Social Media adoption by Audit Institutions. A comparative analysis of Europe and the United States.

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Abstract

Several authors and international organizations have recommended that public sector Audit Institutions use social media (SM) to communicate with and engage stakeholders, but the adoption and use of these tools by Audit Institutions has remained unexplored. This paper analyzes the presence of Audit Institutions in Web 2.0 and SM tools, in the EU and US, at regional and central government level, in order to answer the following research questions: What is the level of adoption of Web 2.0 and SM tools among Audit Institutions? Can any patterns of adoption be identified? What factors are related to the adoption of Web 2.0 and SM tools? What is the main objective of the content published? What is the number of followers and the level of citizen awareness? Results show that the adoption of Web 2.0 and SM tools by Audit Institutions is at an initial stage. There are differences in adoption between Supreme and Regional Audit Institutions, among the different public administration styles, and depending on the population size and level of use of SM and previous levels of transparency at country level. This results in predictable patterns of adoption consistent with path dependencies derived from the institutional context and citizen demands. The number of followers and citizens' awareness is generally low and the contents published rarely aim at encouraging stakeholder participation. Based on these findings, theoretical and practical implications are highlighted.

Keywords: Audit Institutions, Social Media adoption, Europe, United States.

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1. Introduction

Public sector auditing is a complex and comparatively unexplored research area where more investigation is valuable (Hay and Cordery, 2018). Public sector Audit Institutions (Supreme and Regional Audit Institutions, SAIs and RAIs, respectively) are the main external control bodies of the public sector and their most important functions are to carry out compliance, financial and performance audits (GAO, 1972; OECD, 2011). Therefore, they are fundamental public entities in the transparency and accountability of the public sector (Cordery and Hay, 2019). However, they have traditionally been seen as isolated and technocratic entities serving other government organizations and having little to do with citizens and broader governance issues (González et al., 2008; Baimyrzaeva and Kose, 2014). This has started to change in recent years in the context of the transformation from government towards governance. The communication of Audit Institutions' activity, their engagement with stakeholders, their competencies in improving the quality of government, and the development of collaborative networks among them to improve their activity have become more important (Baimyrzaeva and Kose, 2014). The target audience of Audit Institutions is expanding and there is a great interest in including citizens, civil society organizations, other public and private audit entities, professional associations, research organizations and donor communities, among others (González-Díaz et al., 2013).

The International Organization of Supreme Audit Institutions (INTOSAI, 2013a) has recognized that "communicating effectively with stakeholders" and "ensuring appropriate transparency and accountability of SAIs" are two necessary principles for making a difference

to the lives of citizens. Furthermore, engagement with stakeholders, including citizens and civil society organizations, is now deemed essential to maximize the efficiency and impact of Audit Institutions (INTOSAI, 2013b; Reed, 2013; United Nations, 2013; Baimyrzaeva and Kose, 2014; Effective Institutions Platform, 2014; World Bank, 2015; Cordery and Hay, 2019). According to the United Nations (2013, p. 14) "as the ultimate beneficiaries of a better use of public funds, citizens are the most important stakeholders of Supreme Audit Institutions".

Recent advances in Information and Communications Technologies (ICTs), based on the use of Web 2.0 and social media (SM), have created great expectations for the improvement of government-to-citizen relationships because of their potential to improve transparency, communication, collaboration and engagement (Bertot et al., 2012; Bonsón et al., 2012; Haro-de-Rosario et al., 2018). SM support the communication strategy of organizations, helping to provide a more complete image of the organizations and to eliminate dependence on traditional communication media (González-Díaz et al., 2013; Stamati et al., 2015). They make the content published in official websites and other information channels more visible and allow two-way direct communication with stakeholders about different topics, which may be different to those which attract media attention. The many-to-many interaction allowed by SM also increases the level of information sharing: followers receive immediate notifications about new publications and, if they re-direct the information to other users, the information can become "viral". SM foster a more extensive interaction with citizens, allow public sector institutions to easily obtain stakeholder feedback and open new areas for the participation of stakeholders at a small cost (Bertot et al., 2012; Agostino et al., 2017). Furthermore, they allow a wide variety of formats to be used to transmit the information and reduce temporal and spatial obstacles, which facilitates the monitoring of public sector activity. Because of these properties, SM are said to have the potential to change the way the public sector communicates with

stakeholders, advancing from a scenario where the information is available online to a new one that really engages citizens and the rest of stakeholders (Bearfield and Bowman, 2017).

Previous studies in the public sector have mainly been theoretical, dealing with the advantages of SM use or possible strategies to promote their use (e.g. Bertot et al., 2012; Stamati et al., 2015). Empirical studies have mainly analyzed local governments, as they are the level of government closest to citizens (Bonsón et al., 2012, 2015, 2017; Agostino, 2013; Zheng and Zheng, 2014; Haro-de-Rosario et al., 2018). Several authors (González-Díaz et al., 2013; Genaro, 2014) and international organizations (INTOSAI, 2010, 2013a; United Nations, 2013) recommend public sector Audit Institutions to use SM to communicate with and engage stakeholders, but the adoption and use of these tools by Audit Institutions has remained largely unexplored to date. González-Díaz et al. (2013) analyzed the communication strategies of Audit Institutions and provide a brief description of the use of SM and Web 2.0 by Audit Institutions and the advantages they imply. Empirical evidence and comparative analyses about the relationships between different contextual factors and the adoption of transparency and engagement tools by Audit Institutions are needed (Effective Institutions Platform, 2014, pp. 70–74). Therefore, this empirical study covers different research gaps as regards SM use in the public sector (namely, its real use in Audit Institutions) and the relationship between contextual factors and the adoption of these transparency and engagement tools by Audit Institutions.

In this context, the objective of this paper is to analyze the presence of Audit Institutions in Web 2.0 and SM tools, in the EU and US, at central and regional level, in order to answer the following research questions: RQ1. What is the level of adoption of Web 2.0 and SM tools among Audit Institutions? RQ2. Can any patterns of adoption be identified? RQ3. What factors are related to the adoption of Web 2.0 and SM tools? RQ4. What is the main objective of the content published on SM? RQ5. What is the number of followers and the level of citizen awareness? Research questions 1 to 3 deal with the adoption of Web 2.0 and SM tools and the

factors related to different levels of adoption. Research questions 4 and 5 are focused on Twitter as this is the platform with the highest rate of adoption among the Audit Institutions analyzed.

The rest of the paper is structured as follows. The second section provides the background and theoretical framework. The third section describes the methodology applied. The results are presented in the fourth section. Finally, the discussion and conclusions section brings the paper to an end.

2. Background

2.1. Rationale for SM use by Audit Institutions

Audit Institutions make significant contributions to society by bringing transparency, accountability and integrity to government and promoting higher quality in the use of public resources. These contributions are maximized when the Audit Institutions are able to clearly and effectively communicate the results of their work to citizens and other stakeholders (González et al., 2008; OECD, 2011; Bowling, 2013; Cordery and Hay, 2019). In this way, the public's role in ensuring improved governmental compliance and performance is strengthened and pressure for the follow-up of recommendations is created (Reed, 2013; Reichborn-Kjennerud, 2013; United Nations, 2013; Baimyrzaeva and Kose, 2014; Effective Institutions Platform, 2014; World Bank, 2015; Johnsen et al., 2019; van Acker and Bouckaert, 2019). According to Johnsen et al. (2019, p. 177), media attention alone is not enough, but the consequences of media attention are important.

Recently, the importance of communication strategies for public sector Audit Institutions has been highlighted (Erbiti, 2003; González et al., 2008; INTOSAI, 2009a, 2009b; González-Díaz et al., 2013; EUROSAI, 2017). INTOSAI has been particularly active in this regard, indicating that communication should be regarded as a strategic element in auditing (INTOSAI, 2010, p. 2). According to Cordery and Hay (2019), Audit Institutions should develop new ways

to demonstrate their ongoing relevance and how they contribute to increasing public value. They can establish dialog with stakeholders using a variety of instruments and tools. Keeping pace with technology advances in order to ensure that they are reaching their stakeholders is a challenge for them (INTOSAI, 2013b; Genaro, 2014). The key is communicating with citizens and other stakeholders in a manner that allows them to access the content produced by Audit Institutions in a variety of ways that can best meet their needs (Bowling, 2013).

