Social media use in Central and Eastern European cities: Defining government-citizen relationships through phases

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Abstract

Research has shown the potential of social media to disseminate important information as well as transforming citizen engagement with government. However, implementation remains difficult, especially in public sector organizations. The success, impact, and performance of these new forms of networked interactions are yet to be fully explored, especially at the local level. Many municipalities are still experimenting with the use of social media, and few actively measure their performance on these platforms, as well as their digital interactions with the users. Different models or frameworks have been proposed to describe the types of government communication and activity on social media. They are addressed in this conference paper through three different phases, which refer to forms of government-citizen communication on social media. The original assessment method developed here contributes to the existing literature and provides guidance to practitioners. Empirically, our research relies on a database of cities that have between 100,000 and 500,000 inhabitants in European Union member states located in Central and Eastern Europe. It provides social media metrics for all cities included in our sample (N=82) and compares various indicators on Facebook, Twitter and Instagram, thereby contributing to better assess how social media platforms are used by local governments in the region.

Points for practitioners

- The evaluation of social media adoption should consider diverse aspects, including recurrence of use and actual usage by citizens.
- The evaluation of state-citizen exchanges should consider the level of interactivity raised by public organizations on social media platforms.
- Phases of state-citizen exchanges can be defined and measured trough accurate metrics to better assess where cities stand in terms of communication on social media platforms.

Keywords

Social media adoption, Social media use, Digital public sector communication, Citizen engagement, Participation

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1. Introduction

In the past few years, there has been considerable growth of electronic government projects using information and communications technology (ICTs) to help governments in service delivery and information provision online (e-disclosure). ICTs promise efficiency, speed of information delivery, global reach, and transparency (Twizeyimana and Andersson, 2019). The Web 2.0 applications and social media specifically represent one of the latest steps in ICTs use by government. In general, the merits of social media presence are almost unanimously accepted (Faber et al., 2020), since they provide innovative methods for immediate interaction between citizens and governments, becoming a central component of e-government (Bertot et al. 2010) and of the relationship between public organizations and the population (Mabillard et al., 2021) in a very short period of time.

The existence of social media tools in governments has also changed the landscape of public agencies and bureaucracies around the world. After some years of experimentation, testing, and assessment, the diffusion of social media in government is now intended to innovate how bureaucracies operate internally and how they interact with the public outside governments' organizational boundaries (Criado et al., 2013). Social media have raised opportunities to foster two-way communicative interaction as the demand for digital dialogic and knowledge-sharing options emerged. However, implementation is difficult, especially in government organizations (Meijer et al., 2012). The success, impact, and performance of these forms of networked interactions are yet to be fully explored, especially at the municipal level. Social media usage by local governments has thus become an important research topic. This results from the uptake of these platforms by most municipalities, and the increasing need to encourage citizen participation at the local level (Mossberger et al., 2013).

Many municipalities are still experimenting with the use of social media, and few actively measure their performance on social media and their digital interactions with the citizens. Empirical research shows that most government adoption of social media is for purely "informational" purposes (Mergel 2013a). The rise of social media use by governments appears not to have affected fundamentally the unilateral relationship between who provides information and takes decisions (playing an active role, the government) and who receives the information or the consequences of a decision (playing a passive role, the citizens) (Falco and Kleinhans, 2018). Governments seem to be locked in the one-way communication and supply-side "paradigm" where citizens are receivers rather than conscious producers or creators of information, data, ideas, solutions, and decisions in the context of public policies (McNutt 2010). Different models or frameworks have been proposed to describe the types of communication and activity of governments (federal and local) on social media (e.g., Meijer and Thaens, 2013; Mergel, 2013a; Falco and Kleinhans, 2018).

This article contributes to the strand of research on digital communication of public sector organizations through the definition and assessment of phases that characterize local governments' communication on social media. We focus on the use of Facebook, Twitter and Instagram in Central and Eastern European (CEE) cities between 100,000 and 500,000 inhabitants (N=82). In this regard, research on social media use by public administration has emerged only recently in CEE states (Špaček, 2018). Nevertheless, recent studies have shown compelling results regarding social media use in the region.

Our study contributes to the Public Administration (PA) literature on social media use in three ways. First, it extends the current state of research from a theoretical perspective through the development of a new model of state-citizen exchanges. Second, it proposes a methodological approach to measure the phases of this model with

relevant metrics. And third, it presents a unique dataset on CEE cities, thereby contributing to better assess how social media are used by local governments in the region. Indeed, this model involves evolving phases that describe the state of government-citizen communication on social media. Consequently, it provides material to better identify the phase(s) that prevail(s) in municipalities. Through these conceptual and empirical additions to the literature, our study aims at responding to the following research questions (**RQs**): What are the phases that characterize local governments' communication on social media (**RQ₁**)? And where do municipalities in CEE countries stand in terms of communication with their citizens on social media (**RQ₂**)?

This paper is structured as follows. Section 2 discusses social media use and communication phases in government organizations based on the academic literature. Section 3 presents the context and characteristics of the countries included in our study. Section 4 describes the metrics used to measure the phases on social media communication, whereas section 5 focuses on the method preferred to collect and analyze the data. The empirical results are then presented and commented in section 6. The final section of the paper exposes the conclusions and limitations of the paper.

2. Government communication on social media: Engagement as an objective

The first version of the Web was characterized by one-to-many communication, with low levels of interactivity and relatively small numbers of information producers. By contrast, today's users can seamlessly co-create and, importantly, share content that can include images and maps as well as text across a wide range of platforms (Ellison and Hardey, 2014). The rapid adoption of social media has done much to drive this transformation in how information is created, distributed, and used. The Web 2.0 is characterized by the collective creation and distribution of content; social media contribute to this trend in a significant way (Faber et al., 2020).

The use of social media, defined as internet-based applications built on the ideological and technological foundations of Web 2.0 (Kavanaugh et al., 2012), allows governments to provide real-time information to citizens, enhances service delivery and, through ease of use, encourages greater civic engagement and public participation (Manetti et al., 2017). It provides a convenient, accessible means of building relationships between governments and citizens. It also provides an ideal outlet for governments to dialogue with the public, social media being characterized by a low entry cost and a widespread acceptance of their legitimacy as communication channels (Stone and Can, 2020). Social media have thus offered new opportunities for local governments to send local service–related messages to their citizens. They may also serve as information exchange platforms and tools to obtain user feedback. Incorporating social media into the local administration communication strategy may enhance transparency and improve policymaking and the provision of public services (Bonsón et al., 2012). Indeed, social media lowers traditional barriers to civic engagement and participation, allowing the public to efficiently engage with public authorities. Conversely, local governments can be more responsive to users' needs and requests, and dialogue with citizens about salient issues. In addition, engaging citizens through social media can help governments build social capital and foster a shared sense of purpose, responsibility, and understanding with the citizenry (Brainard and Edlins, 2015).

