Factors Influencing Mandatory and Voluntary e-Disclosure Diffusion by Municipalities

Benedetta Gesuele and Concetta Metallo

Abstract This study takes a first step toward understanding the diffusion of e-disclosure tools by Italian municipalities. We construct a synthetic indicator for measuring mandatory disclosure through website and an indicator for voluntary disclosure through social media usage, such as Facebook and Twitter. Moreover, we propose a research model to analyze the determinants of e-disclosure tools diffusion in order to underline any differences for mandatory and voluntary e-disclosure. We use OLS regression modeling on 93 Italian municipalities' data during 2012. The central idea is that determinants can influence in different ways the mandatory and voluntary e-disclosure tools diffusion.

Keywords e-Disclosure municipality • Facebook • Twitter • Website

1 Introduction

Nowadays, characterized by profound economic and financial crisis, citizens need to control the public activities and public entities' performance. Consequently, public entities have the need to disclosure information concerning their activities. New technologies can help governments in information provision, and the Internet has become an important tool to increase the public transparency and accountability [1], key drivers for good governance in the public sector. The Web 2.0 applications, and social media in particular, represent the last step in Internet development usage by the government. Social media provide new and innovative methods to improve the interaction between the government and citizens about policy issue and to enable citizens to participate the democratic process [2].

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In the last years, many municipalities have added to their official website (e-disclosure) also several social media to communicate with citizens, as an additional form of online communication (such as Facebook, Twitter, and YouTube). Our study focuses on Web 2.0 application usage by municipalities because of their rising adoption and the small amount of academic research on the topic. These issues have become an interesting area of inquiry for Public Management scholars and Information Systems researchers. In fact, Mossberger and colleagues [3] have shown that local government is an important subject for the study of social media because of traditions of citizen participation at the local level. The Italian context is an interesting field of investigation of these phenomena because in Italy the importance of mandatory e-disclosure through municipality's website is recognized (with legislative decrees 150/2009 and 33/2013). Despite this, voluntary e-disclosure through social media is becoming more and more established.

This study takes a first step toward understanding the diffusion of Web 2.0 tools by Italian municipalities. In particular, we constructed a synthetic indicator to measure web and social media diffusion, such as Facebook and Twitter, by local government. Moreover, based on agency theory and neo-institutional framework, we propose a research model to analyze the determinants of social media diffusion in order to underline any differences for mandatory and voluntary e-disclosure. The structure of this paper is as follows. In the next section, we introduce the literature review on e-disclosure and social media usage by municipalities. In Sect. 3, we describe the research model and hypotheses, and then we outline the research methodology and the results of the analysis (Sect. 4). Finally, in Sect. 5, we discuss findings.

2 Literature Review

The disclosure via web (e-disclosure) by municipalities has received much attention among researchers. Agency theory and neo-institutional framework represent the most commonly applied theoretical backgrounds for understanding the impacts of web application on the public communication by local government.

Many research on e-disclosure have focused on disclosure via website [4–6], while only a very few have investigated social media adoption [2, 5, 7, 8]. Most of these studies were aimed to the realization of an e-disclosure index, summarizing the information disclosure on municipalities' website and identification of e-disclosure determinants. For example, Serrano-Cinca [6] investigated the determinants of voluntary Internet financial reporting by local administrations. In their study, size, political will, and citizens' income level affect e-disclosure. Gandia [9] analyzed the websites of several municipalities for understanding e-disclosure determinants and showed that political competition, public media visibility, and citizens' educational levels affect voluntary disclosure levels. Yu [10] highlighted how the size, wealth, local authority' organization, pro-capita income, and financial condition affect the e-disclosure. García and García-García [11] analyzed determinants of nonfinancial reporting in the Spanish municipalities, such as level of citizens' economic development, life quality level, size, municipality's budgetary,

political stability, political strength, and political rivalry. Similarly, Garcia-Sanchez [12] assessed the determinants of sustainability disclosure practices in Spanish municipalities, considering as variables the level of citizens' economic development, life quality level, size, municipality's budgetary, political stability, political strength, and political rivalry.