At the end of 2009, INTOSAI passed two International Standards of Supreme Audit Institutions, ISSAI 20 and ISSAI 21 (INTOSAI, 2009a, 2009b), that propose principles and good practice related to transparency and accountability to help SAIs promote a greater understanding of their functions and role in society among the general public. Of the nine principles defined in ISSAI 20, number 7 highlights the fact that SAIs need to report publicly about their activities and number 8 states that the media, websites, and other channels should be used to provide timely and widespread communication of their activities. Websites and SM are tools that should be used in the communication plans of Audit Institutions to guarantee external communication success (INTOSAI, 2010, pp. 11–12, 2013b; González-Díaz et al., 2013; United Nations, 2013; Genaro, 2014). Among the different instruments and tools for communicating the value and benefits of Audit Institutions to stakeholders, INTOSAI (2013b, pp. 6–7) recognizes that Web 2.0 and SM tools (e.g., YouTube, podcasts, Facebook, Twitter, Flickr, SlideShare, sharing widgets, online chats and blogs) play a key role. However, recent research indicates that Audit Institutions can be divided into two broad categories: one with an extensive media strategy and one that intentionally wants to avoid media attention (van Acker and Bouckaert, 2019, p. 66).

The improvements that SM can generate in the communication and activity of Audit Institutions can help to achieve the benefits of SAIs, as defined in ISSAI 12: (1) strengthening the accountability, transparency and integrity of government and public sector entities; (2)

demonstrating ongoing relevance to citizens, parliament and other stakeholders and (3) being a model organization through leading by example (INTOSAI, 2013a). Furthermore, as explained in the Introduction section, the possibilities for information sharing, direct communication, and interactivity offered by SM add value and opportunities for citizen engagement that are not possible with traditional media.

Mergel (2013) distinguishes three SM tactics for public sector entities based on their existing communication and interaction style: (a) a "push strategy" that represents formal government information on SM as additional channels of communication; (b) a "pull strategy" that engages and includes information from stakeholders; and (c) a "networking strategy" that includes both push and pull activities, with a highly interactive and bidirectional responsiveness that produces reciprocal feedback cycles. However, empirical findings have found that most public sector entities use these tools mainly for transparency purposes (DePaula et al., 2018; Zheng & Zheng, 2014; and Golbeck et al., 2010) and even in an essentially ornamental way (Gunawong, 2015; Gandía et al., 2016).

While SM use by Audit Institutions presents an unprecedented opportunity, it also creates risks and new institutional challenges, particularly when these tools are used for engagement purposes that require staff attention and the development of mechanisms to incorporate and respond to external input. As with other tools, if they are not properly implemented, they can have negative impacts on social perceptions (Effective Institutions Platform, 2014; EUROSAI, 2017). Furthermore, populism, disinformation campaigns and strategic political propaganda are increasingly important issues in today's society (Hall, 2017; Bastos and Mercea, 2018; House of Commons, 2018; European Parliament, 2019). Counter-propaganda mechanisms, such as disinformation laws, as well as anti-fake news units or programs developing citizens' critical thinking skills, are being promoted in the EU and US (Hall, 2017). Tackling disinformation and propaganda requires engaged, informed, and media-literate citizens and the

cooperation of all social actors and stakeholders (Hall, 2017; European Parliament, 2019, p. 96). Audit Institutions, as independent experts on the supervision of public financial management issues, could play an important role in fighting disinformation campaigns aimed at increasing mistrust between citizens and public institutions (either on their own or by working in collaboration with anti-fake news units) by publishing independent trustworthy information about audit reports' findings.

González-Díaz et al. (2013) found that, by September 2011, among the 36 OECD member-country SAIs, only the US, Australian and Estonian SAIs were using Facebook and Twitter. According to these authors, "GAO usage of SM and Web 2.0 technologies may be considered an example of good practice that other SAIs, which hardly use them, would do well to emulate" (González-Díaz et al., 2013, p. 600). Legitimacy is one of the reasons that has been used to explain why organizations within the public sector provide information voluntarily and seek stakeholder participation (Pina et al., 2010; Yetano et al., 2010). In some cases, it seems that the search for legitimacy has become, in itself, a rationale for the adoption of new communication and engagement tools.

2.2. Theoretical framework

The two main theories used to explain the adoption of new communication and engagement tools are institutional theory (DiMaggio and Powell, 1983) and the diffusion of innovations theory (Rogers, 2003). Institutional theory establishes that organizations care about legitimacy to justify their existence and the activities they carry out. According to this theory, organizations respond to pressures from their institutional environments and adopt structures and practices that have high social value in reaction to external changes in expectations and formal rules, which explains the tendency towards similarity between organizations. Isomorphism, a key concept embedded in institutional theory, can be used to predict that audit institutions would adopt Web 2.0 and SM tools as a "symbol" of openness and modernity.

Three types of isomorphism are proposed within this theory: coercive, mimetic and normative (DiMaggio and Powell, 1983). Coercive isomorphism results from pressure imposed on an organization by legal, hierarchical or resource dependence. In mimetic isomorphism, organizations imitate practices and models of leading organizations in their institutional field in an attempt to achieve greater recognition. Finally, normative isomorphism stems from environmental pressure for transformation from stakeholders, such as politicians, financial institutions, scholars, multilateral organizations and professional groups who try to define the conditions and method of work. The three specific values and benefits of SAIs listed above - strengthening accountability, demonstrating ongoing relevance to stakeholders and being a model organization, as defined by INTOSAI (2013a)- are strongly related to the idea of legitimacy, which, according to Suchman (1995), is defined as "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions." The adoption of transparency and accountability practices strengthens the public image of Audit Institutions and contributes to legitimizing their authority to control (Mendoza, 2013). Web 2.0 and SM also increase social legitimacy because of the higher involvement of the public (Agostino et al., 2017). Therefore, the use of SM to give visibility to the activities that Audit Institutions carry out can help them to improve their legitimacy by increasing the value perceived by stakeholders, although it can also become a rhetorical instrument in some cases and gaps between rhetoric and reality are likely (Pina et al., 2009; Bonsón et al., 2012; Torres et al., 2019).

SM use by Audit Institutions can be considered an innovation, since it is a new channel for interacting with different user groups. Diffusion is "the process by which an innovation is communicated through certain channels over time among members of a social system" (Rogers, 2003, p. 35). According to the diffusion of innovations theory, the innovations that

are perceived as having greater advantages and observability –how visible the results of the innovation are to others– will be adopted more rapidly. This theory studies the factors affecting the adoption of an innovation. Together with costs, adopters take into account to what extent the innovation would disrupt other functions of their organization, that is, whether it is compatible with existing patterns and values–the compatibility issue, as described by Reichborn-Kjennerud (2013). Five categories of adopters of an innovation are distinguished: innovators, early adopters, early majority, late majority, and laggards. Innovators are on the cutting edge. Early adopters take into account the innovators' experience to make their own adoption decisions: if they observe that the innovation has been effective for the innovators, they will be encouraged to adopt. This group earns respect for its judicious, well-informed decision making and, hence, it is where most opinion leaders reside. Well-informed opinion leaders communicate their approval or disapproval of an innovation, based on the innovators' experiences, to the rest of the social system. Much of the social system merely wants to keep in step with the rest, so a large subsection of the social system follows the trusted opinion leaders.

Even though Audit Institutions' communication goals when interacting with the general public should not be aimed at creating an image (EUROSAI, 2017), according to the institutional and diffusion of innovation theories (mainly, coercive and normative pressures coming from INTOSAI and other international organizations) and due to the increasing adoption of SM by corporations, public sector entities and citizens in general (mimetic isomorphism and diffusion of innovations), a gradual and increasing adoption of SM by Audit Institutions should be expected.