However, the increase of web- and mobile-based platforms, enabling people to express their opinion, identify problems and propose solutions, have not solved issues observed in other communication channels. In this regard, several contributions have shown (so far) that: a) social media have a limited capacity to create mutual discourse

communication (Williamson and Parolin, 2013); b) models of participatory sensing predominate over participatory decision-making through apps (Ertiö, 2015); and c) a large segment of the population still does not feel comfortable about using emerging social media (Linders, 2012). Moreover, recent studies have shown that local governments mainly use social media to deliver information and services online, but that there are few transactions and limited interactivity (Guillamón et al., 2016). They have also confirmed that many local governments only use social media channels for unidirectional communication, sharing information but avoiding the dialogic potential of the platform (Mossberger et al., 2013; Campbell et al., 2014; Manetti et al., 2017). As a result, most local governments have adopted a "dissemination by default" approach, since they often lack a clear purpose and strategy for their social media channel (Campbell et al., 2014).

This is unfortunate since more collaborative relationships between governments and their citizens are a shared desired outcome of modern governance. Benefits would involve greater citizen engagement and participation and a more sustained, multi-stakeholder dialogue. Indeed, research has shown that engagement and participation are often the primary goals for public sector organizations (Mergel, 2013a). Nevertheless, citizen engagement remains an ill-defined concept. By using this term, academics or professionals might refer to: public participation, public engagement, stakeholder involvement, co-creation, political participation, civic engagement, participatory democracy or activism (Bonsón et al., 2019). Although there are multiple definitions of the term, its most essential aspect lies in the increased interaction between citizens and government.

Social networks provide a means to turn this engagement into practice, through discussion and the coordination of social activities (Warren et al., 2014). However, there is no clear evidence that citizens are using social media for interactive participation in the activities of government agencies (Haro-de-Rosario et al., 2018). Government social media engagement starts with the staff that can create opportunities for the public to access and comment on information (Brainard and Edlins, 2015). Strategies range from information dissemination to interactive dialogue. In this regard, Mergel (2013b) and Hofmann et al. (2013) have argued that government agencies still use social media tools for one-way information supply mainly, rather than enabling two-way communication to increase citizen participation. This finding has been confirmed by recent contributions (see Faber et al., 2020; Perea et al., 2021; Wukich, 2022).

Depending on the cultural context, people and governments in different countries tend to adopt social media in different ways. Thus, the existence of effective interactive participation by citizens through social media largely depends on the role played by public administrators, who may be either neutral or dynamic advocates of citizen participation (Bonsón et al., 2013). Although government agencies provide digital tools for participation, citizen engagement may still be limited because social media by themselves cannot automatically overcome passivity. In this sense, government agencies must take responsibility for encouraging interaction (Wukich, 2021).

According to Bovaird (2017), governments from most Western countries are trying to capitalize on social media to restore trust in government and respond to citizens' needs and aspirations. In contrast, Zheng and Zheng (2014) explain that, in other cases, governments tend to adopt and use social media primarily for self-promotion and political marketing, and not for promoting transparent, participatory, and citizen-oriented public services. Despite the evidence that social media is being adopted to promote citizen engagement, research remains rather limited; and while various frameworks and metrics have been proposed (e.g., Bonsón et al., 2015; Warren et al., 2014),

none has provided (to the extent of our knowledge) an integrated model to quantitatively measure the phases that characterize government-citizen relationships.

3. Social media role and use in CEE countries

It should first be noted that drawing the borders of geographical regions is a tricky and, sometimes, politically sensitive issue. Here, we rely on the list of CEE countries established by the French National Institute of Statistics and Economic Studies (INSEE) in 2020, gathering 11 European Union member states of the central and eastern part of Europe[4]. As we concentrate on cities between 100,000 and 500,000 inhabitants, the region includes only 10 countries (colored on Figure 1).

Figure 1. Map highlighting the countries included in the study
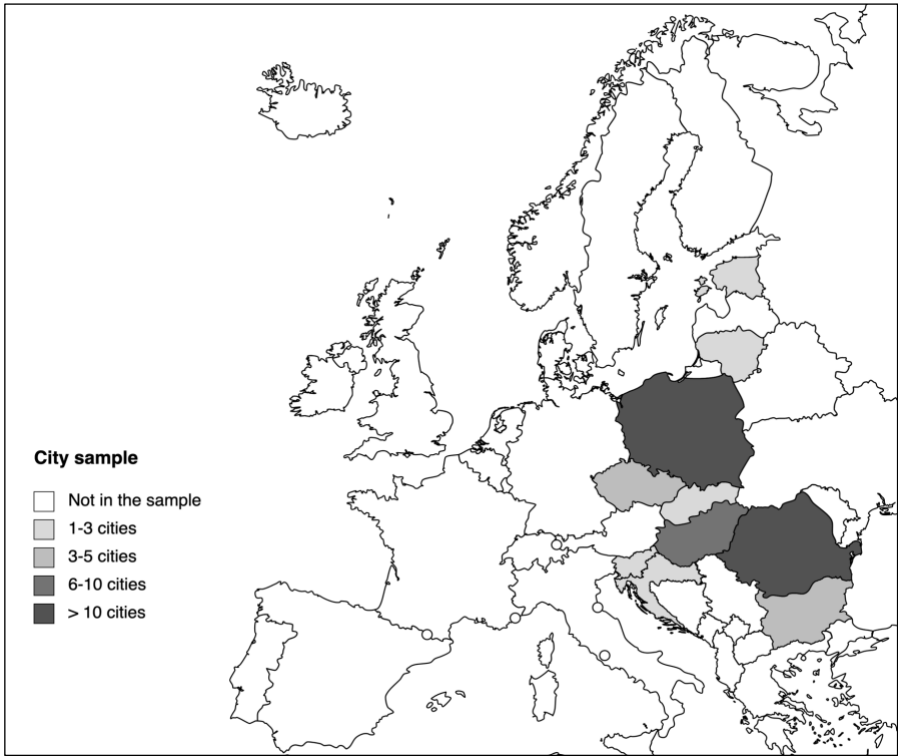
Notes. N=10 countries (including 82 cities). Latvia is not included in our sample since the only city over 100,000 inhabitants, the capital city Riga, has a population of 621,120 inhabitants in 2020. Source: Official Statistics of Latvia.

