 1995). This result was recently confirmed by De Araujo and Tejedo-Romero (2018). The authors found that '*the representation of women in local political life will increase information transparency and reduce information asymmetry in municipalities*' (De Araujo & Tejedo-Romero, 2018, p. 66). However, the same authors had previously found that gender has no significant effect on the index of transparency considered for Spanish municipalities (De Araujo & Tejedo-Romero, 2016). Another variable considered by some authors as effective in explaining PA transparency is the population of the municipality (Albalate, 2012; Cárcaba & García, 2008; Navarro Heras, Mora Agudo, & Delgado Jalòn, 2016). Finally, in Italy, there is the perception that ICT has been underused by administrations in certain geographical areas. Although a study by Banca d'Italia showed that geographical location is not a crucial determinant of the performance gap between Italian regions (Arpaia, Doronzo, & Ferro, 2009), we wanted to investigate how transparency eventually varies from area to area. In addition to these variables, we added other variables based on Italian laws; we do not find comparison for these variables in the international literature since they concern the Italian normative context (for example, the variable 'OIV').

## 6. Methodology

### 6.1. Sample design and dataset

Table 2 shows our reference universe, characterised by 8000 Italian municipalities divided by regions. This represents our first layer of stratification and is the first logical step to build a representative sample. From the population of 8000 units ($N$), a sample of 525 ($n$) municipalities was randomly extracted and proportionately stratified by the number of municipalities present in each region (first level of stratification) and by population (second layer of stratification). The sample numerosity is derived using the formula for large and finite populations without replacement using a level of confidence of 95% and a margin of error of 25. The second stratification, which was applied after stratifying for regions, uses the usual bands established by Italian laws (for example, the threshold of 15,000 is fixed by Law no. 81/1993). We carried out a statistical survey of 364 municipalities with

**Table 2**
Regional distribution of Italian cities with relative weights ($W_h$) and resulting sub-samples ($n_h$).

| REGIONS OF ITALY | MUNICIPALITIES | $W_h$ | $n_h$ |
|---|---|---|---|
| LOMBARDY | 1528 | 19% | 100 |
| PIEDMONT | 1202 | 15% | 79 |
| VENETO | 576 | 7% | 38 |
| CAMPANIA | 550 | 7% | 36 |
| CALABRIA | 409 | 5% | 27 |
| SICILY | 390 | 5% | 26 |
| LAZIO | 378 | 5% | 25 |
| SARDINIA | 377 | 5% | 25 |
| EMILIA ROMAGNA | 334 | 4% | 22 |
| ABRUZZO | 305 | 4% | 20 |
| TRENTINO | 294 | 4% | 19 |
| TUSCANY | 279 | 3% | 18 |
| APULIA | 258 | 3% | 17 |
| MARCHES | 236 | 3% | 15 |
| LIGURIA | 235 | 3% | 15 |
| FRIULI VENEZIA GIULIA | 216 | 3% | 14 |
| MOLISE | 136 | 2% | 9 |
| BASILICATA | 131 | 2% | 9 |
| UMBRIA | 92 | 1% | 6 |
| AOSTA VALLEY | 74 | 1% | 5 |
| TOTAL | 8000 | 100% | 525 |

Source: our elaboration based on data published in www.comuniverso.it.

fewer than 5000 inhabitants ($n_{h1}$), 112 municipalities with between 5000 and 15,000 inhabitants ($n_{h2}$), and 49 municipalities with more than 15,000 inhabitants ($n_{h3}$). This stratification is synthesised in Table 3. The reference period is March–July 2016.

Since 'Operation Transparency' launched in 2008, every administration is required to communicate and publish online the following:

- offices entrusted to external consultants and collaborators;
- payments to public employees;
- executive information (curriculum vitae, remuneration and institutional information).

Following the approval of Legislative Decree no. 33/2013, this approach was extended to all the data, documents, and information on the activities carried out in the exercise of public functions by the various administrations; each institutional website was to provide the section named 'Transparent Administration'. Legislative Decree no. 33/2013 has been subject to significant changes by Legislative Decree no. 97/2016. The intention of the legislator is already evident from the modification of the title of Decree 33 with the introduction of the notion of 'civic access'. The rationale for these reforms is to ensure that citizens have a higher level of information easily accessible via institutional websites. Therefore, we analysed all the sampled city websites gathering all the needed information in order to conduct a statistical analysis of the supervisory and informative system of PA. The purpose was to use these data as evaluation elements (Fig. 1) to conclude if a website is compliant or not. This allowed us to gather the dependent variable series, to juxtapose it with the results given by the Compass of Transparency, and to evaluate the discrepancy between our results and the Compass's results. Finally, we used these data to build our logit model, which provides a better description of the considered websites.