2.3. Public administration styles

Agostino et al. (2017) highlight the need for further research about SM use in the public sector which takes the influence of the national culture into account. The public administration

style has been an important element for explaining the evolution of other public sector reform initiatives (Hood, 1995; Pollitt and Summa, 1997; Pollitt and Bouckaert, 2000; Torres, 2004; Pina et al., 2009; Torres et al., 2019) and developments in e-government related to transparency and accountability (Pina et al., 2007, 2010). According to these authors, the dissemination of public sector management innovations is influenced by their organizational and administrative culture, historical background and legal structural elements. Torres et al. (2019) also note that Anglo-American, Nordic and Germanic Audit Institutions usually carry out more value for money audits. On the contrary, Southern and Eastern European countries usually pay more attention to regularity (financial-compliance) audits. Therefore, the public administration style also encapsulates, to some extent, the type of work carried out by different Audit Institutions.

Among the countries included in this study, five broad styles of public management may be distinguished (Pina et al., 2009): Anglo-American, Nordic, Germanic, Napoleonic and Eastern European. During the 1980s, Anglo-American countries introduced a new public managerial approach that emphasized efficiency, effectiveness, and value for money. These countries were pioneers in the introduction of market mechanisms, notions of competitiveness, and attempts to make public services more responsive to users/customers. Nordic countries also belong to a public administration style that is concerned with meeting citizens' needs and they have been front-runners in performance audits (Johnsen et al., 2019). They have an explicit ambition to create and sustain a welfare state and a cultural tradition of openness, transparency, negotiation and consultation. The Germanic and Napoleonic countries are influenced by structures inherited from a bureaucratic, hierarchical, Weberian public administration grounded in administrative law. The citizen has traditionally been considered as a "subject", although this view is changing. The Eastern European group is made up of the countries which were under the political and administrative influence of the USSR, but now belong to the EU. Toonen (1993) identified five principles that guided Eastern European societies in building their

governments: decentralization; the improvement of channels of communication between government and citizens in response to a demand for participation; a concern for public welfare and social justice in terms of services and human rights; an efficient government administration at all levels; and internal and external accountability.

The literature on public sector management usually considers that Anglo-American and Nordic countries have a long-standing reputation of public sector reforms, transparency, and citizen engagement. On the contrary, Germanic and Napoleonic countries belong to a more legalistic tradition and have been considered as laggards in introducing some public sector reforms. From the literature discussed above and the leading role of Eastern European countries as regards ICTs in general, and SAIs innovative practices using ICTs in particular (EUROSAI, 2019), a priori, a higher level of development of Web 2.0 and SM tools could be expected in Anglo-American, Nordic and Eastern European Audit Institutions. Previous research analyzing the use of SM to engage citizens in spending review processes in the UK, France and Italy has found that the UK was the only country using Web 2.0 tools (Agostino et al., 2017). Similarly, less than 40% of Germanic RAIs publish the complete version of their performance audit reports on the Internet (Torres et al., 2019). However, Bonsón et al. (2012) found that the public administration style was not a determining factor of the level of development of Web 2.0 and SM at the local level.

3. Sample and Method

The sample of this study includes all the Audit Institutions (SAIs and RAIs) of the US and the EU (except for those RAIs that act as subsidiaries to the SAI) and the European Court of Auditors (ECA), making a total of 143 Audit Institutions (see the Appendix I). The ECA is a unique, supranational Audit Institution responsible for auditing the institutions of the EU. Although not technically a SAI, its status and operations are sufficiently similar to national

SAIs and RAIs (Pollitt and Summa, 1997) to be included in the comparison. In general terms, SAIs and RAIs carry out similar functions, but their competences are over different public bodies and, in some federal and quasi-federal countries, such as Germany and Spain, most performance audits are carried out by RAIs. Therefore, differences in countries' structures require the study of the activity of the RAIs (Torres et al., 2019) in order to provide an overall view of SM use by Audit Institutions. Furthermore, in those countries where both SAIs and RAIs coexist, RAIs are the public sector Audit Institutions closest to citizens and, due to this, a higher use of SM tools and citizen awareness could be expected.

The US and European Audit Institutions were chosen for the analysis as they are pioneers in public sector auditing and they have traditionally been the geographical environments with the highest rates of adoption of new technologies and e-government indexes in international rankings (United Nations, 2018). Therefore, these countries have both the capacity and a high potential critical mass of networked stakeholders.

In the first part of the research (RQ1), the presence of the Audit Institutions in the different Web 2.0 and SM tools was evaluated based on the existence of an active link to them on their official websites. All the SM and Web 2.0 tools, according to the classification used by Bonsón et al. (2012), were considered. These data were collected in June 2018 and 13 platforms/tools were found.

Then, in order to answer RQ2, a cluster analysis was carried out taking as observations the 143 Audit Institutions in the sample. The variables used for the analysis were the 13 dichotomous variables measuring the adoption of SM and Web 2.0 tools. The Ward method was used as the level of adoption of these tools was very asymmetrical and there were some atypical data and outliers. The possibility of eliminating outliers was ruled out because they have the highest adoption rates and the purpose is to show the situation of all Audit Institutions. The resulting groups were evaluated according to their presence in each platform/tool, the

average number of tools adopted, the public administration styles and countries of origin, and the type of institutions (RAI/SAI). The five public administration styles defined in the previous section were taken into account, plus the ECA that is not included in any of these styles.

In order to answer RQ3, bivariate analyses were carried out to analyze the factors related to the adoption of these communication platforms (dichotomous variable, taking the value 1 if the Audit Institution has adopted any of the 13 tools/platforms analyzed and 0 otherwise) and the number of SM and Web 2.0 tools adopted. Research on transparent and open government usually highlights two critical success factors (Bertot et al., 2010): a culture of transparency embedded within the governance system and a transparency "readiness" factor, including factors related to technology penetration. In order to understand what factors are related to the adoption of Web 2.0 and SM tools, the following variables have been considered: the public administration style, the open budget index (OBI) and the corruption perception index of the country (as proxies of the culture of transparency embedded within the governance system), the Internet and SM penetration rates (as a general and a more specific measure, respectively, of the technological readiness of the population) and the online service index (OSI) (as a measure of the level of development of public e-services provided by the respective countries). The population of each country/region and the type of Audit Institution (SAI/RAI) were also considered as control variables. The population data was collected from Eurostat, the UK office for National Statistics (for Scotland and Wales) and the US Census Bureau; the Internet penetration data was obtained from the International Telecommunications Union (www.itu.int); SM penetration was collected from We are social (2018); the corruption perception index was obtained from Transparency International (www.transparency.org), the OBI was collected from the International Budget Partnership (2018) and the OSI was collected from the United Nations E-Government Survey (United Nations, 2018). For some of the variables (Internet penetration, SM penetration, corruption perception index, OBI and OSI) the

information for the RAIs is at country level because data for regions is not available. The bivariate analyses consisted of Pearson's Chi-squared test (two qualitative variables), the U-Mann Whitney test (dichotomous versus quantitative variable), the Kruskal-Wallis test (quantitative versus qualitative variable with more than two categories), and Spearman's correlation (two quantitative variables), as appropriate, depending on the type of variables involved in each case.

To answer RQ4, the publications of the Audit Institutions (30 publications from each Twitter account, the tool with the highest level of adoption, as shown below) were classified, depending on the type of content published, adapting the classification proposed by DePaula et al. (2018) to the context of this study (Audit Institutions)[1]. Eleven types of publications were differentiated (see Appendix II), which are grouped into 4 main categories: information provision (related with the diffusion of substantive information, i.e. the main activities carried out by Audit Institutions), input seeking and online dialog/offline interaction (publications that look for citizen input or offline engagement) and symbolic presentation (publications aimed at improving the image of the audit institution, complying with social conventions that facilitate interaction, and/or at expressing opinions on political issues). Taking into account the different roles that audit information (in our case, contents published in SM by Audit Institutions) can play (see Johnsen et al. 2019), the above mentioned categories can also be grouped into three: instrumental or conceptual information, by providing new knowledge and/or new insights for the public to be better informed (i.e. provision of substantive information); interactive impacts, which means that the content is intended to be used by stakeholders to interact with the Audit Institutions (input seeking and online dialog/offline interaction) and political-legitimizing or tactical information (symbolic presentation).