Sources. <u>Bulgaria</u>: National Statistical Institute (Dec. 31, 2018); <u>Croatia</u>: Croatian Bureau of Statistics (Dec. 31, 2018); <u>Czech Republic</u>: Czech Statistical Office (2018); <u>Estonia</u>: Statistics Estonia (2019); <u>Hungary</u>: Central Statistical Office (Jan. 1, 2019); <u>Lithuania</u>: Statistics Lithuania (July 1, 2019); <u>Poland</u>: Statistics Poland (Dec. 31, 2018); <u>Romania</u>: National Institute of Statistics (Jan. 1, 2016); <u>Slovakia</u>: Statistical Office (Dec. 31, 2019); <u>Slovenia</u>: Statistics Slovenia (Q2, 2019).

After World War II, CEE countries became part of the Socialist Bloc. In 1989, some countries demanded political changes which, within the subsequent two years, participated to the disintegration of the "East vs. West" political configuration that prevailed in Europe (Glińska and Rudolf, 2019). A forceful pursuit of societies within those countries to adopt democratic standards along with reforms of the economic system became a basis for political and economic changes, bringing their standards closer to those of Western European countries (Randma-Liiv and Drechsler, 2017). Each CEE country has tried to implement subsequent phases of transformation on its own, a

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[4] https://www.insee.fr/en/metadonnees/definition/c2055#:~:text=Bulgaria%2C%20Croatia%2C%20Estonia%2C%20Hungary,Slovenia%2C%20Slovakia%2C%20Czech%20Republic.

process that has occurred at varying rates (Perković, 2014). These rates have sensibly influenced the style of public administration and communication activities carried out by local governments (Bonsón et al., 2015). Indeed, social media use conforms to expectations and associates with higher personal support for the democratic regimes. This shows that the interactive capabilities of the internet are one of the most important factors that differentiate it from traditional media (Placek, 2017).

The use of social media by government in post-communist countries is thus still emerging, and the research on this issue is scarce. Nevertheless, we have identified several studies that examined the use of social media in CEE government organizations. For instance, Jukić and Merlak (2017) analyze the use of Facebook among 112 Slovenian state administrations, finding that only a few public organizations have adopted Facebook. Špaček (2017) presents preliminary results of Facebook use in 11 regions in the Czech Republic, detecting that Facebook pages were used mainly for diffusing ex-post information, with calls for participation found only sporadically. Sinkienė and Bryer (2016) in Lithuania, Jukić and Svete (2018) in Slovenia, Mital (2020) in Slovakia and Urs (2017), and Zeru (2021) in Romania also contribute to the analysis of social media use by local governments in the region.

According to Urs (2017), CEE countries use new technologies for better government and social media change the way citizens are getting political information. Jukić and Merlak (2016) show that many municipalities (41 %) have created their Facebook profiles in 2015 because it was the year of the local elections, and adopting Facebook might have provided an advantage for individuals running for office. They also point out that public administrations have not been so eager to capitalize on social media for improving service delivery, transparency, organizational image, and inclusive policy processes. Although most municipalities are active on Facebook, they do not respond to the comments or provide other forms of feedback, echoing the results from Zheng and Zheng (2014).

4. Social media phases in government-citizen relationships: Toward an integrated model

Our study aims at identifying the phases that characterize local governments' communication on social media. We refer more specifically to the literature that points to strategies (Mergel, 2013b; Mergel 2015; Wukich 2021), missions (Harrison et al., 2012; Lee and Kwak, 2012), information directions (Grunig, 2013; Linders 2012), communication flows (Mergel 2017; Wukich 2022) and tactics (Meijer and Thaens, 2013; Mergel, 2013a). To gather these various aspects, we create an encompassing framework of government-citizen relationships on social media that includes the phases described below and that will help us respond to **RQ₁**: what phases characterize local governments' communication on social media?

4.1 Dissemination phase

In the first, dissemination phase, local governments see the use of additional channels on social networking sites to institutionalize their interactions and bring government information to citizens with the objective of being as inclusive as possible, and to reach audiences in the social spaces they frequent daily (Mergel, 2013a). Social media are used as a broadcasting channel and citizens are conceived as the target audience for the reception of government information (Meijer and Thaens, 2013; Mergel, 2012). The goal is to increase transparency and inclusiveness through the voluntary release of government information on other channels than the traditional ones, such as a dedicated website (Mergel, 2013a). This type of communication has often been praised since information provision

to the general public remains an important activity for democratic governments to fulfil their transparency and accountability mandates (Bertot et al., 2010).

Mergel (2013b: 127) describes this phase as a representation tactic (or strategy): "The overwhelming reason to participate in social media spaces can be summarized with one main goal: Representation of the agency on all potential interaction channels". The objective, therefore, is to reach audiences that do not routinely interact with local governments and that are excluded from decision-making and policy-making processes. Municipalities that are following a representation tactic are mostly simply repurposing existing online content, and using social media to notify their audiences about policy statements or major press releases. Minimal additional resources are invested into tailoring the content specifically for social media channels or active bidirectional interactions (Mergel, 2013b). Meijer and Thaens (2013) and DePaula and Dincelli (2016) describe this approach as a push strategy. Social media are used to convey basic information to users about public bodies' activities. This approach is also described as one-way symmetric (Grunig, 2013), referring to the simple provision of information from "one-to-many" (Wukich, 2022) and a communication flow that is unidirectional. Empirical research has shown that departments of local governments mostly use Facebook for information provision as described here: most content (71.9%) examined in a study from De Paula and Dincelli (2016) was one-way information provision. Several other researchers have found similar results (Leston-Bandeira and Bender, 2013; Hofmann et al., 2013; Mabillard and Zumofen, 2019), confirming that most local governments are still in this phase.

4.2 Interaction phase

Considering the global popularity of social media, these platforms may also be used by local authorities to reach citizens for input and commentary in government matters (DePaula and Dincelli, 2016). In this second phase, the objective to run social media accounts pertains to dialogue and citizen participation, which could be defined as the act of incorporating public input into decision-making (Harrison et al., 2012), as some municipalities acknowledge that their traditional websites are not the locus of citizens' search for information anymore (Mergel, 2013b). While social media tools were initially used in similar fashion to traditional static websites (Mergel, 2013a), local governments following this strategy have recognized the need to interact with users in a natural conversation style instead of pushing out reports or memos without providing opportunities for interaction (Mergel, 2013b).