### 6.2. Variables description

As already mentioned, the dependent variable used is the dummy variable 'Web Transparency', which takes value of 1 when the municipality's website is compliant with the current regulatory framework, 0 otherwise. We compared the information required by Decree no. 150/

**Table 3**
Second stratus of sampling.

| REGIONS | MUNICIPALITIES $N_h$ | POP $N_{h1} \leq 5000$ | $W_{h1}$ | $n_{h1}$ | POP $5000 < N_{h2} \leq 15{,}000$ | $W_{h2}$ | $n_{h2}$ | POP $N_{h3} > 15{,}000$ | $W_{h3}$ | $n_{h3}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| LOMBARDY | 1528 | 1059 | 69% | 69 | 357 | 23% | 23 | 112 | 7% | 7 |
| PIEDMONT | 1202 | 1064 | 89% | 70 | 91 | 8% | 6 | 47 | 4% | 3 |
| VENETO | 576 | 304 | 53% | 20 | 212 | 37% | 14 | 60 | 10% | 4 |
| CAMPANIA | 550 | 335 | 61% | 22 | 130 | 24% | 9 | 85 | 15% | 6 |
| CALABRIA | 409 | 323 | 79% | 21 | 66 | 16% | 4 | 20 | 5% | 1 |
| SICILY | 390 | 205 | 53% | 13 | 118 | 30% | 8 | 67 | 17% | 4 |
| LAZIO | 378 | 251 | 66% | 16 | 74 | 20% | 5 | 53 | 14% | 3 |
| SARDINIA | 377 | 314 | 83% | 21 | 47 | 12% | 3 | 16 | 4% | 1 |
| EMILIA ROMAGNA | 334 | 141 | 42% | 9 | 137 | 41% | 9 | 56 | 17% | 4 |
| ABRUZZO | 305 | 249 | 82% | 16 | 39 | 13% | 3 | 17 | 6% | 1 |
| TRENTINO | 294 | 255 | 87% | 16 | 29 | 10% | 2 | 10 | 3% | 1 |
| TUSCANY | 279 | 126 | 45% | 8 | 98 | 35% | 6 | 55 | 20% | 4 |
| APULIA | 258 | 85 | 33% | 6 | 101 | 39% | 7 | 72 | 28% | 5 |
| MARCHES | 236 | 170 | 72% | 11 | 42 | 18% | 3 | 24 | 10% | 2 |
| LIGURIA | 235 | 183 | 78% | 12 | 41 | 17% | 3 | 11 | 5% | 1 |
| FRIULI VENEZIA GIULIA | 216 | 152 | 70% | 10 | 53 | 25% | 3 | 11 | 5% | 1 |
| MOLISE | 136 | 125 | 92% | 8 | 8 | 6% | 1 | 3 | 2% | 0 |
| BASILICATA | 131 | 101 | 77% | 7 | 25 | 19% | 2 | 5 | 4% | 0 |
| UMBRIA | 92 | 60 | 65% | 4 | 16 | 17% | 1 | 16 | 17% | 1 |
| AOSTA VALLEY | 74 | 73 | 99% | 5 | 0 | 0% | 0 | 1 | 1% | 0 |
| TOTAL | 8000 | 5575 | 70% | 364 | 1684 | 21% | 112 | 741 | 9% | 49 |