[1] The following modifications were made: "audit reports" and "public interest information" were added to the information provision category; "job offers and competitive exams" were added to the online dialog/offline interaction category; and, finally, the "favorable presentation" and "branding and marketing" subcategories were merged together due to the impossibility of distinguishing between them in most cases.

Finally, in order to answer RQ5, the two following metrics were also collected for Twitter: 1) number of followers, to know what is the level of monitoring of these accounts and the potential number of stakeholders that will receive announcements of their publications; and 2) awareness level (Nº followers/population), multiplying the final result by 1,000 due to the low number of followers.

4. Results

4.1. Level of adoption of online communication platforms among Audit Institutions

Half of the institutions analyzed do not use any Web 2.0 or SM tool, and the average number of tools used is 1.3 (see Table 1). The level of use is higher among SAIs: 72% of the SAIs use at least one SM tool, versus 43% of the RAIs, and the average number of tools used is 2.6 and 0.9, respectively.

The most used SM are Twitter, Facebook and RSS for both SAIs and RAIs, although with large differences: their use is close to 50% for SAIs, but much lower for RAIs, as can be seen in Table 1. The use of YouTube and LinkedIn among SAIs is also relatively high. The presence of Audit Institutions in the rest of the platforms is residual.

Table 1. Presence of Audit institutions in Web 2.0 and SM.

	EU			US			Total		
	SAI	RAI	Total	SAI	RAI	Total	SAI	RAI	Total
Twitter	51.7%	17.5%	28.3%	100.0%	50.0%	51.0%	53.3%	31.9%	36.4%
Facebook	44.8%	3.2%	16.3%	100.0%	42.0%	43.1%	46.7%	20.4%	25.9%
RSS	48.3%	15.9%	26.1%	100.0%	12.0%	13.7%	50.0%	14.2%	21.7%
YouTube	37.9%	3.2%	14.1%	100.0%	16.0%	17.6%	40.0%	8.8%	15.4%
LinkedIn	27.6%	7.9%	14.1%	100.0%	16.0%	17.6%	30.0%	11.5%	15.4%
Blog	6.9%	3.2%	4.3%	100.0%	2.0%	3.9%	10.0%	2.7%	4.2%
Flickr	10.3%	0.0%	3.3%	100.0%	4.0%	5.9%	13.3%	1.8%	4.2%
Instagram	3.4%	0.0%	1.1%	0.0%	6.0%	5.9%	3.3%	2.7%	2.8%
Google+	6.9%	0.0%	2.2%	0.0%	0.0%	0.0%	6.7%	0.0%	1.4%
SlideShare	3.4%	0.0%	1.1%	0.0%	0.0%	0.0%	3.3%	0.0%	0.7%
Dailymotion	3.4%	0.0%	1.1%	0.0%	0.0%	0.0%	3.3%	0.0%	0.7%
Pinterest	0.0%	1.6%	1.1%	0.0%	0.0%	0.0%	0.0%	0.9%	0.7%
Widgets	0.0%	0.0%	0.0%	100.0%	0.0%	2.0%	3.3%	0.0%	0.7%
N	29	63	92	1	50	51	30	113	143
Mean	2.4	0.5	1.1	8	1.5	1.6	2.6	0.9	1.3
Min	0	0	0	8	0	0	0	0	0
Max	7	6	7	8	5	8	8	6	8

The adoption of SM among Audit Institutions is higher in the US than in the EU (1.6 versus 1.1 tools used, on average). As regards SAIs, the GAO (General Audit Office in the US) has the greatest presence in SM as it uses 8 tools. The use of SM in European SAIs is lower, in general terms, with 2.4 tools used, on average. The SAI with the highest level of adoption in Europe is the "Cour des Comptes" in France with 7 tools. The use among European RAIs is limited, with an average number of 0.5 tools. The most common SM tools for RAIs in Europe are Twitter and RSS, but the level of adoption is just 17.5% and 15.9%, respectively. RAIs in the US have a higher level of presence in SM, with 1.5 tools used, on average, Facebook and Twitter being the most adopted tools (50% and 42%, respectively). The RAIs with the greatest presence in SM are "Audit Scotland" (6 tools), "Wales Audit office" and the "Office of State Auditor" of Mississippi (5 tools each).

4.2. Patterns of adoption of online communication platforms

Cluster analysis identifies 5 groups of Audit Institutions (see Appendix III), depending on their level of adoption of SM. The last column in Appendix I indicates the group in which each Audit Institution is included. The identified groups differ in the use of the most frequent communication platforms (Twitter, Facebook and RSS) and in how they complement their use with less common SM. Groups 1 and 2 have the highest level of adoption of SM, with an average of 4 tools used, on average (see Table 2).

Table 2. Groups of Audit Institutions depending on SM adoption

	Group 1	Group 2	Group 3	Group 4	Group 5	Total
Twitter	100.0%	95.7%	85.0%	12.5%	0.0%	36.4%
Facebook	100.0%	69.6%	50.0%	0.0%	0.0%	25.9%
RSS	18.2%	56.5%	0.0%	100.0%	0.0%	21.7%
YouTube	100.0%	34.8%	0.0%	18.8%	0.0%	15.4%
LinkedIn	9.1%	87.0%	5.0%	0.0%	0.0%	15.4%
Instagram	36.4%	0.0%	0.0%	0.0%	0.0%	4.2%
Blog	0.0%	26.1%	0.0%	0.0%	0.0%	4.2%
Flickr	27.3%	8.7%	0.0%	0.0%	1.4%	2.8%
Google+	9.1%	0.0%	0.0%	6.3%	0.0%	1.4%
SlideShare	0.0%	4.3%	0.0%	0.0%	0.0%	0.7%
Dailymotion	0.0%	4.3%	0.0%	0.0%	0.0%	0.7%

Pinterest	0.0%	4.3%	0.0%	0.0%	0.0%	0.7%
Widgets	0.0%	4.3%	0.0%	0.0%	0.0%	0.7%
N	11	23	20	16	73	143
No. of tools adopted						
Mean	4.0	4.0	1.4	1.4	0.0	1.3
Min	3	2	1	1	0	0
Max	5	8	2	4	1	8
SAI	5	9	2	6	8	30
RAI	6	14	18	10	65	113
Anglo-American	6	14	12	1	23	56
Eastern	5	2	0	9	12	28
Germanic	0	0	1	1	25	27
Napoleonic	0	1	3	5	11	20
Nordic	0	5	4	0	2	11
ECA	0	1	0	0	0	1

Group 1 includes 11 Audit Institutions (6 from the US and 1 each from Slovakia, Poland, Lithuania, Latvia and Bulgaria). All of them use Twitter, Facebook and YouTube and the 4 institutions of the sample that use Instagram are included in this group. According to We are social (2018), Facebook, YouTube and Instagram are the tools with the largest number of active users. Therefore, Audit Institutions in Group 1 are at the forefront of SM adoption.

Group 2 is composed of 23 Audit Institutions (10 from the US, 4 from the UK, 3 from the Netherlands and 1 each from Sweden, Slovenia, France, Finland and Estonia, and the ECA) that use Twitter and/or Facebook and are differentiated from the rest by a high presence in LinkedIn (87%) and, to a lesser extent, RSS (56.5%). As can be seen in Table 2, some Audit Institutions in this group are also present in other minority SM.

Group 3 includes 20 Audit Institutions (12 from the US, 4 from Netherlands, 2 from Spain, and 1 each from Malta and Austria) whose most important characteristic is that they do not use any SM tool to complement their activity in Twitter and/or Facebook, where the average presence is 85% and 50%, respectively. This causes an important difference in the average number of tools used in comparison with the two previous groups (1.4 versus 4).

Group 4 includes 16 Audit Institutions (7 from Poland, 3 from Spain and 1 each from the US, Italy, Hungary, Germany, Czech Republic and Belgium). They are characterized by a more traditional use of online communication platforms. All of them use RSS and the use of the other

tools is residual. Therefore, they are mainly interested in one-way communication, in most cases without any possibility for stakeholders to interact in SM.

Group 5 is the largest, with 73 Audit Institutions (51% of the 143 institutions in the sample). They do not use SM, except for one entity (the Office of State Auditor in Alabama) that uses Flickr.

