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Social media government communication and stakeholder engagement in the era of Covid-19: evidence from Italy

Silvia Fissi and Elena Gori
Department of Business and Economics, Università degli Studi di Firenze, Florence, Italy, and
Alberto Romolini
Università Telematica Internazionale UNINETTUNO, Rome, Italy

Abstract

Purpose – Covid-19 is a worldwide pandemic disease that changed the government communication to citizens about the health emergency. This study aims to provide in-depth research about regional Italian government communication through social media (SM) and its effects on citizens' engagement.
Design/methodology/approach – The study uses a case analysis, focusing on the Italian context. In detail, the authors analyse the more involved Italian regions in Covid-19 pandemic (Lombardy, Veneto, Piedmont, Emilia Romagna and Tuscany) applying the Crisis and Emergency Risk Communication (CERC) model.
Findings – The results reveal that SM is a powerful tool for communication during a health emergency and for facilitating the engagement with stakeholders. However, results also highlight a different perception about the timing of the Covid-19 crisis.
Practical implications – Findings suggest a gap between the answer of the public government compared to the citizens' needs that are clear since the first earlier stage of the pandemic event. The engagement level is very high since the first phase of the pandemic event; however, to be adequately developed, it requires specific and timing information that are not always in line with the citizens' communication needs.
Originality/value – This is the first research that aims to study the citizens' engagement in the Italian regions during the Covid-19 pandemic.

Keywords Health emergency, Citizen engagement, Social media communication, Covid-19, CERC, Italy
Paper type Research paper

Introduction

Covid-19, a disease caused by a new type of coronavirus, emerged in the Chinese city of Wuhan at the end of 2019 and spread widely in more than 114 countries in a few days. Therefore, on 11th March 2020, WHO (2020) stated that coronavirus can be characterized as a pandemic event. On April 2020, several states in Europe, Asia and America were in lockdown: millions of people were confined in their houses, and billions of companies were closed. In this sense, the impact of Covid-19 pandemic has no precedent in the history in terms of human health risk, impact on the economy and on social environment (Macnamara, 2021).

In this context, a worldwide emergency management by central and local governments is fundamental because each level has own responsibilities and resources in the battle against

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virus (Antwi-Boasiako and Nyarkoh, 2020). Considering several instances of international emergencies that occurred in the last decades, research has increased, and the knowledge in the field of emergency management government has improved, especially at a national level rather than at sub-national one (Yu *et al.*, 2017). Therefore, risk communication has the task of overcoming this gap as risk can be correctly perceived only if it has been correctly understood (Tirkkonen and Luoma-aho, 2011).

In the case of public health emergencies, information communication technology enables governments and citizens with a better collaboration in order to achieve public health challenges (Lee *et al.*, 2019). In particular, in the last years, social media (SM) has become a fundamental part of the communication (Heldman *et al.*, 2013) and for citizens' engagement (Agostino *et al.*, 2017). Indeed, in most recent years, the WHO (2018) also considers communication aspects fundamental in order to face the health emergencies, and it strongly recommends using SM to strengthen the effectiveness of public strategies. Moreover, scholars state the need for more case studies in order to improve the communication for public organizations and, in this way, to mitigate the health risk for citizens (Heldman *et al.*, 2013). In the same perspective, Gálvez-Rodríguez *et al.* (2019) highlight the lack of knowledge on how the public sector uses SM in crisis situations. Within health emergency, a well time communication is the key to reach citizens and to spread proper behaviours, and SM provides a potential platform to disseminate correct information (Mirbabaie *et al.*, 2020).

At the best of our knowledge, no previous studies have investigated the connection between the Covid-19 most affected government risk communication and the engagement of citizens on Facebook (FB).

Our research is located within the emergency management communication framework, with particular reference to the informational perspective (Frandsen and Johansen, 2020). This study aims to investigate in-depth the Italian government communication fostered through SM and to analyse its effects about citizens' engagement. The research focuses on the Italian regions for twofold reasons. Primarily, as Italy was the first European state to face the Covid-19 emergency (Di Mascio *et al.*, 2020), and it represents an "emblematic case" because the country was not prepared for this type of emergency (Capano, 2020). Secondly, we chose the regional level because the Italian health management and organization system is run by each single region. Thus, the study answers two connected research question:

RQ1. What are the topics for risk communication used by the government for facing Covid-19 in Italy during the timeline of pandemic?