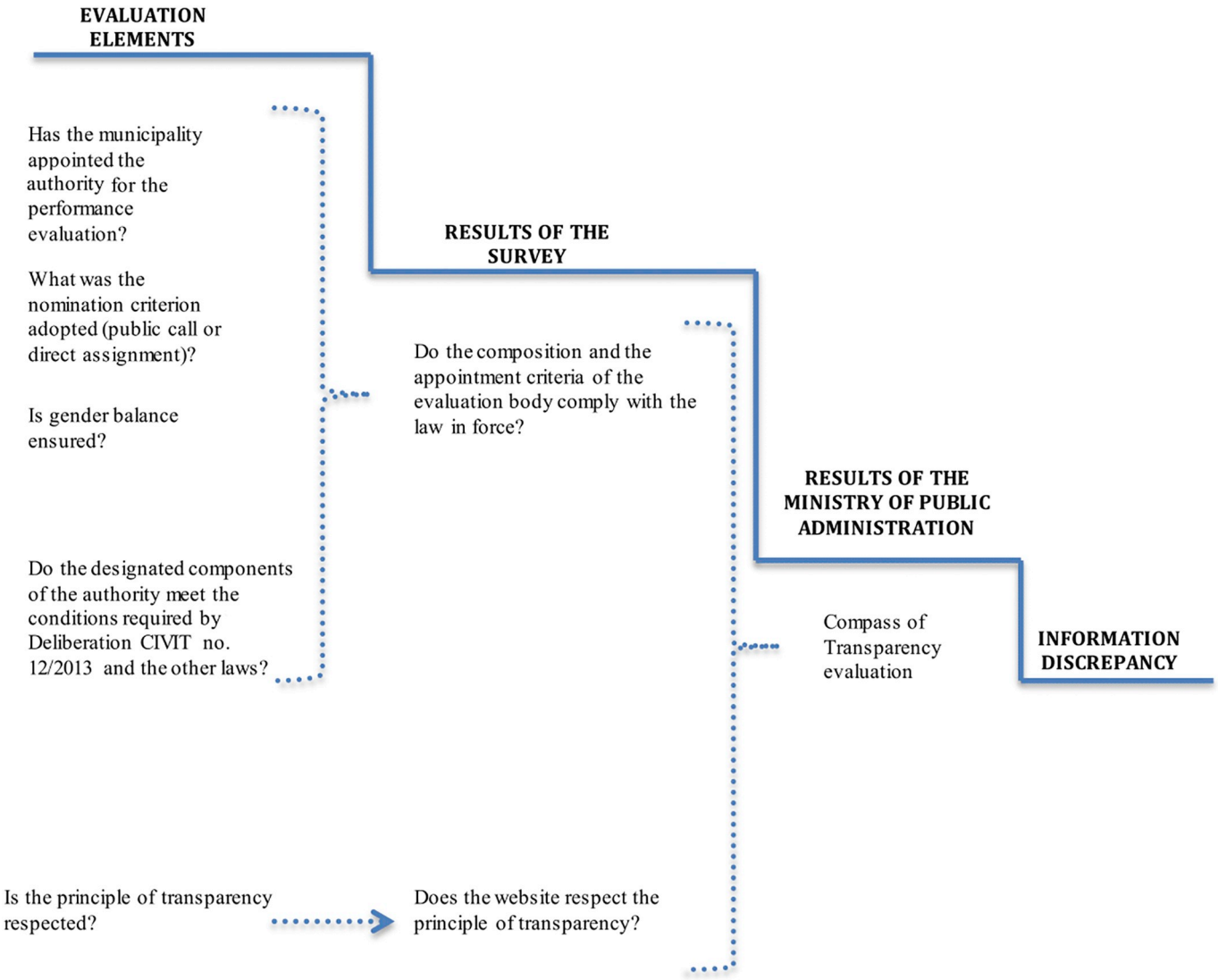


**Fig. 1.** The synoptic schema of the study.

**Table 4**
Explanatory variables of the model.

| Variable | Definition | Principal normative |
|---|---|---|
| NomTransp | Dummy variable for the appointment transparency of the authority's members (1 if respected). | D. Lgs. No. 150/2009, D. Lgs. No. 33/2013 |
| CvTransp | Dummy variable for the transparency of members' curricula (1 if respected). | D. Lgs. No. 150/2009, D. Lgs. No. 33/2013 |
| Appointment | Dummy variable for the correctness of the appointment procedure (1 if respected). | D. Lgs. No. 150/2009, D. Lgs. No. 33/2013 |
| Gender Balance | Number of female components of the evaluation body. | D. Lgs. No. 150/2009 |
| OIV | Dummy variable for the type of body (1 if it is an OIV). | D. Lgs. No. 150/2009 |
| Call | Dummy variable which takes value 1 if the assignment is made by public call. | No requirements |
| North, Centre, Islands | Dummy variables for the geographical area. | No requirements |
| POP | Population of the municipality. | No requirements |

2009 and other laws to the information provided by each website of the sample. If the website was compliant with the legislation, we classified it as transparent.

The variable 'Gender Balance' is a variable for the number of female members of the evaluation body and serves as a measure of gender balance. The current legislation requires that gender balance must be ensured, and any derogation from this principle may be only admitted if properly justified.

'NomTransp' is a dummy variable for the appointment transparency of the authority's members;'CvTransp' is a dummy variable for the transparency of members' curricula; and 'Appointment' is a dummy variable for the correctness of the appointment procedure. All these criteria are required by the new legislation. In particular, all the acts of the process are public: the acts of the component's designation; their curricula and remuneration; the opinion of the 'Commission for the evaluation, the transparency, and the integrity of public administrations'; and the relevant application must be published on the institutional website of the administration with the attached documentation. The lack of one of these parameters could represent evidence that the website had low standards of transparency. As stated by Grimstone (2016), the procedure for making public appointments should be open and transparent, and we want to prove whether this consideration is warranted.

'OIV' is a dummy variable that takes the value of 1 if the municipality adopts an OIV, and 0 otherwise. This variable is included to test whether the adoption of the new audit body is relevant in explaining the higher transparency standards of websites. 'Call' is a dummy variable that takes the value of 1 if the assignment is made by public call, and 0 otherwise. It is legitimate to expect that appointment processes carried out by means of public calls could have a positive impact on the level of transparency of a municipality after the appointment of the audit authorities. 'North', 'Centre', and 'Islands' are three dummies to take into account the geographic area in which the municipality is located (the variable 'South' is excluded to avoid the 'dummy variable trap'), whereas POP is the population of the municipality. The inclusion of these variables responds to two important questions: are municipalities in the Northern area more transparent than those located in the Southern area? Are smaller municipalities less transparent than bigger ones? This last point is particularly interesting from an international perspective since, in other contexts, such as in the US, it has been noted that small municipalities have been subject to numerous corruption scandals (CAPI, 2016).