The highest levels of adoption of SM correspond to Anglo-American, Nordic and Eastern European countries (with a mean of 1.8, 1.8 and 1.4 tools used, respectively). All the entities in Group 1 are Anglo-American or Eastern European. Groups 2 and 3 are mostly made up of Anglo-American and Nordic Audit Institutions (83% of the entities in these groups belong to these two styles). Audit institutions from Germanic and Napoleonic countries have a lower presence in SM (with a mean of 0.1 and 1 tools). 92.6% of the Germanic Audit Institutions belong to Group 5 as they hardly use SM, and 80% of the Napoleonic Audit Institutions are in Groups 4 and 5. SAIs are overrepresented in Groups 1 and 2: they represent 45% and 64% of the Audit Institutions in these groups, respectively, but only 21% of the whole sample.

Table 3. Factors related to SM adoption by Audit Institution

Panel A: Factors related to the adoption of at least one tool (N=142).			
	% of Audit Institutions that use at least one tool		
Anglo-American	60.7%		
Eastern	57.1%		Kruskal-Wallis
Germanic	7.4%		27.2**
Napoleonic	45.0%		
Nordic	81.8%		
SAIs	72.4%		Chi-square
RAIs	43.3%		27.4**
	Do not use any tool(1)	Use at least one tool(2)	U-MW
Ln (inhab.)	14.70	15.44	1,702.5**
Internet	80.77	79.45	2,357.0
SM	56.99	62.84	1,848.5**
Corruption	71.29	70.53	2,464.0
OBI(3)	68.11	70.57	1,298.0
OSI(4)	93.03	93.48	2,880.5
Panel B: Factors related to the number of tools adopted (N=142).			
	Average No. of tools adopted		
Anglo-American	1.8		
Eastern	1.4		Kruskal-Wallis
Germanic	0.1		26.2**
Napoleonic	1.0		

Nordic	1.8					
SAIs	2.6				U-MW	
RAIs	0.9				3.8**	
Spearman correlation	Ln (inhab.)	Internet	SM	Corruption	OBI[3]	OSI[4]
No. of tools adopted	0.351**	- 0.043	0.270**	0.012	0.240*	0.161

Notes: *p-value<0.05; **p-value<0.01. N=142 because the ECA has not been included in these analyses.
[1] Average value of the following variables for those Audit Institutions that do not use any Web 2.0 or SM tool: number of inhabitants (Ln) of the country/region, percentage of individuals using the Internet, percentage of individuals using SM tools, corruption perception index, open budget index (OBI) and online service index (OSI).
[2] Average value of the same variables for those Audit Institutions that use at least one Web 2.0 or SM tool.
[3] N=113 because data for Austria, Belgium, Cyprus, Denmark, Estonia, Finland, Greece, Ireland, Latvia, Lithuania, Luxembourg, Malta and Netherlands was not available.
[4] N=141 because data for Cyprus was not available.

4.3. Factors related to the adoption of online communication platforms

Table 3 shows the results obtained for the bivariate tests carried out to analyze the factors related to the adoption of at least one communication platform and the number of tools adopted. As can be seen, the factors statistically related to the adoption of at least one tool (Panel A) are practically the same as for the number of tools adopted (Panel B). The only difference is for the OBI, which does not explain differences in the adoption or non-adoption of SM, but is positively related to the number of tools adopted. The results for the public administration style and type of Audit Institutions confirm the general impressions obtained in the previous subsection: these two variables are related to the adoption of Web 2.0 and SM tools. Particularly, the percentages of adoption of at least one tool are higher for Nordic, Anglo-American and Eastern European countries (81.8%, 60.7% and 57.1%), versus 7.4% for Germanic Audit Institutions. 45% of the Audit Institutions in Napoleonic countries have adopted at least one tool. As can be seen, 72.4% SAIs have adopted at least one of the tools versus 43.3% RAIs. As regards the number of tools adopted, the differences among public administration styles and type of Audit Institutions are also statistically significant. Regarding countries/regions characteristics, the number of inhabitants and the level of SM adoption among the population are positively related to the adoption of at least one tool and the number of tools adopted (in this last case, the OBI is also statistically significant). Conversely, Internet

penetration, the corruption perception index and the OSI are not related to the adoption of Web 2.0 or SM tools by Audit Institutions.

4.4. Contents published through SM

As can be seen in Table 4, most of the publications in Twitter (86.7%) aim at transmitting substantive information to stakeholders. The information communicated is mostly related to the activity of the Audit Institutions: audit reports represent 52% of the tweets and 31% refer to press releases, conferences, meetings and other activities. The second objective, according to publication frequency (6.7%), is related to the improvement of the image of the Audit Institutions. Most of the tweets classified as symbolic presentation seek to attribute merits to the Audit Institutions or present promotional content and those that express opinions on political issues are rare.

Table 4. Type of publications in Twitter (N=1,380 tweets)

	TOTAL
Information Provision	**86.7%**
Audit reports	52.5%
Events and other activities	31.2%
Public interest information	3.1%
Input Seeking	**2.4%**
Citizen information	2.3%
Fundraising	0.1%
Online dialog/offline interaction	**4.1%**
Online dialog	0.0%
Offline discussion	0.0%
Job offers and competitive exams	4.1%
Symbolic presentation	**6.7%**
Favorable presentation and marketing	4.9%
Symbolic act	1.4%
Political positioning	0.4%
Total	**100.0%**

Note: Examples of each type of tweets can be found in Appendix II.

Publications that aim at promoting interaction with stakeholders (input seeking and online dialog/offline interaction categories) are the least frequent. Within these categories, the most common tweets relate to job offers or competitive exams (4.1%). This shows that Audit

Institutions are using SM mostly for one-way communication related to their main fields of activity.

4.5. Number of followers and levels of citizen awareness

The average number of followers in Twitter is around 7,100 (see Table 5). However, there are large differences between Audit Institutions as shown by the minimum, maximum and standard deviation figures. In these cases, the median value is more representative than the average value, and this figure is much lower (827 followers). Some institutions have a very high level of followers, such as the GAO (43,200) and the UK "National Audit Office" with 133,000. The smallest number of followers (10) corresponded to the "Office of the Auditor" in Hawaii.

The levels of awareness (number of followers divided by the number of inhabitants of the country/region) are very low. On average, only 3 people per 10,000 inhabitants are following these Twitter accounts. Indeed, only 4 Audit Institutions have more than 1 follower per 1,000 inhabitants. These results are lower than those presented by other institutions, such as local or national governments (Mickoleit, 2014; Bonsón et al., 2017), as their target audience is probably smaller than all the population in the region/country.

Table 5. Level of follow-up in Twitter

Followers	Mean	7,115.7
	Median	827.5
	Max	133,000.0
	Min	10.0
	SD	22,168.7
Awareness	Mean	0.3
	Median	0.2
	Max	2.0
	Min	0.0
	SD	0.4

Note: Followers data refer to June, 2018.

5. Discussion and Conclusions

SM are becoming a more and more common source of information that people use to receive direct updates and content on general topics or personal interests, by following different organizations or people. Therefore, SM could be another adequate channel for Audit Institutions to promote transparency and citizen engagement, and to improve their visibility and change their perception as closed and distant institutions in the eyes of citizens. However, the use of Web 2.0 tools and SM by Audit Institutions is still at an initial stage. Half of the Audit Institutions analyzed do not use any of these tools. Others only use RSS to keep citizens informed about recent updates. Therefore, most of the Audit Institutions do not allow any type of interaction with stakeholders through SM, suggesting that media attention is considered as a potential source of conflict for a considerable percentage of Audit Institutions, as previous research has found (van Acker and Bouckaert, 2019), and that environmental pressures for SM adoption result in different configurations of the "same" reform. These results contradict the idea of "diffusion as imitation" (mimetic isomorphism) and confirm that the adoption of public management reforms by Audit Institutions are conditioned by contextual factors (Torres et al., 2019).