The interaction phase goes beyond mere broadcasting and diffusion of information to the external public. Instead, government organizations are actively trying to encourage their audiences to create and share content in different formats with them (Mergel, 2013b). This phase is described by some authors as going two-way with a pull tactic because if refers to the interaction of the governments with the citizen for acquisition of information and feedback (DePaula and Dincelli, 2016). Since the initiating organization (in this case the government) acquires input from the audience but does not engage in a reciprocal dialogue on this information, this phase is considered as asymmetric (Grunig, 2013) with a "one-to-one" communication flow (Wukich, 2022).

Over time, local governments in the dissemination phase tend to move from a purely representative and broadcasting tactic to a more interactive tactic (Meijer and Thaens, 2013), thus transiting toward an interaction phase. Indeed, it is today expected that government use social media such as Facebook to ask for feedback, fill a survey or asks for opinions from their audience without explicitly referring to or giving a chance for dialogue and mutual conversation (DePaula and Dincelli, 2016), even though such dialogue is often not effectively achieved. Beyond providing information to the public, government organizations should actively seek feedback from citizens

through their social media channels (Mergel, 2013a). Although some government organizations engage in some interaction with citizens, Leston-Bandeira and Bender (2013) report that this is often in the form of "bubble engagement" where input is not further acknowledged by public authorities.

4.3 Transaction phase

In the third phase, governments may connect with a knowledgeable audience to coproduce plans, policies or simply content. In the past, coproduction was constrained by the limited ability of government to effectively coordinate citizen actions and the difficulty of ordinary citizens to self-organize. However, advances of the Internet gradually enabled a unique "many-to-many" interactivity and helped fulfil the promise of enabling coproduction on an unprecedented scale (Linders, 2012). Increased collaboration between government and citizens indicates a higher level of engagement in a reciprocated manner, by allowing users to directly engage with government content and co-create government innovations (Mergel, 2013a).

Indeed, allowing audiences to reuse content posted by government organizations on social media is a first step towards this tactic and can be interpreted as another indicator of this strategy (Mergel, 2013b). In this transaction phase, governments' relationships with citizens become highly interactive and bidirectional. They often create reciprocated feedback cycles. Therefore, this phase does not only include active interactions with the citizens, but it can be regarded instead as an enhanced interaction between the citizens and the content produced by an agency. In turn, this can create a snowballing effect through the citizens' own networks. This phase is characterized by the citizens being given a larger responsibility and control over the content. This tactic allows government to absorb comments, gain valuable insights about the sentiments around mission-relevant issues or topics discussed by their online audiences across different social media channels (Mergel, 2013b). This type of dialogue is termed two-way symmetric and proposed as the best model for how organizations in general should interact with the public (Grunig, 2013). While social media account managers mentioned the objective of reaching this phase in prior studies, very few interviewees were able to point to concrete examples. Instead, they listed reciprocated feedback and interaction as a desirable goal for their social media use, as already noted by Mergel (2013b).

Table 1. Social media government-citizen relationship phases model

Phases	**Missions**	**Tactics**	**Information directions**	**Strategies**	**Communication flows**
1. Dissemination	Transparency Inclusiveness	Push	One-way symmetric	Representation	One-to-many
2. Interaction	Participation Deliberation	Pull	Two-way asymmetric	Engagement	One-to-one
3. Transaction	Collaboration Coproduction	Networking	Two-way symmetric	Mingling	Many-to-many

5. Method

This section aims at explaining the main approaches used, the metrics preferred to measure the phases described above, the selection of the cities included in our sample, as well as the collection and treatment of the data. First of all, to respond to **RQ₂**, this contribution needs to present an effective way to measure the phases described above based on objective criteria. Certain local governments want to engage in higher level of online interactions not only to become more transparent, but also to increase participation. However, the challenges remain vivid, and most government organizations seem to be stuck in the dissemination phase, as highlighted by Mabillard and Zumofen (2019). Facebook, Twitter and Instagram, three of the most used social media platforms globally, are preferred in this study. Most indicators included in our model and analysis are not available for other social media, at least in the software package used here (*FanPage Karma*)[5].

5.1 Definition of the metrics

Metrics used to characterize the dissemination phase of government-citizen relationships on social media usually include the number of posts, followers, page views, or likes (e.g., Bonsón et al., 2015; Bonsón et al., 2017; Bonsón & Ratkai, 2013; Haro-de-Rosario et al., 2018; Silva et al., 2019). Here, we consider the number of posts per day (on a predefined period) as the best indicator. Indeed, the number of posts per day is not influenced by government size. In addition, it indicates how often information is published by local authorities in an accurate manner.

The interaction phase shows higher levels of engagement and citizen willingness to constructively work with the content provided by local governments, give feedback, add their own ideas, or create insights (Mergel, 2013a). Metrics such as the number and rating of comments, shares or re-post of content are often used to assess this phase (e.g., Agostino and Arnaboldi, 2016; Mergel, 2013b; Marino and Presti, 2018). In this study, we build on the approach used by Silva et al. (2019) and already proposed by Bonsón and Ratkai (2013), which relies on the number of likes, comments and shares by Facebook users to measure citizen engagement on posts published by municipalities. The reactions added by Facebook (sad, angry, love, etc.) are also included here. The division of these data points by the total number of posts and fans makes such metrics independent from municipality size, allowing for comparison of all profiles. On Twitter, such metric includes users' likes, comments and retweets; on Instagram, it includes users' likes and comments. All data were provided by the software, except for users' comments on Twitter, which were retrieved manually.

In the transaction phase, citizens go beyond viewing governments' online content or commenting on such content. They are actively interacting with the content published, collaborating with the local authorities, and seeking opportunities repeat this in the future (Mergel, 2013a). Measurement involves mainly the level of conversation that characterizes the interactions between the government and users. This is commonly used to evaluate this phase (e.g., Linders, 2012; Wukich, 2021). In our study, we focus on the comments made by users that triggered a discussion through responses. However, to assess the role of public authorities in the process, we counted only the comments that were made by them (as replies to users' comments). As this metric is not systematically available in the software for all platforms, we managed to retrieve these comments manually. As a result, we were able to

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[5] Source: https://www.fanpagekarma.com/.

isolate the replies published by governments on users' comments, sometimes leading to additional replies from users themselves, and thereby generating a true "many-to-many" communication flow.

5.2 Selection of the municipalities

The new measurement method is applied empirically to all CEE cities with 100,000 to 500,000 inhabitants (N=82). This choice was driven by three main factors: a) the conference is taking place in Romania, and it is compelling to focus on a region that has received less attention than Western (and especially Anglo-Saxon) countries; b) prior research has shown that large municipalities are usually more active on social media platforms (Haro-de-Rosario et al., 2018); and c) the most populous cities in Europe are extremely big compared to the following ones in many cases (e.g., Bucharest, Budapest, Prague).