At this point, it should be noted that the empirical literature is not very supportive of the present study because, to our knowledge, this is the first attempt to quantitatively model the phenomenon relative to the Italian case, so we had to transpose part of the Italian norms into variables. Variables such as 'CvTransp' or 'Appointment' are fundamental indicators for the audit authority during the evaluation process to conclude whether a website is transparent or not; excluding such variables from the model would deeply reduce its practical use as an instrument for the detection of anomalies. The set of explanatory variables is described briefly in Table 4.

## 7. Some data on the Italian situation[8]

### 7.1. Inhabitants and macro-areas

The sample of municipalities analysed consists of 69.7% of municipalities with fewer than 5000 inhabitants, 13.9% with between 5000 and 10,000 inhabitants, 9.1% with a population in the range of 10,000 to 20,000, 5.7% with a population in the range of 20,000 to 50,000, and 1.5% with over 50,000 inhabitants. These classes are gathered into a variable called 'POPclass'.

Of the municipalities, the 14.3% are in Central Italy,[9] the 9.9% in the Islands, the 58.9% in the North and the 16.9% in the South. Of the total sampled municipalities (525), 20.2% nominated an OIV and 21% an NDV, whereas 57.9% did not declare any assessment body (as it appears from the institutional websites). Of the audit agencies, 34.9% were nominated for direct assignment, while only 3.2% took place by call; the remaining percentage represents municipalities without any statement on the nomination modality.

### 7.2. Transparency of appointments and curricula

Of the municipalities that did not respect the principles of transparency in the appointment of the evaluation authority, 41% were found in the North; 11.4% were in Central Italy; 10.3% were in Southern Italy; and 6.5% were in the Islands. The chi-square test suggests that the transparency of the nomination of the evaluation authority is independent of the geographical area at 5% significance (chi-square = 7.507 with $p$-value = .057). Only 33% of municipalities complied with the publication of CVs (curricula vitae) on their website, and this percentage differed among geographic areas. Only 17.9% of municipalities in the North, 6.1% in the South, 5.1% in the Islands, and 3.8% in Central Italy respected this principle. Furthermore, there was a statistically significant dependence between geographical areas and the publication of the curricula of the evaluation body's members (chi-square = 11.071 with $p$-value = .011).

### 7.3. Gender balance and assignment type

Among the municipalities that have nominated the evaluation body, 22% respected the principle of gender balance, and the 20% did not, while for the remaining 58% this information was not provided.

Direct affiliation seems to prevail mainly in the Islands (44.2%) and

[8] From now on, a level of significance of 5% is assumed. Therefore, we reject the null hypothesis if $p$-value < 5%.

[9] If we had adopted the first layer of stratification (regions) also for data description, we would have had very little synthesis. If we had represented the data using the population, we would have had mixed municipalities from every geographical area. The problem is that the geographical macro-area could be important in explaining differences among municipalities, because of different cultures or laws. Therefore, to satisfy the need for synthesis and to avoid losing important geographical differences, we preferred to present the information using macro-areas.

**Table 5**
Results of the Compass of Transparency evaluation for geographic macro-areas.

| Geographic macro-area | Italian Compass of Transparency evaluation | | |
|---|---|---|---|
| | Negative | Positive | Total |
| CENTER | 4.2% | 10.1% | 14.3% |
| ISLANDS | 2.1% | 7.8% | 9.9% |
| NORTH | 15.0% | 43.8% | 58.9% |
| SOUTH | 8.0% | 9.0% | 17.0% |
| Total | 29.3% | 70.7% | 100.0% |

in the South (39.3%), followed by the North (34.6%) and Central Italy (24%). Furthermore, there is a statistically significant dependence between the geographic location and the choice of the assignment type (chi-square = 22.753 with p-value = .001).

### 7.4. Appointment of members and general website transparency

In relation to our survey, over 68% of the analysed municipalities lacked information on how the members of the commission were nominated, with noteworthy geographical differences: 39.8% of this lack of information was registered in the North, 11.2% in the Central Italy, 11% in the South, and 6.3% in the Islands. Of the municipalities analysed, 82% did not respect the website transparency requirements of the legislators, with a major portion of this violation registered in the North; moreover, the transparency of the website depends on the geographical location of municipalities (chi-square = 11.619 with *p*-value = .009).

### 7.5. Discrepancies with the Compass of Transparency

The results of our evaluations contrast with the Compass of Transparency. Table 5 shows the results of the Compass of Transparency recorded in the same municipalities aggregated by geographic areas; the percentages are different from our results.

The Wilcoxon test (Table 6) and the non-parametric sign test (Table 7) highlight significant differences between our results on website transparency and the results of the Compass of Transparency (Wilcoxon rank test = −15.045 with p-value = .000 and sign test = −14.990 with p-value = .000). From these data, we understood that the process of evaluation of PA websites in Italy was not appropriate to the need for transparency that animated the new reform. These considerations convinced us to propose a different model to endow the audit authority with a new instrument to detect non-compliant administrations.