The Audit Institutions that have adopted SM mainly use Twitter or Facebook and only few Audit Institutions complement the use of these tools with other SM. However, having a SM account does not imply that Audit Institutions are reaching and engaging in dialog with stakeholders. As our results show, the number of followers and citizens' awareness of the official Twitter accounts is low, in general terms. Most of the tweets refer to the audits they perform, trying to increase legitimacy by increasing stakeholder levels of awareness and perceived value about the main activities they carry out. However, the contents published rarely aim at encouraging stakeholder participation, which corroborates the results obtained for other public sector organizations (Golbeck et al., 2010; Zheng and Zheng, 2014; DePaula et al.,

2018). It seems that Audit Institutions are using SM to increase their visibility and legitimacy by using what Mergel (2013) defines as a "push strategy". There are some exceptions, such as the campaign "Shape our audits" in the Audit Office of Wales (UK), which consists in an online public consultation about the themes and topics that stakeholders think the audit office should analyze (see Appendix II). The lack of publications seeking bidirectional communication means that the possibility of using SM to achieve the goal of gaining legitimacy through responsiveness ("networking strategy") is being wasted.

These results are more consistent with the traditional view of Audit Institutions as isolated and technocratic entities (having little to do with citizens and broader governance issues) than with more recent approaches advocating higher levels of stakeholder engagement. Two decades ago, Pollitt and Summa (1997) already indicated that, because of their meta-bureaucratic nature, Audit Institutions are presumably among the most resistant institutions towards the adoption of public management reforms. This is also evident in the adoption of SM tools. According to the diffusion of innovations theory, the low rate of adoption of SM suggests that Audit Institutions do not perceive great advantages for the use of these tools or believe that their use is in conflict with existing patterns and values as regards disclosure, accountability and relationships with citizens and other stakeholders–the compatibility issue, as described by Reichborn-Kjennerud (2013). The low adoption rates, especially for RAIs, also suggest that Audit Institutions, in general terms, do not feel a real urgency to adopt these tools in spite of the recommendations of INTOSAI and other international organizations.

Overall, our results point to the existence of a certain dependence on institutional pressures (institutional theory), contextual factors (public administration styles and open budget index) and citizen demand (size of the population and SM use among citizens) for the adoption of Web 2.0 and SM tools by Audit Institutions. Cultural influences and contextual factors seem to march hand-in-hand with SM adoption by Audit Institutions. Although previous research at

the local level found no differences between SM adoption depending on the public administration style (Bonsón et al., 2012), this is not the case in our research for Audit Institutions. The Audit Institutions that have more presence in SM usually belong to the Anglo-American, Nordic, or Eastern-European public administration styles. Similarly, higher open budget indexes are also related to higher levels of adoption of SM. The higher level of adoption in Anglo-American and Nordic countries is consistent with the more open, egalitarian and less formal cultures of these countries and their greater tradition of public sector reforms, transparency, e-government developments and citizen engagement (Pollitt and Summa, 1997; Pina et al., 2010; Yetano et al., 2010). However, the more hierarchical, formal and status-oriented administrative cultures of Germanic and Napoleonic Audit Institutions are less favorable to the adoption of these tools. These findings are also consistent with previous research analyzing the use of SM to engage citizens in spending review processes (Agostino et al., 2017). Similarly, the analysis of the websites of RAIs in Spain (Garde et al., 2014) also showed that the main weakness of these websites was the lack of possibilities for stakeholders to interact. In spite of that, some exceptions have been found, such as the "Cour des Comptes" in France that is using a high number of Web 2.0 tools, which is consistent with its recent innovative experiences in control methods, external communication and open data (EUROSAI, 2019). Furthermore, as it is one of the most prestigious institutions in the French system of government (Pollitt and Summa, 1997), it might have felt more pressure to adopt these tools. Furthermore, Audit Institutions from the five public administration styles can be found in the group of non-adopters. This suggests that the public administration style provides a more favorable or unfavorable context but is not a decisive factor and, most probably, political will plays a key role.

The higher levels of adoption among SAIs are very probably explained by INTOSAI (2009a, 2010, 2013b) recommendations regarding effective communication with stakeholders and

appropriate levels of transparency and accountability, confirming that coercive and normative isomorphism (institutional theory) are also important factors to explain SM adoption. A higher number of inhabitants and a higher SM penetration rate are also related with more presence in Web 2.0 tools and SM, in contrast with previous research in municipalities (Bonsón et al., 2012). Audit institutions serving a larger population receive a greater amount of attention from a variety of stakeholder groups and the general public alike. Similarly, Audit Institutions in countries with higher rates of SM use among citizens will feel more pressure and/or a higher justification for SM adoption. These factors seem to play a key role in the initial stages of SM adoption, which is the present situation of Audit Institutions. In the case of SM use by the biggest local governments in Western Europe (Bonsón et al., 2012), where the use was generalized, these contextual factors lost their relevance.

These results have important theoretical and practical implications. As regards theoretical implications, our results confirm that contextual factors play a main role for the adoption of SM and Web 2.0 tools by Audit institutions. The importance of these factors is not properly addressed by institutional theory or the diffusion of innovations theory. Therefore, these theories have to be complemented with additional variables or logics (e.g. the public administration style) in order to understand varieties in the adoption of transparency and engagement tools. Furthermore, the high percentage of non-adopters (laggards, using the terminology of the diffusion of innovations theory) and the compatibility issue (i.e. the extent to which the innovation is expected to disrupt the main functions of organizations) deserve special attention and further research in the case of SM adoption by Audit Institutions.

As regards practical implications, the significantly lower levels of adoption among RAIs also point out that, for the sake of homogeneity, recommendations about SM use should be extended beyond SAIs. Audit Institutions need to work to increase their follower base if they really want to improve communication with stakeholders through Web 2.0 and SM tools. The

low number of followers and awareness levels for most of the Twitter accounts also suggests that Audit Institutions should be present on several platforms to try to reach to the highest number of stakeholders and improve communication and engagement. Publishing more content that seeks two-way communication in order to incorporate stakeholder input and to improve responsiveness and the activities carried out by Audit Institutions also seems to be a pending task.

The exploratory nature of this work does not allow causality relationships to be established. It is, however, necessary to point out that this is the first study aimed at describing the adoption of SM by Audit Institutions and should, therefore, be useful to Audit Institutions, academics and the general public. Further studies to deal with other matters not analyzed in this research are necessary. For example, further research is required about the benefits, costs and risks (e.g. compatibility issues) of SM use by Audit Institutions. These analyses are necessary in order to justify the use of these tools and will be particularly useful for Audit Institutions not using these tools yet in order to make an informed decision about whether to jump on the bandwagon or not. Future research should also analyze in greater depth SM use by Audit Institutions, extending the analysis beyond Twitter and looking at the real interactions taking place in these platforms, how stakeholders are being engaged and which are the most effective platform(s). This research has been carried out in the EU and US but, taking into account that the greatest presence in Web 2.0 and SM is in SAIs, subsequent research could extend to all the institutions belonging INTOSAI, since this organization has actively recommended its use. Further research should also take into account the capacities and resources of Audit Institutions, but these data were not easily available at the time this analysis was carried out (see also Cordery and Hay, 2019, p. 11).