The data compilation process is also innovative and comprehensive. Indeed, the Facebook accounts were identified through four consecutive stages. First, the logos of social media platforms were browsed on the cities' website. Then, in the absence of a logo, a systematic search for the cities was performed on all platforms. Third, a search with the appropriate keywords was also conducted on a search engine. Finally, direct contacts were established with the cities included in our sample in case of uncertainty. By using this sequential approach, accounts that were not indicated on the municipalities' official websites were not forgotten and added to the analysis. As mentioned above, the notion of "active account" as presented in Table 2 refers to the account having posted at least once in the month before data collection started (March 2021 and March 2022). This is attached theoretically to the notion of "active adoption" developed by Zumofen et al. (2022).

5.3 Treatment of the data

The data collected online and/or through direct contacts with certain cities were then gathered on a single file. Information about the status of the accounts (registered or not / active or inactive) were available as of March 31, 2022. We decided to focus on a timeframe of three months (January 1 – March 31, 2022) for all social media-related metrics used to determine the phases listed in section 4. Such a period allows for the identification of the cities' behavior and communication on social media. Regarding the metrics obtained through *FanPage Karma*, the software performed the analysis by extracting the data for each account on the defined period. Data retrieved manually were then added to the file to complete the database. All data were collected in early April 2022.

This empirical investigation enabled us to respond to **RQ₂**. We conducted two different analyses: in the first one, we looked at the status of all cities (i.e., registration and activity) and their position in the phases—dissemination, interaction, and transaction (see Table 10). To do so, we defined the cities that belong to each status and (mutually exclusive) category through a binary variable (0-1), following these criteria:

- *Registration*: The city has an account but is inactive.

- *Phases*: The city has published any kind of post in the last month of the predefined period.

> <u>Dissemination</u>: The city has only published posts.

> <u>Interaction</u>: There has been at least one reaction, share or comment by users on the page's posts.

> <u>Transaction</u>: There has been at least one reply by the page on users' comments.

In the second analysis, we measured the level of intensity within each phase. Indeed, certain cities can be included in a phase with only one post, reaction or reply, and it does not enable to compare the relative "performance" of

the cities in each phase (see Tables 7, 8 and 9). To do so, we relied on the following indicators, that enabled for comparisons across all cities and platforms between January 1st and March 31, 2022:

> <u>Dissemination</u>: Number of posts per day.

> <u>Interaction</u>: Number of comments, reactions (likes on Twitter and Instagram) and shares (or retweets) divided by the total number of posts and by the number of fans as of March 31, 2022 (see Silva et al., 2019).

> <u>Transaction</u>: Number of replies by the page on users' comments.

6. Findings

The findings section will be organized in two subsections. First, we will describe the general situation in terms of adoption, longevity, use and popularity on each social media platform in the CEE region (subsection 6.1). Then, the subsection 6.2 will focus on the empirical analysis of the city sample in terms of metrics and phases.

6.1 General situation

Before we present the position of the cities in the phases, and the level of intensity, the first part of this section presents descriptive statistics related to the development of social media use in CEE countries. We start with a comparison of the evolution of the presence on Facebook, Twitter and Instagram since 2008 (Figure 2). Twitter generated much enthusiasm at the beginning, but was quickly taken over by Facebook, which became the most widely used platform in CEE cities (80 cities out of 82). In contrast, some Twitter accounts have not been used at all, or sporadically at the start, and several accounts do not (re)tweet regularly. Instagram has gained ground and is now the second most used platform, with 65 cities registered on the platform as of December 31, 2021.

Figure 2. Evolution of the number of registered accounts on Facebook, Twitter and Instagram in CEE cities included in our sample (2008-2021)
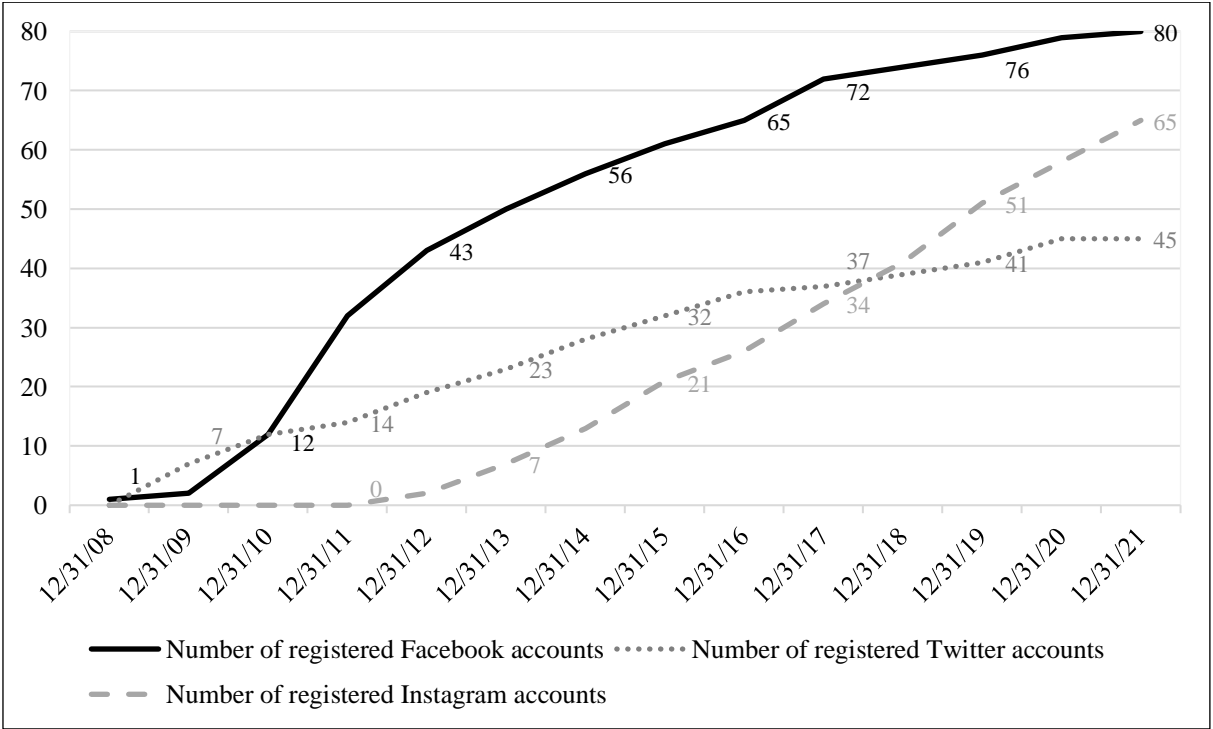
The lack of popularity of Twitter in CEE cities could be explained by the relatively low penetration of this platform in international comparison. Indeed, the Twitter potential outreach is lower in CEE countries, and much lower in certain cases, especially compared to other states such as Belgium, Canada and Switzerland, where the level of outreach is over or close to 10% (see Table 2). One notable exception here is Poland, where the Twitter potential outreach, just above 4%, is not associated with a low number of city activity on the platform. We note in this regard that such observation points to the Polish cities' high level of activity on all three social media platforms.