The rapid diffusion of social media applications is ushering new ways for the government to communicate with and engage the public, and social media usage by municipalities represents an additional form of e-disclosure. Norris and Reddick's [13] survey on social media adoption of local governments (e.g., Facebook, Twitter, and YouTube) in the United States highlighted an amazing adoption rates; two-thirds of local governments had adopted at least one social media. Bonsón and colleagues' research [2] on the use of Web 2.0 and social media tools in EU local governments has shown that most local governments are using social media although the use of these applications to promote e-participation is still in their infancy at the local level. Klang and Nolin [14] investigated several Swedish social media policies produced by municipalities in order to recommend practical guidelines for improving transparency and interaction through social media. Kavanaugh [15] analyzed social media use by local governments for managing crisis situations from the routine (e.g., traffic, weather crises) to the critical (e.g., earthquakes, floods). Feeney and Welch [16] investigated whether different e-participation technologies and the intensity of e-participation technology use are associated with managers' perceptions of outcomes in the local governments. Mossberger [3] examined the use of social media and other interactive tools in the 75 largest US cities between 2009 and 2011, constructing an index of interactivity. Oliveira and Welch [17] have shown patterns of social media application for particular purposes, highlighting that social media tools are not a monolithic group. Ma [18] examined the diffusion of police microblogging (e.g., Twitter) and its determinants in Chinese municipal police bureaus through the perspective of organizational innovation diffusion. Her findings have shown that government size, Internet penetration rate, regional diffusion effects, and upper-tier pressure are positively and significantly associated with the adoption and earliness of police microblogging.

3 Research Model and Hypotheses

This study is aimed to analyze the determinants of mandatory (trough website) and voluntary e-disclosure (trough social media such as Facebook and Twitter) by Italian municipalities. In this research, we propose a research model to analyze the determinants of e-disclosure tools diffusion in order to underline any differences for mandatory and voluntary e-disclosure.

We built two e-disclosure indices: e-disclosure website index (eDI) measures the mandatory disclosure through municipalities' websites; social media usage index (smI) measures the voluntary disclosure via social media such as Facebook and Twitter. The use of synthetic indicator to measure website and social media diffusion among municipalities has been developed in some previous studies [2, 19, 20].

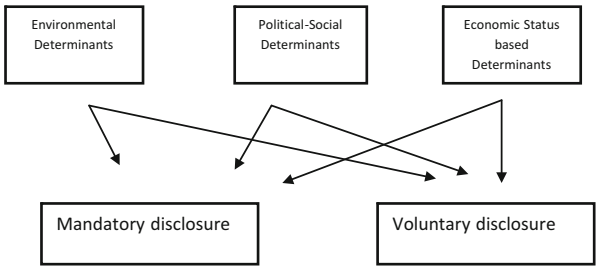

Fig. 1 Research model

Several empirical studies [5, 31] have found evidence that social determinants, such as municipalities' size, are able to influence the use of web applications for mandatory and voluntary disclosure tools. Other scholars highlighted the role of economic and political factors as the key drivers of web application adoption by local government [6, 20]. In this study, we chose to identify three types of determinants that can affect e-disclosure: environmental determinants (size, municipality's type, and geographical position), political–social determinants (gender of mayor and political position), and economic status determinants (financial autonomy and citizens' wealth). We developed a research model in order to investigate determinants of mandatory and voluntary e-disclosure by Italian municipalities in order to underline the existence of different types of determinants; see Fig. 1.

The scholars agree that [4, 6, 11, 19–21] there is a positive relationship between size and usage of strategic communication tools by municipalities. In line with the agency theory, we consider the organization size as e-disclosure determinants, in the biggest municipalities people have less face-to-face contacts and use more web application as communication tools, that can be consider as showcase for municipalities activities [11]. Large municipalities would show greater information asymmetries among managers and citizens, and the social media usage can be considered as a strategic tool for reducing the agency costs [6]. Consequently, we proposed the following hypothesis:

H1: There is a positive relationship between municipality's size and e-disclosure tools (eDI and smI).

Several authors [20, 22–24] considered the geographical position and regional differences as a determinant in the development of e-government activities. The scholars considered that the regional differences could influence also differences in political culture and governance styles [25] as patterns of accounting and disclosure [6, 7, 26]. Thus, the following hypothesis was proposed:

H2: There is a relationship between municipalities' geographical position and e-disclosure tools (eDI and smI).

Previous research investigated about the relationship between municipality's type as urban district (small town) or city (large town) and e-disclosure propensity [2, 4]. e-Government tools usage requires specific technical and administrative

structure [21] and availability of financial, technical, or personnel capacities [27, 28]. Several authors agreed that cities have more resources and tend to be more inclined to e-disclosure tools [29, 30]. Thus, the following hypothesis was proposed:

H3: There is a positive relationship between municipality's type and e-disclosure tools (eDI and smI).