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Appendix I: Audit Institutions analyzed

Country	Name	SAI/RAI	Website	Group (cluster)
-	European Court of Auditors	SAI	www.eca.europa.eu	2
Austria	Rechnungshoft Österreich	SAI	www.rechnungshof.gv.at	3
Austria	Kärntner Landesrechnungshof	RAI	www.lrh-ktn.at	5
Austria	Oberösterreichischer Landesrechnungshof	RAI	www.lrh-ooe.at	5
Austria	Salzburger Landesrechnungshof	RAI	www.salzburg.gv.at/pol/lt-rechnungshof	5
Austria	Steiermärkischer Landesrechnungshof	RAI	www.landesrechnungshof.steiermark.at	5
Austria	Landesrechnungshof Tirol	RAI	www.tirol.gv.at/landtag/landesrechnungshof	5
Austria	Burgenländischer LandesRechnungshof	RAI	www.blrh.at	5
Austria	Niederösterreichischer Landesrechnungshof	RAI	www.lrh-noe.at	5
Austria	LandesRechnungshof Vorarlberg	RAI	www.lrh-v.at	5
Austria	Stadtrechnungshof Wien	RAI	www.stadtrechnungshof.wien.at	5
Belgium	Rekenhof Cour des Comptes Rechnungshof	SAI	www.courdescomptes.be	4
Bulgaria	Сметна палата на Република България	SAI	www.bulnao.government.bg	1
Croatia	State Audit Office	SAI	www.revizija.hr	5
Cyprus	Audit Office of the Republic of Cyprus	SAI	www.audit.gov.cy	5
Czech Republic	Nejvyšší Kontrolní úřad	SAI	www.nku.cz	4
Denmark	Rigsrevisionen	SAI	http://uk.rigsrevisionen.dk	5
Estonia	Riigikontroll	SAI	www.riigikontroll.ee	2
Finland	Valtiontalouden Tarkastusvirasto	SAI	www.vtv.fi	2
France	Cour des Comptes	SAI	www.ccomptes.fr	2
Germany	Bundes Rechnungshof	SAI	www.bundesrechnungshof.de	4
Germany	Rechnungshof Baden Württemberg	RAI	www.rechnungshof.baden-wuerttemberg.de	5
Germany	Landesrechnungshof Brandenburg	RAI	www.lrh-brandenburg.de	5
Germany	Hessischer Rechnungshof	RAI	https://rechnungshof.hessen.de	5
Germany	Landesrechnungshof Mecklenburg Vorpommern	RAI	www.lrh-mv.de	5
Germany	Rechnungshof Rheinland Pfalz	RAI	www.rechnungshof-rlp.de	5
Germany	Sächsischer Rechnungshof	RAI	www.rechnungshof.sachsen.de	5
Germany	Landesrechnungshof Sachsen Anhalt	RAI	https://lrh.sachsen-anhalt.de	5
Germany	Landesrechnungshof Schleswig Holstein	RAI	www.landesrechnungshof-sh.de	5
Germany	Thüringer Rechnungshof	RAI	http://thueringer-rechnungshof.de	5
Germany	Bayerischer Oberster Rechnungshof	RAI	www.orh.bayern.de	5
Germany	Rechnungshof von Berlin	RAI	www.berlin.de/rechnungshof	5
Germany	Rechnungshof der Freien Hansestadt Bremen	RAI	www.rechnungshof.bremen.de	5
Germany	Rechnungshof der Freien und Hansestadt Hamburg	RAI	www.hamburg.de/rechnungshof	5
Germany	Niedersächsischer Landesrechnungshof	RAI	www.lrh.niedersachsen.de	5
Germany	Landesrechnungshof Nordrhein Westfalen	RAI	www.lrh.nrw.de/	5
Germany	Rechnungshof des Saarlandes	RAI	www.rechnungshof.saarland.de	5
Greece	Ελεγκτικό Συνέδριο	SAI	www.elsyn.gr/el	5
Hungary	Állami Számvevöszék	SAI	https://asz.hu/	4
Ireland	Office of the Comtroller and Auditor General	SAI	www.audgen.gov.ie	5
Italy	Corte dei Conti	SAI	www.corteconti.it	4
Latvia	Valsts Kontrole	SAI	www.lrvk.gov.lv	1
Lithuania	Valstybës kontrolë	SAI	www.vkontrole.lt	1
Luxembourg	Cour des Comptes	SAI	www.cour-des-comptes.lu	5
Malta	Ufficcju Nazzjonali tal Verifika	SAI	http://nao.gov.mt	3
Netherlands	Algemene Rekenkamer	SAI	www.rekenkamer.nl	2
Netherlands	Noordelijke Rekenkamer	RAI	www.noordelijkerekenkamer.nl	3
Netherlands	Rekenkamer OostNederland	RAI	http://rekenkameroost.nl	2
Netherlands	Randstedelijke Rekenkamer	RAI	www.randstedelijke-rekenkamer.nl	3
Netherlands	Rekenkamer Zeeland	RAI	www.rekenkamerzeeland.nl	3
Netherlands	Zuidelijke Rekenkamer	RAI	www.zuidelijkerekenkamer.nl	2
Netherlands	Rekenkamer Amsterdam	RAI	www.rekenkamer.amsterdam.nl	3
Netherlands	Rekenkamer Rotterdam	RAI	https://rekenkamer.rotterdam.nl	5
Poland	Najwyższa Izba Kontroli	SAI	www.nik.gov.pl	1
Poland	Regionalna Izba Obrachunkowa w Bydgoszczy	RAI	www.bydgoszcz.rio.gov.pl	4
Poland	Regionalna Izba Obrachunkowa w Katowicach	RAI	www.katowice.rio.gov.pl	5
Poland	Regionalna Izba Obrachunkowa w Krakowie	RAI	www.krakow.rio.gov.pl	5
Poland	Regionalna Izba Obrachunkowa w Łodzi	RAI	www.lodz.rio.gov.pl	5
Poland	Regionalna Izba Obrachunkowa w Poznaniu	RAI	www.poznan.rio.gov.pl	5
Poland	Regionalna Izba Obrachunkowa w Szczecinie	RAI	www.szczecin.rio.gov.pl	4
Poland	Regionalna Izba Obrachunkowa w Warszawie	RAI	http://bip.warszawa.rio.gov.pl	4
Poland	Regionalna Izba Obrachunkowa we Wrocławiu	RAI	http://bip.wroclaw.rio.gov.pl	4