Table 2. Activity on Facebook, Instagram and Twitter, and Twitter potential outreach* for cities between 100,000 and 500,000 inhabitants, comparison between CEE and a selection of other countries (as of Feb. 2021)

	Cities active on Facebook (in %)	Cities active on Instagram (in %)	Cities active on Twitter (in %)	Twitter potential outreach (in %)
Belgium	100%	67%	67%	10.3%
Canada	100%	74%	100%	19.7%
Switzerland	83%	100%	100%	9.9%
Bulgaria	100%	0%	0%	3.3%
Croatia	100%	33%	67%	3.6%
Czech Republic	100%	75%	25%	6.1%
Estonia	100%	100%	100%	6.9%
Hungary	43%	57%	0%	3.3%
Lithuania	100%	67%	0%	4.9%
Poland	100%	88%	70%	4.1%
Romania	95%	36%	9%	4.0%
Slovakia	100%	100%	0%	3.0%
Slovenia	100%	100%	0%	5.5%

* *Note*. Twitter potential outreach refers to Twitter's potential advertising audience compared to the population over 13 years old. Source: #Digital2021 (https://datareportal.com/reports/digital-2021-global-overview-report).

The notion of active adoption has been defined by Zumofen et al. (2022). It is used to distinguish between the cities that have simply created an account (without using it) and those that are active (at least on post in the last month of the studied period). As illustrated in Figure 3, the number of active accounts is distributed almost equally among the cities (33% with 3 active accounts, 35% with 2 active accounts and 29% with 1 active account). The proportion of cities with no active account remains low (3%). It is worth noting that Poland has the highest number of cities in the sample (33), and that all cities have two or three active accounts (Table 3).

Figure 3. Number of active accounts per city in our sample (as of March 31, 2022)

Cities with 0 active account 3%

Cities with 3 active accounts 33%

Cities with 1 active account 29%

Cities with 2 active accounts 35%
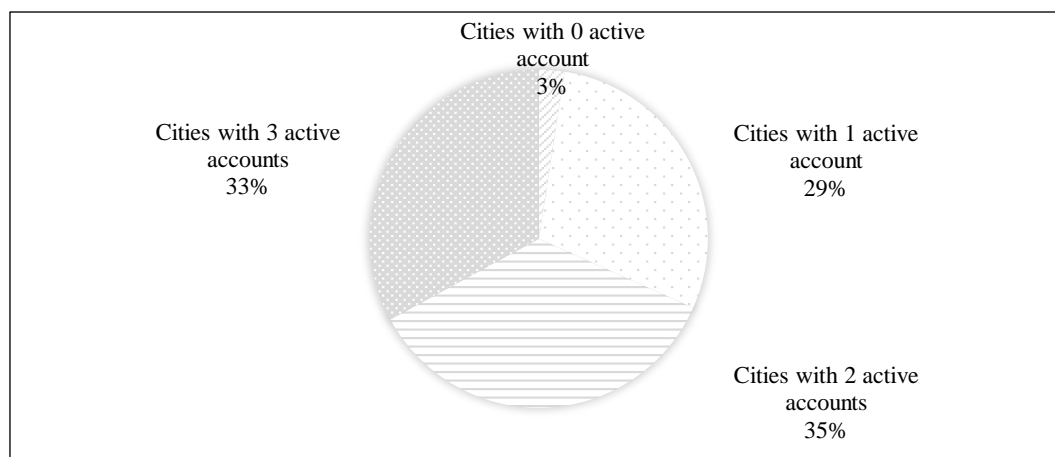
Table 3. Number of cities with two or three active accounts in our sample (as of March 31, 2022)

	Number of cities with two or three active accounts (in %)
Bulgaria	0 (0%)
Croatia	2 (67%)
Czech Republic	3 (75%)
Estonia	1 (100%)
Hungary	2 (29%)
Lithuania	1 (33%)
Poland	33 (100%)
Romania	10 (45%)
Slovakia	2 (100%)
Slovenia	2 (100%)
N	**56 (68%)**

In addition, the mean longevity of CEE cities on each platform is coherent with the emergence of the social media considered here (Facebook in 2004, Twitter in 2006, and Instagram in 2010), although most cities have registered on these platforms much later. As presented in Table 4, the mean longevity on Facebook is 100,3 months since registration, 95,7 on Twitter and 56,4 on Instagram. However, if we leave out the two inactive cities found in Bulgaria and Slovakia, the mean longevity on Twitter differs significantly from Facebook, and moves closer to Instagram, highlighting once again the adoption and usage patterns identified in the region. It is worth underlining that Instagram became popular later than the two other platforms. On an individual note, Croatia is the country in which all 3 platforms have been adopted the most synchronously (over 15,7 months).

Table 4. Mean longevity of registered cities on Facebook, Twitter and Instagram as of March 31, 2022 (in months since registration)

	Mean longevity on Facebook	*Mean longevity on Twitter*	*Mean longevity on Instagram*
Bulgaria	70,8	144,0	39,0
Croatia	113,7	98,0	101,0
Czech Republic	101,5	85,0	81,7
Estonia	19,0	19,0	59,0
Hungary	73,8	68,0	53,2
Lithuania	111,7	- - -	51,0
Poland	119,3	103,6	66,7
Romania	85,0	78,9	31,1
Slovakia	120,5	150,0	32,0
Slovenia	106,5	- - -	49,5
Mean	**100,3**	**95,7***	**56,4**

* *Note*. This mean should be interpreted cautiously since Bulgaria and Slovakia have only one city registered, and their accounts are inactive.