Municipalities are governed by politicians, and their political ideology may influence disclosure practices, because different ideologies usually suggest different situations facing local authorities [6, 12]. The ruling party's political ideology may support different e-government styles and influence some aspects of administration culture such as e-disclosure propensity. The previous empirical studies have shown different results. For example, Tolbert and colleagues [32] highlighted the positive influence of left-wing ideology on e-government development. Similarly, other studies showed that municipalities governed by left-wing majorities are more transparent than those ruled by conservative mayors [4, 12]. On the contrary, other scholars found opposite results [5]. In this study, we hypothesized that political position may influence disclosure practices through website or social media by municipality. Thus, we proposed the following hypothesis:

H4: There is a relationship between political position and e-disclosure tools (eDI and smI).

In literature there are different studies that include the gender of mayor as political determinant [3, 22, 31]. The scholars investigated participatory inequality between men and women, showing that the gender is related to political activity [3, 33, 34].Thus, we proposed the following hypothesis:

H5: There is a relationship between gender of mayor and e-disclosure tools (eDI and smI).

Many studies [4, 11, 30, 34, 35] considered the relationship between municipalities' financial condition and disclosure. The central idea is that financial condition reveals the ability of municipality's management to benefit from considerable proper revenues (essentially taxes and fees) [5]. Consequently, local government has an increased responsibility to give citizens explanations on where and how is spending such revenues [5] and tends to highlight more the results of municipalities' activities. Thus, we proposed the following hypothesis:

H6: There is a positive relationship between financial autonomy and e-disclosure tools (eDI and smI).

In different studies, citizens' wealth is considered as a disclosure determinant [10, 19, 20, 22]. People that have higher economic status have more access to new technology [10] and greater user experience [9]. In fact, Yo [10] shown that people with a lower per capita income are less inclined to web usage. Moreover, citizens

with higher income per capita expect more services and performance information [6, 9, 10, 18]. Thus, we proposed the following hypothesis:

H7: There is a positive relationship between citizens' wealth and e-disclosure tools (eDI and smI).

4 Methodology

This section introduces the information about the sample, measurement, and data analysis.

4.1 The Research Context: The Italian Municipalities

The Italian public sector is divided into three levels: state, 20 regional governments, 101 cities (such as large town), and 9.195 urban districts (small town). In Italy, there are several acts about the e-disclosure. The last acts are legislative decrees 150/2009 and 33/2013. In 2009, the legislative decree 150 proposed the extend control on municipalities' activities in order to improve performances. This reform predicted that the local government discloses some information on their activity, such as objectives, organization, performance indicators, and data about resources spent to deliver public services. The legislative decree 33/2013 established the mandatory disclosure and outlined the information to publish on the website.

To test the proposed model, we used ordinary least squares (OLS) regression modeling on 93 Italian municipalities' data during 2012. The sample is composed by Italian municipalities that use both Facebook and Twitter for voluntary disclosure.

4.2 Measurement

e-Disclosure website index (eDI) measures interaction level among citizens and municipalities using official/mandatory disclosure channel [2]. For e-disclosure website index, we considered some items based on previous literature. In particular, we analyzed the website of each local government and looked for the following 13 items (i): organization (i1), governing body (i2), consults (i3), wage body (i4), management (i5), controlled company (i6), internal auditing (i7), performance (i8), balance (i9), balance controlled company (i10), economic planning (i11), support planning (i12), and assets (i13). They are collected manually. For every item, we

analyzed the presence that was scored with a binary variable (presence, 1; no presence, 0). It is calculated by the following equation (Equation 1):

$$\mathrm{eDI} = \sum_{k=1}^{13} i_k$$

The social media usage index (smI) is constructed using Facebook information, which describes municipalities' Fb activity, and Twitter information, which describes municipalities' Twitter activity. The use of a synthetic indicator to measure the level of Fb and Tw usage by municipalities has been developed in some previous studies [2, 19, 20, 36]. The Fb index is composed of seven items (i) collected from Arata's (2012) report [37] and manually from municipalities' Fb Homepage. The items chosen are the number of friends (i1), up data frequency (i2), reply to comment (i3), replay to link or video (i4), import by official page (i5), presence of specific type of contents (i6), and type of account (i7). For every item, we analyzed the presence that was scored with a binary variable (presence, 1; no presence, 0). The Tw index is composed of eight items (i) collected from Arata's (2012) report [38]: total tweet (i1), following (i2), followers (i3), recognizability (i4), Twitter frequency (i5), tweet number to others in the last 12 months (i6), mean number of retweets (RT) to our tweet in the last 12 months (i7), and specific contents (i8). For item number 3, 4, and 7, we analyzed the presence that was scored with a binary variable (presence, 1; no presence, 0). The item numbers 1, 2, 5, and 6 have been measured in natural logarithm (LN). The smI is one synthetic indicator that we construct adding up two indicators, Fb index and Tw index, and calculated by the following equation (Equation 2):

$$\mathrm{smI} = \mathrm{FbI} \sum_{K=1}^{7} i + \mathrm{TwI} \sum_{K=1}^{8} i$$

For the determinants, many data are collected from comuniverso.it. comuniverso.it is a free web portal on Italian municipalities that publics data about political, economic, and geographic information on the municipalities. Determinants are described in the following table (Table 1).