## 8. The econometric model

Table 8 reports the non-parametric correlation matrix for the variables considered. The variables are defined as described in section VI.II. The variable 'POPclass' contains the classification of the sampled municipalities by population, whereas the variable 'Compass of Transparency evaluation' is a dummy variable that takes the value of 1 when the transparency principles are respected based on the Compass of Transparency survey. Since we are using a non-parametric matrix, the variable 'Gender Balance' used in this case is dichotomous and takes a value of 1 if the balance requisite is respected, and 0 otherwise. The correlation matrix allows us to measure the 'association' between the variables, especially with our dependent variable 'Website Transparency'. We can draw the following conclusions:

- There is a positive correlation between members correctly nominated and website transparency of a city (0.494);
- There is positive correlation between the nomination transparency and website transparency (0.678);

**Table 6**
Wilcoxon test between the Compass of Transparency evaluation and the results of our survey.

| | N | Mean Rank | Sum of Ranks |
|---|---|---|---|
| Negative Ranks | 31(a) | 170 | 5270 |
| Positive Ranks | 308(b) | 170 | 52,360 |
| Ties | 186(c) | | |
| Total | 525 | | |

Wilcoxon Signed Ranks Test = −15.045 p-value = .000.
a Compass of Transparency results < Results of our survey.
b Compass of Transparency results > Results of our survey.
c Compass of Transparency results = Results of our survey.

**Table 7**
Sign test between the Compass of Transparency evaluation and the results of our survey.

| Compass of Transparency results - Results of our survey | N |
|---|---|
| Negative Differences(a) | 31 |
| Positive Differences(b) | 308 |
| Ties(c) | 186 |
| Total | 525 |

Sign Test = −14.990 p-value = .000.
a Compass of Transparency results < Results of our survey.
b Compass of Transparency results > Results of our survey.
c Compass of Transparency results = Results of our survey.

- If the curriculum of a member is published, the transparency on the website grows (0.656);
- Where the gender balance is respected, there is lower website transparency (−0.26);
- There is a positive correlation between the appointment via public call and website transparency (0.586);
- There is a high positive correlation between the nomination transparency of an OIV or an NDV and the appointment via public call (0.835);
- The respect of curricula transparency is highly and positively correlated with the type of assessment authority (0.702) and positively correlated with the population of a city (0.292);
- Population is positively correlated with the appointment via call (0.256);
- The Compass of Transparency evaluation is non-significantly correlated with any of the considered variables (the only significant correlation is with POPclass, but the tau-b is nearly zero), whereas the results of our survey are highly significant.

Given that all the variables are significantly associated with our dependent variable, the next step is to build the logit model. This model could represent a predictive framework to evaluate the probability that an institutional website complies with the regulation of transparency by studying the impact of different factors. Our dependent variable is 'Website Transparency', which is a dichotomous variable that takes the value of 1 when the municipality's website respects the transparency standards required by the new regulatory framework, and 0 otherwise. We used the logit model to study this relationship using a set of 10 explanatory variables; the choice of a logit makes the interpretation of the results easier than other models. For example, the probit model gives similar results but has a more intricate construction; furthermore, the logit framework seems to be a solid basis for studies of this kind (see, for example, Grimmelikhuijsen & Welch, 2012; or Ingrams, 2018). We also considered the possibility of modelling the phenomenon under analysis using structural equation modelling to highlight the paths and relations between the variables, but the issue could be implemented in future studies.

The probability that the variable 'Web Transparency' takes a value of 1 is modelled as follows:

**Table 8**
Non-parametric correlation matrix (the * indicates a significant coefficient at 5%).

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 OIV | tau-b | 1.000 | 0.827 | 0.730 | 0.702 | 0.690 | 0.496 | 0.066 | 0.078 | 0.274 |
| | p-value | . | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.111 | 0.243 | 0.000 |
| 2 Call | tau-b | 0.827* | 1.000 | 0.835 | 0.727 | 0.707 | 0.586 | 0.040 | −0.083 | 0.256 |
| | p-value | 0.000 | . | 0.000 | 0.000 | 0.000 | 0.000 | 0.357 | 0.205 | 0.000 |
| 3 NomTransp | tau-b | 0.730* | 0.835* | 1.000 | 0.620 | 0.628 | 0.678 | 0.041 | −0.161 | 0.235 |
| | p-value | 0.000 | 0.000 | . | 0.000 | 0.000 | 0.000 | 0.349 | 0.016 | 0.000 |
| 4 CvTransp | tau-b | 0.702* | 0.727* | 0.620* | 1.000 | 0.648 | 0.656 | 0.007 | −0.027 | 0.292 |
| | p-value | 0.000 | 0.000 | 0.000 | . | 0.000 | 0.000 | 0.879 | 0.692 | 0.000 |
| 5 Appointment | tau-b | 0.690* | 0.707* | 0.628* | 0.648* | 1.000 | 0.494 | 0.060 | −0.043 | 0.231 |
| | p-value | 0.000 | 0.000 | 0.000 | 0.000 | . | 0.000 | 0.168 | 0.521 | 0.000 |
| 6 Website Transparency | tau-b | 0.496* | 0.586* | 0.678* | 0.656* | 0.494* | 1.000 | −0.037 | −0.260 | 0.235 |
| | p-value | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | . | 0.392 | 0.000 | 0.000 |
| 7 Compass of Transparency evaluation | tau-b | 0.066 | 0.040 | 0.041 | 0.007 | 0.060 | −0.037 | 1.000 | 0.091 | 0.095 |
| | p-value | 0.111 | 0.357 | 0.349 | 0.879 | 0.168 | 0.392 | . | 0.176 | 0.022 |
| 8 Gender Balance | tau-b | 0.078 | −0.083 | −0.161* | −0.027 | −0.043 | −0.26* | 0.091 | 1.000 | 0.030 |
| | p-value | 0.243 | 0.205 | 0.016 | 0.692 | 0.521 | 0.000 | 0.176 | . | 0.627 |
| 9 POPclass | tau-b | 0.274* | 0.256* | 0.235* | 0.292* | 0.231* | 0.235* | 0.095* | 0.030 | 1.000 |
| | p-value | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.022 | 0.627 | . |

$$P(\text{Web Transparency} = 1|X_1 = x_1, \ldots, X_{10} = x_{10}) = \frac{\exp(\beta_0 + \beta_1 x_1 + \ldots + \beta_{10} x_{10})}{1 + \exp(\beta_0 + \beta_1 x_1 + \ldots + \beta_{10} x_{10})} \quad (1)$$

where the $\beta_i$s are the parameters; $x_1$ = NomTransp; $x_2$ = CvTransp; $x_3$ = Appointment; $x_4$ = Gender balance; $x_5$ = OIV; $x_6$ = Call; $x_7$ = North; $x_8$ = Central Italy; $x_9$ = Islands; $x_{10}$ = POP. We preferred to include the continuous variable 'POP' in the model rather than 'POPclass' because of its easier interpretation. The results of the logit models are reported in Table 9. Model (I) uses the complete set of variables; the likelihood ratio test shows that the model is statistically significant, whereas the McFadden R-squared[10] shows a remarkable goodness of fit of our model to the observed data. The coefficients of the variables 'NomTransp', 'CvTransp', and 'Appointment' (all significant at 5%) have a positive sign, which means that when the website presents one of these standards, compared to the case when these standards are absent, it is more likely to be transparent, ceteris paribus. The dummies for the geographic macro-areas show negative coefficients with the greater modulus, associated with municipalities in Central Italy. This means that if the municipality is located in Central Italy, its website is less likely to be compliant compared to the case of municipalities located in Southern Italy (the benchmark category). The variable 'Gender Balance' is poorly significant, whereas the variables 'OIV', 'Call', and 'POP' are highly non-significant.

In model (II), we dropped the variables 'OIV' and 'POP', which were highly non-significant in model (I). Now, the variable 'Call' is significant at 10%, and its coefficient is negative, which means that when the assignment is made by public call, it is less likely that the municipality's website results are transparent, compared to the case when the assignment is committed in an alternative way or it is not specified. Based on the Akaike criterion (AIC) and the adjusted R-squared, model (II) seems to be the best. In model (III), we also drop the variable 'Call', which shows the highest *p*-value in model (II). The variable 'Gender Balance' is now significant at 5% and shows a negative coefficient; therefore, when the female component of an authority's team increases, it is less likely to observe a compliant website. This seems reasonable since the gender balance also requires male members in the team to be respected and therefore to be in compliance with the regulatory framework.

All three models show irrelevant levels of collinearity because of the low VIFs. Furthermore, all three models have a negative intercept, which means, consistent with our analysis, that when all the variables are null, a lack of transparency is more observable on the institutional website. The number of cases correctly predicted is approximately 93.5% (491 cases) across all models,[11] which shows that this econometric framework can be used to assess what elements should be revised in order to improve the level of transparency of local PA websites and to identify non-compliant municipalities. As pointed out by one of the referees, the variable 'Gender Balance' seems weak; therefore, we ran a final model, (IV), which excludes all the variables from model (I) with coefficients non-statistically significant at 5%. Even though this model is not the best one based on the AIC or the McFadden R-squared, it is the most accurate because it predicts correctly more than 94% of cases (495 cases). Fig. 2 shows a plot of the actual websites' values (1 if transparent, 0 otherwise) and the prediction based on this last model.