Moreover, we can assess the use and popularity of the three platforms in the CEE region. As mentioned above, the first phase of our model is assessed through the number of posts per day (on a predefined period). This metric allows for a systematic comparison across the platforms and countries, and it can be used to assess the use of these platforms by CEE cities. In Table 5, we can observe a higher recurrence of posting on Facebook with close to two posts per day (mean = 1,94). The variance is high between the countries, with Slovenia or Estonia posting less than once per day and Poland more than three times per day. Instagram is much less used than the other two, with a post every two days (mean = 0,48). The favored format on Instagram (picture and not text) could partially justify this difference. In terms of popularity, Facebook counts the most fans, much more than the two other platforms, especially Twitter, which is the least preferred and least followed channel in the CEE region.

Table 5. Use and popularity of Facebook, Twitter and Instagram among our city sample (January – March 2022)

	Facebook		Twitter		Instagram	
	Dissemination (Mean)	*Ratio followers/pop*	*Dissemination (Mean)*	*Ratio followers/pop*	*Dissemination (Mean)*	*Ratio followers/pop*
Bulgaria	2,15	7,00%	- - -	- - -	- - -	0,36%
Croatia	1,71	17,35%	2,20	3,36%	0,44	9,87%
Czech Republic	2,14	11,26%	1,63	2,17%	0,59	3,99%
Estonia	0,67	0,42%	0,78	0,23%	0,24	0,82%
Hungary	2,80	12,52%	- - -	- - -	0,36	1,57%
Lithuania	2,37	17,76%	- - -	- - -	0,38	2,35%
Poland	3,49	24,04%	2,69	2,06%	0,72	5,56%
Romania	1,20	11,18%	1,41	0,24%	0,73	0,84%
Slovakia	2,11	11,72%	- - -	0,95%	0,49	4,59%
Slovenia	0,78	8,51%	- - -	- - -	0,35	2,84%
Mean	1,94	16,60%	2,43	1,98%	0,48	3,83%

Finally, we provide an overview of the sample characteristics in Table 6. Facebook gathers the highest number of active accounts in CEE countries, as observed in other contexts (e.g., Mabillard and Zumofen, 2019). Estonia stands out as scoring 100% on all three platforms, but this is biased by the fact that only the city of Tallinn is included in the sample. Polish cities are very active on all three platforms compared to their CEE counterparts. Both Slovakia and Slovenia have their two cities fully active on Facebook and Instagram, while Bulgarian cities seem to focus more narrowly on Facebook. In all other cases, activity is generally high on Facebook, lower on Instagram, and much lower or inexistent on Twitter.

Table 6. Detailed data of the sample as of March 31, 2022

	Number of cities	*Active* Facebook accounts*	*Active Twitter accounts*	*Active Instagram accounts*
Bulgaria	5	5 (100%)	0 (0%)	0 (0%)
Croatia	3	3 (100%)	2 (67%)	2 (67%)
Czech Republic	4	4 (100%)	2 (50%)	3 (75%)
Estonia	1	1 (100%)	1 (100%)	1 (100%)
Hungary	7	5 (71%)	0 (0%)	2 (29%)
Lithuania	3	3 (100%)	0 (0%)	1 (33%)
Poland	33	33 (100%)	21 (64%)	32 (97%)
Romania	22	22 (100%)	3 (14%)	9 (41%)
Slovakia	2	2 (100%)	0 (0%)	2 (100%)
Slovenia	2	2 (100%)	0 (0%)	2 (100%)
N	**82**	**80 (98%)**	**29 (35%)**	**54 (66%)**

Note. Accounts are regarded as active if there has been at least one post in the last month of the data collection period.

6.2 Empirical analysis of the phases: where do CEE cities stand in terms of social media use?

The empirical analysis of the phases relies on the status / phases in which cities can be classified (Table 10) and on the intensity of their communication on social media. In this regard, dissemination is measured through the number of posts per day; interaction is addressed as: ((total number of comments, shares and reactions)/number of fans/number of posts)*1000 (Silva et al., 2019); and finally, transaction is measured as a ratio of the number of replies posted by the account on the total number of comments received. This allows for the systematic comparison of city "performance" in the three phases across countries and platforms.

The situation on Facebook differs quite strongly from one country to another. Regarding dissemination, Poland stands out from the rest of the CEE countries with almost four posts a day on average. In terms of interaction and transaction, the results of the sample are more homogeneous. The Czech cities are the most mature with the highest mean for the transaction phase (7,21%). This figure must be interpreted cautiously as the Czech sample includes only 4 cities. The Romanian case is also compelling: while cities publish few posts, they trigger numerous reactions and comments, but the number of replies to such reactions and comments remains very low.

Table 7. Intensity in each phase (minimum/maximum/mean) on Facebook (January – March 2022)

| | *Facebook* | | | | | | | | |
| | *Dissemination* | | | *Interaction* | | | *Transaction (%)* | | |
	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean
Bulgaria	0,71	1,30	1,01	0,78	3,87	3,03		0,81	
Croatia	0,66	1,96	1,31	0,74	16,00	11,00	0,99	3,00	1,99
Czech Republic	1,01	1,03	1,02	2,60	6,86	6,07	0,82	7,79	7,21
Estonia		0,67			8,19			4,65	
Hungary	0,26	9,06	2,80	0,59	7,64	2,82	0,26	0,29	0,28
Lithuania	1,20	2,73	1,97	2,20	14,48	9,93	0,52	2,01	1,18
Poland	1,00	4,33	3,97	1,32	12,25	7,37	0,19	13,96	2,50
Romania	0,06	3,11	0,99	1,23	39,32	9,19	0,06	1,82	0,55
Slovakia	1,41	2,80	2,11	3,52	6,74	5,13	0,88	5,30	3,09
Slovenia	0,61	0,96	0,78	4,24	10,13	7,18	0,51	6,39	3,45

Table 8 details the situation on Twitter. Twitter use and engagement on the platform are less developed than what can be observed on Facebook and Instagram. This is especially true when looking at the transaction phase in which there is almost no city from our sample (replies to users' comments are almost inexistent). Transaction is extremely high in the Czech Republic, but there is only one city in the phase, so this should be interpreted cautiously.