Table 2 shows descriptive statistics.

4.3 Data Analysis

We analyzed the correlation among variables in order to use OLS regression model. The following table (Table 3) shows that there is not a strong correlation among the independent variables.

Table 1 Determinant description

Variable	Tag	Definition	Measurement	Literature	Sources
Size	Size	The number of municipality's popu1ation	Number (Natural 1) Number (1: Nord; 2: Centro; 3: South; 4: Island)	Laswad, Fisher, and Oyelere (2005), Alvarez et al. (2010), Guillimòn, Bastida, and Benito (2011), Albalate (2013), Serrano-Cinca, Rueda-Tomas, and Portillo-Tarragona et al. (2008), and Garcia and Garcia (2010)	www.comuniverso.it
Geographical Position	GeoPos	The Municipalities' geographical location The type of local government: municipality (such as urban district) or city (Such as large town)		Norris and Moon (2005), Albalate (2013)	www.comuniverso.it
Municipalities' type	Mtype		Number (0: municipality; 1: city)	Laswad Fisher, and Ovelere (2005)	www.comuniverso.it
Political position	PolPos	The political ideology of municipal ruling parties	Number (1: left; 2: right; 3: center-left; 4: center-right; 5: center)	Guillimòn Bastida and Benito (2011)	www.comuniverso.it
Gender	Gender	The mayor's gender	Number (1: woman: 0: men)	Guillimòn Bastida and Benito (2011)	www.comuniverso.it
Index of financial autonomy	FinAut	Index of financial autonomy	Number	Laswad Fisher, and Oyelere et al. (2005), Styles and Tennyson (2007),	www.istat.it

(continued)

Table 1 (continued)

Variable	Tag	Definition	Measurement	Literature	Sources
				Guillimòn et al. (2011), and García et al. (2010)	
Citizens' Wealth	CitWealth	The value of economic activity per capita	Number	Laswad Fisher, and Oyelere et al. (2005), Styles and Tennyson (2007), Guillimòn et al. (2011), and García et al. (2011)	www.istat.it

Table 2 Descriptive statistics

Variables	Mean	Median	Min	Max
Size	9.76522	9.74373	5.18178	13.8046
GeoPos	2.02151	2.00000	1.00000	4.00000
MType	0.774194	1.00000	0.00000	1.00000
PolPos	3.82796	3.00000	2.00000	10.0000
Gender	0.043478	0.00000	0.00000	1.00000
AutFin	59.7097	62.0000	15.0000	86.0000
CitWealth	9.97551	9.96133	9.61820	10.3227
eDI	8.81720	9.00000	0.00000	13.0000
smI	40.2714	34.0865	13.5756	112.528

Table 3 Correlation

Size	GeoPas	MType	Pol_Pos	Gender	AutFin	CitWealth	
1.0000	−0.0713	−0.6902	−0.2375	−0.1221	0.1031	0.6033	Size
	1.0000	0.1762	0.0549	−0.1534	−0.4108	−0.4883	GeoPos
		1.0000	0.1439	0.1124	0.1099	−0.5949	MType
			1.0000	−0.0589	0.0071	−0.1647	PolPos
				1.0000	0.2242	−0.0089	Gender
					1.0000	0.2801	AutFin
						1.0000	CitWealth

Table 4 OLS regression model (e-disclosure website determinants)

	Coefficient	Error Std.	*T* Student	*p*-value	
const	−103.306	24.5274	−4.2119	0.00006	***
Size	0.543515	0.228585	2.3777	0.01969	**
GeoPos	0.205635	0.278213	0.7391	0.46189	
MType	0.755022	0.883971	0.8541	0.39546	
PolPos	−0.186127	0.214482	−0.8678	0.38798	
Gender	0.800325	1.20059	0.6666	0.50685	
AutFin	0.0140757	0.0190251	0.7398	0.46146	
CitWealth	10.589	2.49437	4.2452	0.00006	***
R^2	0.481509				
R^2 adjusted	0.438301				

***, error <1%; **, error <5%; *, error <10%

Then, using regression analysis, OLS performed the data analysis for testing the hypothesized relationships among constructs. The two models listed below show the contribution of independent variables (environmental, political–social, and economic status-based determinants) to dependent variables (e-disclosure website index and social media usage index).