Our estimates suggest that respect of transparency in the appointment procedure of the authorities' members and the adequate disclosure of their curricula are the key factors to ensure the proper transparency of the institutional websites, thus increasing the probability of complying with the new legislation. Nevertheless, the adequacy of the appointment procedure and the geographical location of a municipality play a central role in explaining the phenomenon of PA web transparency in Italy. The gender balance and the type of assignment play a marginal role in our framework, whereas the population size and the choice of the OIV authority are negligible factors.

## 9. Discussion and conclusions

This survey highlighted the difficulties experienced by Italian municipalities in adopting all the requirements imposed by the new norms. Our study conducted between March and July 2016 found that the majority of the sampled cities did not publish the required information

[10] It is the alternative measure to the traditional R-squared for the logit model.

[11] We have also to point out that testing the algorithm on the whole dataset may generate overfitting. Therefore, we have also tested the algorithm splitting the dataset into a training set and a test set using the common 80–20 rule (80% of the data in the training set and the remaining 20% in the test set). The data were allocated in the two sets to maintain the sample representativeness. We estimated model II (because it is the model with the lowest AIC) on the training set, and then we tested its performance on the test set. The accuracy for the training set was 89% of cases correctly predicted, whereas the accuracy on the test set was 84%. The performance was slightly lower regarding the training on the whole dataset but very high also in this case, showing that our results are not due to overfitting.

**Table 9**
Results of the logit models.

| | Coefficient | P-value | Slope | VIF | Coefficient | P-value | Slope | VIF |
|---|---|---|---|---|---|---|---|---|
| | | (I) | | | | (II) | | |
| Constant | −7.6460*** | < 0.0001 | | | −7.6972*** | < 0.0001 | | |
| NomTransp | 4.5080*** | < 0.0001 | 0.0481 | 1.982 | 4.4762*** | < 0.0001 | 0.0480 | 1.933 |
| CvTransp | 5.9124*** | < 0.0001 | 0.1063 | 2.264 | 5.8241*** | < 0.0001 | 0.1026 | 2.121 |
| Appointment | 1.1561** | 0.0163 | 0.0034 | 2.187 | 1.1298** | 0.0173 | 0.0034 | 2.101 |
| Gender Balance | −0.5419* | 0.0563 | −0.0012 | 1.437 | −0.5444* | 0.0527 | −0.0013 | 1.410 |
| OIV | −0.0862 | 0.8440 | −0.0002 | 1.437 | | | | |
| Call | −1.2761 | 0.1502 | −0.0017 | 1.143 | −1.4453* | 0.0977 | −0.0018 | 1.069 |
| North | −2.1736*** | 0.0049 | −0.0072 | 1.868 | −2.1225*** | 0.0054 | −0.0070 | 1.872 |
| Center | −2.6125*** | 0.0056 | −0.0031 | 1.626 | −2.5399*** | 0.0059 | −0.0030 | 1.614 |
| Islands | −2.2231** | 0.0128 | −0.0025 | 1.463 | −2.1971** | 0.0140 | −0.0025 | 1.460 |
| POP | < −0.0001 | 0.5118 | < −0.0001 | 1.179 | | | | |
| McFadden R-squared | 0.7098 | | | | 0.7091 | | | |
| Adjusted R-squared | 0.6652 | | | | 0.6726 | | | |
| Akaike criterion | 165.0739 | | | | 161.5394 | | | |
| Likelihood ratio test chi-square (p-value in brackets) | 349.975 [0.0000] | | | | 349.904 [0.0000] | | | |
| Observations | 525 | | | | 525 | | | |
| | | (III) | | | | (IV) | | |
| Constant | −7.6812*** | < 0.0001 | | | −7.7742*** | < 0.0001 | | |
| NomTransp | 4.424*** | < 0.0001 | 0.0493 | 1.932 | 4.4187*** | < 0.0001 | 0.0471 | 1.915 |
| CvTransp | 5.7194*** | < 0.0001 | 0.1021 | 2.108 | 5.5215*** | < 0.0001 | 0.0869 | 2.030 |
| Appointment | 1.1328** | 0.0147 | 0.0036 | 2.099 | 1.0440** | 0.0213 | 0.0031 | 2.022 |
| Gender Balance | −0.5752** | 0.0377 | −0.0014 | 1.386 | | | | |
| OIV | | | | | | | | |
| Call | | | | | | | | |
| North | −2.0145*** | 0.0068 | −0.0069 | 1.852 | −2.0617*** | 0.0059 | −0.0069 | 1.851 |
| Center | −2.3952*** | 0.0081 | −0.0031 | 1.605 | −2.2576** | 0.0117 | −0.0029 | 1.603 |
| Islands | −2.4251*** | 0.0051 | −0.0028 | 1.459 | −2.5481*** | 0.0033 | −0.0028 | 1.453 |
| POP | | | | | | | | |
| McFadden R-squared | 0.7034 | | | | 0.6943 | | | |
| Adjusted R-squared | 0.6710 | | | | 0.6659 | | | |
| Akaike criterion | 162.3481 | | | | 164.7110 | | | |
| Likelihood ratio test chi-square (p-value in brackets) | 347.096 [0.0000] | | | | 342.338 [0.0000] | | | |
| Observations | 525 | | | | 525 | | | |

Note: * means significance at 10%, ** means significance at 5%, *** means significance at 1%.