Table 8. Intensity in each phase (minimum/maximum/mean) on Twitter (January – March 2022)

	Twitter								
	Dissemination			*Interaction*			*Transaction (%)*		
	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean
Bulgaria	- - -			- - -			- - -		
Croatia	0,48	3,91	2,19	0,24	1,22	0,73	- - -		
Czech Republic	0,32	2,94	1,63	0,82	1,96	1,39	40,28		
Estonia	0,78			11,86			- - -		
Hungary	- - -			- - -			- - -		
Lithuania	- - -			- - -			- - -		
Poland	0,01	14,17	2,69	0,34	25,17	3,38	1,52	32,14	9,91
Romania	0,26	2,56	1,40	0,28	15,63	7,95	- - -		
Slovakia	- - -			- - -			- - -		
Slovenia	- - -			- - -			- - -		

In contrast, Instagram metrics show a real propensity of the platform to stimulate interaction, and cities engage more intensively in transaction compared to Facebook and Twitter (Table 9). However, several countries limit themselves to dense interactions but do not engage in transactional mechanisms. The example of Hungary is typical of this phenomenon with a mean interaction coefficient of 27,22 and no cities in the transaction phase. Transaction is quite low in Croatia and quite high in Slovakia, but as there is only one city in the phase in both countries, this should again be interpreted cautiously.

Table 9. Intensity in each phase (minimum/maximum/mean) on Instagram (January – March 2022)

	Instagram								
	Dissemination			*Interaction*			*Transaction (%)*		
	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean
Bulgaria	- - -			- - -			- - -		
Croatia	0,37	0,51	0,44	18,07	79,16	48,62	1,11		
Czech Republic	0,17	0,70	0,40	18,68	31,57	23,33	3,85	14,80	9,32
Estonia	0,24			55,70			31,58		
Hungary	0,02	0,68	0,35	4,63	49,82	27,22	- - -		
Lithuania	0,38	0,38	0,38	25,82	25,82	25,82	- - -		
Poland	0,07	3,93	0,72	17,08	91,04	42,54	0,58	28,75	6,32
Romania	0,03	2,85	0,66	11,36	83,39	37,83	- - -		
Slovakia	0,28	0,70	0,49	11,07	35,79	23,43	7,03		
Slovenia	0,10	0,59	0,34	12,24	47,16	29,70	6,67	10,40	8,54

In conclusion, Table 10 shows how many cities are experimenting each phase. Facebook remains the platform with the most advanced use in terms of engagement. Out of the 82 cities in the sample, 64 are in a transactional phase (80%). This number is much lower for Twitter (34%) and Instagram (50%).

Table 10. Summary of status and city presence in the phases (as of March 31, 2022)

	Registration		*Phases*		
	Unregistered	*Inactive*	*Dissemination*	*Interaction*	*Transaction*
Facebook	2	0	0 (0%)	16 (20%)	64 (80%)
Twitter	37	16	0 (0%)	19 (66%)	10 (34%)
Instagram	17	11	0 (0%)	27 (50%)	27 (50%)

7. Conclusions and limitations

The main contribution of this paper is conceptual since it proposes a new framework that includes the strategies, missions, information directions, communication flows and tactics related to public organizations' communication on social media. It builds on various contributions to offer an integrated model that categorizes social media usage and digital interactions with citizens. The definition of the three phases—dissemination, interaction, transaction— thus provides a detailed answer to **RQ$_1$**.

This approach is enriched by the empirical analysis of these phases in CEE cities. While previous contributions have focused mainly on case studies (e.g., Jukić and Merlak, 2017; Špaček, 2017; Sinkienė and Bryer, 2016; Jukić and Svete, 2018; Mital, 2020; Urs, 2017; Zeru, 2021), this paper adopts a more encompassing approach. It displays empirical data on three platforms (Facebook, Twitter and Instagram) in 82 cities located in 10 CEE countries. The empirical part of the paper gives a detailed account of the communication practices in these countries, thereby responding to **RQ$_2$**. As shown in Tables 6-10, many cities are inactive on Twitter and Instagram; in contrast, Facebook is the most popular channel, and transaction is particularly high on this platform; the activity on social media automatically triggers reactions, regardless of the number of posts published; Twitter is by far the least popular channel; and Polish cities stand out as most of them are very active on all platforms. Country specificities are presented on Figure 4.

Moreover, this transnational analysis enables us to identify ideal-typical city profiles (Table 11). Classifying such profiles in a typology may be of interest for both academics and practitioners to define what characteristics play a role in favoring one behavior or another on social media. We assume that individual characteristics of the community manager (if there is one) may play a role in defining what kind of behavior the city will adopt. This certainly opens promising avenues for future research, including further studies on the determinants of active adoption (Zumofen et al., 2022) of social media, as well as the factors that may explain why a city is in a certain phase. In the same vein, our model calls for further research on the engagement dimensions of social media platforms in local governments. This field of research remains theoretically underexplored and systematic comparisons across countries are still lacking despite certain notable contributions on the subject (Bonsón et al., 2015; Guillamón et al., 2016).

Table 11: Matrix of social media activity (dissemination-transaction) with ideal-typical cities from our sample

	Interaction and reactivity (transaction)	
−		+

	−	+
+ Activity (dissemination)	Debrecen (Hungary) on Facebook	Gdańsk (Poland) on Twitter
|	Baia Mare (Romania) on Facebook	Tallinn (Estonia) on Instagram

This paper meets with limitations. First, it does not include all social media platforms used in public organizations. Indeed, cities in this sample have started communicating on Snapchat, TikTok and YouTube. Second, because of data collection difficulties, most of our measures are based on a three-month span (1 January – 31 March 2022). Extending the timeframe would have enabled more robust analyses. Certain cities may have been in another phase earlier; however, we argue that the presence in a phase should be sustained, especially due to the nature of social media (immediate communication, need to react quickly and to ensure sustained interactions). Third, the selection of cities between 100,000 and 500,000 inhabitants is restrictive and can be criticized. Analyzing less populated cities would have enriched the data sample and give a more reliable picture of the situation in some countries. We especially refer here to Estonia (1 city), Lithuania, Slovenia, and Slovakia (2 cities each). In many cases, the results for the whole sample (and especially the mean) are largely influenced by Romanian (22) and Polish (33) cities.

Figure 4. Main characteristics of the sample based on our study (as of March 31, 2022)

Estonia
Tallinn active on the three platforms
Interaction is particularly high on Instagram

Poland
Huge activity on all three platforms
Transaction higher on Twitter and Instagram

Lithuania
All three cities not registered on Twitter
High dissemination and interaction on Facebook

Czech Republic
Low dissemination on all platforms
Highest transaction rate on all platforms

Slovakia
Highest longevity on Facebook
Facebook and Instagram preferred over Twitter

Slovenia
No presence on Twitter among the two cities
More interaction and transaction on Instagram

Hungary
No activity on Twitter among the seven cities
Quite high interaction on Instagram

Croatia
Cities very active on Instagram
Very high interaction on Instagram

Romania
Low dissemination on all platforms
Very high interaction on Facebook and Instagram

Bulgaria
Activity concentrated on Facebook
Only one city in the transaction phase

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