In particular, we tested the hypotheses concerning on the relationship on determinants and eDI through the following OLS regression model (Equation 3):

$$\text{eDI} = \alpha + \beta(\ln)\text{Size} + \beta\text{GeoPos} + \beta\text{MType} + \beta\text{PolPos} + \beta\text{Gen} + \beta\text{AutFin} + \beta\text{CitWealth}$$

Table 4 shows the findings of the first OLS regression model. Findings highlight that size and citizen's wealth affect to e-disclosure website index; thus, hypotheses 1 and 7 are supported.

Then, we tested the hypotheses concerning on the relationship on determinants and smI through the following OLS regression model (Equation 4):

$$\text{smI} = \alpha + \beta(\ln)\text{Size} + \beta\text{GeoPos} + \beta\text{MType} + \beta\text{PolPos} + \beta\text{Gen} + \beta\text{AutFin} + \beta\text{CitWealth}$$

Table 5 shows the findings of the second OLS regression model. Findings highlight that size and political position are positively related to social media index; thus, hypotheses 1 and 4 are supported. Moreover, Table 5 shows that the geographical position and municipalities' type affect social media index, supporting hypotheses 2 and 3.

Table 5 OLS regression model (social media usage determinants)

	Coefficient	Error Std.	*T* Student	*p*-value	
const	−25.5858	153.784	−0.1664	0.86826	
Size	5.54602	1.4332	3.8697	0.00021	***
GeoPos	−3.66365	1.74436	−2.1003	0.03870	**
MType	−9.82247	5.54238	−1.7722	0.07998	*
PolPos	2.3832	1.34477	1.7722	0.07999	*
Gender	1.02161	7.52753	0.1357	0.89237	
AutFin	−0.13246	0.119285	−1.1104	0.26998	
CitWealth	2.54882	15.6394	0.1630	0.87093	
R^2	0.475005				
R^2 adjusted	0.431256				

***, error <1%; **, error <5%; *, error <10%

5 Discussion of Results

In line with previous studies [19, 20, 30], our findings have shown a positive relationship between municipality's size and e-disclosure. Large municipalities are more likely to use website and social media, where a higher number and variety of stakeholders might encourage the information disclosure [12].

Our results have also highlighted that citizens' wealth affect e-disclosure through website, in accord with several studies [10, 26, 31]. Domínguez [21] have argued that higher income per capita is directly linked to purchases of computers and technological devices, as well as access to the Internet; consequently, these features influence demand for e-disclosure. Conversely, findings have not shown a significant relationship between citizens' wealth and social media usage. Twitter and Facebook are the most popular social media tools because they are entirely free and with open access and user-friendly, used for professional and personal purposes in both workplace and "out-of-office" environments, and individuals can access on their computers, phones, or both. For these reasons, we believe that citizens' wealth is not an important prerequisite of their adoption. Moreover, Facebook and Twitter are increasingly gaining currency for both younger and older people, regardless of economic or social status and geographic position. In fact, our results have highlighted that municipalities' type and geographical position have a negative influence on social media usage, in contrast to other studies [9, 25, 39]. We justify these results considering the characteristics of the sample investigated. While the previous research analyzed national governments of several countries, our study is focused on municipalities of a single country, such as Italy, where regional differences in administrative culture are minor. Findings showed a significant relationship between political position and social media usage by municipality, consistently with previous studies [6, 19, 36]. Governing party's political ideology may support different e-government styles and influence some aspects of administration culture such as e-disclosure

propensity. Bonsón and colleagues ([2], p. 12) have shown that "the development of an active presence in social media platforms is not country-related but dependent on the political will and specific circumstances of each local government."

This study presents several limitations. One limitation stems from the size of the sample with respect to the determinants investigated. Second, literature of traditional disclosure (not web) indices is abundant and detailed, but the new disclosure (via web or social media) indices present specific problems that may involve a certain degree of subjectivity. Moreover, the e-disclosure index considered in this work (eDI and smI) seems heterogeneous: the first is simple, and it can vary from 0 to 13; the second is more complex, and it is composed of dichotomous items and not. Future research would be appropriate to make a validity test of this index.

Despite some limitations, this research contributes to the existing knowledge on e-disclosure, highlighting the growing importance of voluntary disclosure through social media. Findings from 93 Italian municipalities showed the presence of different determinates for e-disclosure website and social media usage, pointing out that large municipalities characterized by high income per capita are more likely to use website to information disclosure. Moreover, municipality's size and political position are able to influence the use of social media as strategic communication channel. Moreover, the geographical position and municipality's type negatively affect e-disclosure through social media, differing from the results of the most previous research.

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