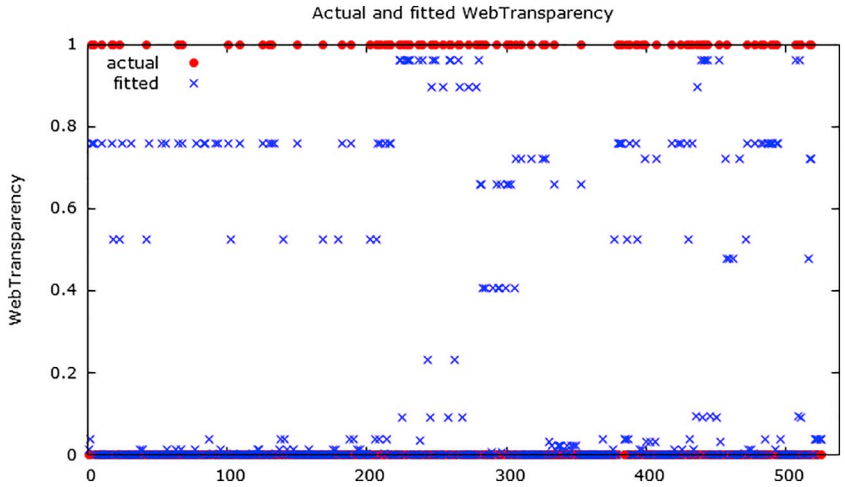


**Fig. 2.** Plot of the actual values (1 if transparent, 0 otherwise) and estimates based on the logit model (IV).

on the institutional site; in other words, municipalities did not respect the principles of transparency established by the Italian regulatory framework. Furthermore, the municipalities that respected these principles, in many cases, presented several problems on their websites in terms of usability for citizens. This is in contrast with the Brunetta Decree and with the recent measures of the Freedom of Information Act (Legislative Decree no. 97/2016), making access to information, even now, very difficult. The transparency promoted by the Brunetta Decree still appears, after years, as not sufficiently implemented even though all the analysed municipalities present the 'Transparent Administration' section on their institutional websites.

These considerations are evident from the results obtained over the 525 sampled cities. For example, in Lombardy, 64% of municipalities lacked information or the available information had not been updated. The same situation was also present in Piedmont, where the percentage reached 70%. In regions such as Campania, Calabria, Lazio, Abruzzo and Marches, the percentage of municipalities lacking important information varies between 53% and 76%. The most striking data,

however, were undoubtedly those obtained from cities in Trentino Alto Adige and Molise. More than 90% of the sampled cities in Trentino did not provide information about the assessment authority; in Molise, all the sampled cities failed to comply with the required websites transparency. This result may be induced by random sampling, nonetheless, these data are concerning.

The results clearly show how the Compass of Transparency overestimates the compliance of municipal websites. Indeed, from the study of the non-parametric correlation matrix (Table 8), it emerged that none of the considered variables were consistently correlated with the result of the Compass of Transparency. The reason for this discrepancy lies probably in the fact that the Compass of Transparency deals principally with an idea of information availability restricted to few parameters (and its methodology is unclear), whereas our evaluation considers a broader and, in our view, more complete definition of transparency, including factors such as the nomination criteria, gender balance, or the professional profile of the nominated members, which are fundamental parameters introduced by the new reform. The logit model provided in this paper is a more powerful practical tool for the audit authority to detect anomalies in the municipalities' websites given the inconsistency of the Compass. Using few predictors, our model was able to correctly classify most of the sampled municipalities. The audit authority could fix a threshold of tolerance (e.g., 60%) and decide to deepen the inspection of the municipalities whose probability of compliance is below the chosen threshold. Owing to its flexibility, this framework can be adapted to other countries with a similar legislation.

The appointment procedure and transparency of curricula are key factors, whereas relevant differences exist between cities in different geographical macro-areas (Southern cities did not behave worse than Northern cities). The phenomenon of transparency appears to be less related to the assignment typologies and to the dimension of the considered city, expressed in terms of population, which allow us to exclude the phenomenon of 'Small Town Corruption' (CAPI, 2016).

Italy appears to be far from the auspicated paradigm proposed by Mabillard and Zumofen (2017) of governmental transparency beyond the '*simple access to information and disclosure of administrative data*'. The authors named as 'active transparency' the voluntary release of information by the government, whereas 'passive transparency' refers to the requests of citizens to obtain the needed information.

The correct use of transparency has the power to create a virtuous circle that triggers dynamic political change (Worthy, 2010) and to produce positive impacts on society, such as increased trust and reduced corruption (Etzioni, 2010). As stressed in this work, several Italian municipalities lacked the information required by the new regulatory framework, making the auspicated shift of paradigm unrealised for the moment.

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## Authors statement

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