Poland	Regionalna Izba Obrachunkowa w Zielonej Górze	RAI	www.zielonagora.rio.gov.pl	5
Poland	Regionalnej Izby Obrachunkowej w Białymstoku	RAI	http://bialystok.rio.gov.pl	5
Poland	Regionalna izba Obrachunkowa w Gdansku	RAI	www.bip.gdansk.rio.gov.pl	4
Poland	Regionalna izby Obrachunkowej w Kielchach	RAI	http://bip.kielce.rio.gov.pl	5
Poland	Regionalna Izba Obrachunkowa w Lublinie	RAI	www.lublin.rio.gov.pl	4
Poland	Regionalna Izba Obrachunkowa w Olsztynie	RAI	www.olsztyn.rio.gov.pl	5
Poland	Regionalnej Izby Obrachunkowej w Opolu	RAI	http://rio.opole.pl	4
Poland	Regionalna izba Obrachunkowa w Rzeszowie	RAI	www.rzeszow.rio.gov.pl	5
Portugal	Tribunal de Contas	SAI	www.tcontas.pt	5
Romania	Curtea de Conturi a României	SAI	www.curteadeconturi.ro	5
Slovakia	Najvyšší Kontrolný Úrad	SAI	www.nku.gov.sk	1
Slovenia	Računsko Sodišče Republike Slovenije	SAI	www.rs-rs.si	2
Spain	Tribunal de Cuentas de España	SAI	www.tcu.es	4
Spain	Cámara de Cuentas de Aragón	RAI	www.camaracuentasaragon.es	4
Spain	Cámara de Cuentas de Andalucía	RAI	www.ccuentas.es	3
Spain	Sindicatura de Cuentas del Principado de Asturias	RAI	www.sindicastur.es	5
Spain	Sindicatura de Comptes de les Illes Balears	RAI	www.sindicaturaib.org	5
Spain	Audiencia de Cuentas de Canarias	RAI	www.acuentascanarias.org	5
Spain	Consejo de Cuentas de Castilla y León	RAI	www.consejodecuentas.es	4
Spain	Sindicatura de Comptes de Catalunya	RAI	www.sindicatura.org	5
Spain	Consello de Contas de Galicia	RAI	www.consellodecontas.es	5
Spain	Cámara de Cuentas de la Comunidad de Madrid	RAI	www.camaradecuentasmadrid.org	5
Spain	Cámara de Comptos de Navarra	RAI	http://camaradecomptos.navarra.es	3
Spain	Sindicatura de Comptes de la Comunitat Valenciana	RAI	www.sindicom.gva.es	5
Spain	Tribunal Vasco de Cuentas Públicas	RAI	http://web.tvcp.orges	5
Sweden	Riksrevisionen	SAI	www.riksrevisionen.se	2
UK	National Audit Office	SAI	www.nao.org.uk	2
UK	Audit Scotland	RAI	www.audit-scotland.gov.uk	2
UK	Wales Audit Office	RAI	www.audit.wales	2
UK	Northern Ireland Audit Office	RAI	www.niauditoffice.gov.uk	2
US	U.S. Government Accountability Office	SAI	www.gao.gov	2
US	Alabama - Office of State Auditor	RAI	http://auditor.alabama.gov	5
US	Alaska - Division of Legislative Audit	RAI	www.legaudit.state.ak.us	5
US	Arizona - Office of the Auditor General	RAI	www.azauditor.gov	4
US	Arkansas - Auditor of State	RAI	www.arkansas.gov/auditor/	3
US	California - Bureau of State Audits	RAI	www.bsa.ca.gov	3
US	Colorado - Office of the State Auditor	RAI	https://leg.colorado.gov/agencies/office-of-the-state-auditor	3
US	Connecticut - Auditors of Public Accounts	RAI	www.cga.ct.gov/APA/default.asp	5
US	Delaware - Office of Auditor of Accounts	RAI	https://auditor.delaware.gov	5
US	Florida - Auditor General	RAI	www.myflorida.com/audgen/	5
US	Georgia - Department of Audits and Accounts	RAI	www.audits.ga.gov	5
US	Hawai'i - Office of the Auditor	RAI	http://auditor.hawaii.gov	2
US	Idaho - Office of the State Controller	RAI	www.sco.idaho.gov	5
US	Illinois - Auditor General	RAI	www.state.il.us/auditor	5
US	Indiana - Auditor of State	RAI	www.in.gov/auditor	3
US	Iowa - Auditor of State	RAI	https://auditor.iowa.gov	1
US	Kansas - Legislative Division of Post Audit	RAI	www.kslpa.org	3
US	Kentucky - Auditor of Public Accounts	RAI	www.auditor.ky.gov	1
US	Louisiana - Legislative Auditor	RAI	www.lla.state.la.us	2
US	Maine - Department of Audit	RAI	www.maine.gov/audit	5
US	Maryland - Office of Legislative Audits	RAI	www.ola.state.md.us	5
US	Massachusetts - Office of the State Auditor	RAI	www.mass.gov/sao	2
US	Michigan - Office of the Auditor General	RAI	http://audgen.michigan.gov	2
US	Minnesota - Office of the Legislative Auditor	RAI	www.auditor.leg.state.mn.us	2
US	Mississippi - Office of the State Auditor	RAI	www.osa.state.ms.us	1
US	Missouri - Office of the State Auditor	RAI	www.auditor.mo.gov	2
US	Montana - Legislative Audit Division	RAI	http://csimt.gov	1
US	Nebraska - Auditor of Public Accounts	RAI	www.auditors.state.ne.us	3
US	Nevada - Legislative Counsel Bureau	RAI	www.leg.state.nv.us/Division/Audit	5
US	New Hampshire Office of the Legislative Budget Assistant	RAI	www.revenue.nh.gov	5
US	New Jersey - Office of the State Comptroller	RAI	www.nj.gov/comptroller	3
US	New Mexico - Office of the State Auditor	RAI	www.saonm.org	5
US	New York Office of the State Comptroller	RAI	www.osc.state.ny.us	1

US	North Carolina Office of the State Auditor	RAI	www.ncauditor.net	2
US	North Dakota Office of the State Auditor	RAI	www.state.nd.us/auditor	3
US	Ohio - Auditor of State	RAI	www.auditor.state.oh.us	1
US	Oklahoma Office of the State Auditor and Inspector	RAI	www.sai.ok.gov	5
US	Oregon Audits Division	RAI	http://sos.oregon.gov/audits	2
US	Pennsylvania Department of the Auditor General	RAI	www.paauditor.gov	3
US	Rhode Island - Office of the Auditor General	RAI	www.oag.state.ri.us	5
US	South Carolina - Office of the State Auditor	RAI	http://osa.sc.gov	5
US	South Dakota State Auditor	RAI	www.sdauditor.gov	5
US	Tennessee Comptroller of the Treasury	RAI	www.comptroller.state.tn.us	5
US	Texas State Auditor's Office	RAI	www.sao.state.tx.us	5
US	Utah - Office of the Legislative Auditor General	RAI	https://le.utah.gov/audit/olag.htm	5
US	Office of Vermont the State Auditor	RAI	http://auditor.vermont.gov	5
US	Virginia - Auditor of Public Accounts	RAI	www.apa.state.va.us	3
US	Office of the Washington State Auditor	RAI	www.sao.wa.gov	2
US	West Virginia State Auditor's Office	RAI	www.wvsao.gov	3
US	Wisconsin - Department of Administration	RAI	https://doa.wi.gov	3
US	Wyoming - State Auditor's Office	RAI	http://sao.state.wy.us	5

Appendix II: Type of publications made on Twitter (definitions and examples).

Information Provision	
Audit reports	Audit reports made and published by Audit Institutions. "The EU's current long-term plan for high-speed #rail is unlikely to be achieved and there is no solid EU-wide strategic approach, according to a new report from the @EUauditors". Source: ECA.
Events and other activities	Events, conferences, press releases, appearances in parliamentary sessions. Other activities of the Audit Institution, such as changes of address, telephone, contact emails. "Our experience is evaluated internationally: a memorandum of cooperation between the Latvian and the Laos Supreme Audit Institutions has been signed today for the exchange of experiences and professional development. http://ejuz.lv/aosa". Source: Valsts kontrole (SAI of Latvia).
Public interest information	Campaigns from other institutions and recommendations of topics not related to the institution's activities (E.g. public health, elections). "Very exciting news for our State. @amazon has picked Indianapolis as one of the 20 finalists to be home to the company's 2nd headquarters. #NextLevel #HQ2". Source: Indiana Auditor of the State.
Input Seeking	
Citizen information	Requests for participation in surveys, campaigns against fraud or timely information on any subject related to the activity of the Audit Institution. "To help us choose future topics, we want you to tell us what you think we should focus on by completing our #ShapeOurAudits consultation". Source: Wales Audit Office.
Fundraising	Posts that ask for donations to different causes not necessarily related to the activity of the institution (e.g., child poverty). "Our Office, together with 34 other state and local agencies, participate in the #WellFedWellRead campaign headed by the Thurston County Food bank. The goal? To get backpacks full of food and books to kids in need for breaks from school. Only a week left to participate!". Source: Washington State Auditor's Office.
Online dialog/offline interaction	
Online dialog	Response by the Audit Institutions to user comment in SM. *No examples found in the 30 tweets per Audit Institutions analyzed.*
Offline discussion	Promotion of face-to-face events to discuss the activity of the institution, to know its mission and functions or collaborate with it. *No examples found in the 30 tweets per Audit Institutions analyzed.*
Job offers and competitive exams	Promotion of job offers and announcement of competitive exams carried out by the institution. "Become a financial magistrate! A competition is organized in 2018 by the Court of Auditors for the recruitment of eight advisers for the regional chambers of account from 1 January 2019. Registrations are open until 18 May inclusive." Source: Cour des Comptes.
Symbolic presentation	
Favourable presentation and marketing	Milestones achieved or prizes won, images or promotional videos, internal information with the clear objective of improving the external image of the audit institution. "Czechs are contributing to the European space programme not only with parts for space rockets, but also with our auditors. They are auditing budget and financial management of ESA. Lubos Rokos is the chair of the Audit Commission, Regina Charyparová is working for it in Paris". Source: Nejvyšší kontrolní úřad (SAI of the Czech Republic).
Symbolic act	Celebration of significant days or anniversaries of events, express condolence or gratitude (e.g. celebration of workers' day, armed forces' day or Christmas holidays). "The weather may have been cold but celebrating Dr. Martin Luther King Jr's legacy of civility with so many Hoosiers was worth it. @INCivilRights #MLKJR50". Source: Indiana Auditor of the State.
Political positioning	Express the opinion of the Audit Institution/General Auditor on a political issue. "We want companies holding NY state pension fund investments to ensure board diversity. That's why we're voting against all incumbent board directors at companies with #zerowomen directors". Source: New York Office of the State Comptroller.

Source: Classification adapted from DePaula et al. (2018). Examples of publications collected by the authors.

Appendix III: Dendrogram