RQ2. What is the level of engagement between public government and citizens and its evolution during the crisis?

By knowing the topics and the correlated response in terms of engagement by citizens, the study is going to point out which topics are more engaging, and, in this sense, the study's results are useful for policymakers and practitioners interested in planning effective communication strategies by SM in the health emergency context. It also contributes to explain the utility of SM in crisis communication answering to the call of Coombs and Holladay (2015), Eriksson (2015) and Waters and D'Urso (2021) that they consider it an "under-researched area", especially in the public sector (Criado *et al.*, 2017) during a health emergency.

The article is structured as follows. The next section is dedicated to a literature review, while the method section presents the research methodology. The results section describes and discusses the findings, and the last section presents the conclusions, the theoretical and managerial implications and the future developments.

Literature review

Risk communication

Covello (1992, p. 359) defines risk communication as "the exchange of information among interested parties about the nature, magnitude, significance, or control of a risk", and Dickmann *et al.* (2015) consider it a standpoint issue within emergency management. In other words, according to Seeger *et al.* (2018), emergency risk communication is commonly accepted as a critical approach for risk management (see Bracci *et al.* (2021) for a literature review about risk management in the public sector).

In a pandemic event, the communication aims to minimize and manage health impacts by spreading strategies in order to inform citizens about the risks and, consequently, about the behaviours to follow for avoiding them (Wirtz *et al.*, 2021). In other words, the management of public health issues involves significant communication components as it needs to prompt warnings about risk messages, self-efficacy, symptomatology and medical treatment.

Risk communication is a science-based approach for communicating effectively in high concern situations, and it is based on a multi-level process of interactive exchange of information between public government and citizens (Sellnow and Sellnow, 2010). Often, it involves multiple messages about the nature of the risk and/or about the legal and the institutional arrangements for risk management (Covello and Sandman, 2001).

Risk communication models are based on the assumption that citizens have the right to know and to be promptly informed in health emergencies, and it is fundamental to spread available information quickly within smart models (Infanti *et al.*, 2013). Since the first studies about communication risk, authors agreed that the content of risk communication should propose information about the risk, its response and management (Sorensen and Mileti, 1991). Another basic element for effective risk communication was found according to the necessity of using different types and channels of information in order to reach a rapid dissemination, different targets and to spread credibility as a single source is not universally reliable (Plough and Sheldon, 1987).

According to Wray *et al.* (2006), the development of engagement is important to spread effective messages and strategies since before the pandemic event as, on the contrary, citizens are not willing to follow public health authorities' indications (WHO, 2015). In this sense, Maduka *et al.* (2016) highlight lack of transparency, inaccurate and late information, and lack of collaboration between citizens and government as the most critical issues for effective communication. At the same time, Sancino *et al.* (2021) underline the importance to manage strategically people by considering the necessity to prompt engage them democratically and, moreover, their different needs. Within previous elements, collaboration is particularly important as government agencies use SM in one-way communication rather than in two-way communication.

Social media and health risk communication

Authors agree that SM are a fundamental tool for health risk communication (Heldman *et al.*, 2013); to date, the use of SM is quickly increasing (Statista, 2020), and it becomes a widespread channel of communication (Al-Saggaf and Simmons, 2015) also for epidemics and pandemics (Liu and Kim, 2011; Lwin *et al.*, 2018). Recent studies highlighted that SM is fully implemented in practice as information channels during the Covid-19 pandemic (Wang *et al.*, 2021a); however, Li *et al.* (2020) pointed out that academic research studies about the use of SM during the health emergency are limited. In particular, with reference to the effectiveness tools, some authors (Hu and Kapucu, 2016; Kim and Hawkins, 2020) demonstrated that SM if correctly implemented, is faster and more effectiveness in disseminating key information. In fact, SM has some interesting features in facilitating engagement, such as the interactive synchronous communication and collaboration among numerous participants (Kaplan and

Haenlein, 2010). Moreover, governments are able to use them 24/7 to gain and disseminate information in a fully interactive sharing dialogue (Marino and Lo Presti, 2019).

Citizens use SM not only to talk with friends but also to search for information about government and institutions, as they expect that public issues concerning crises are communicated timely through SM (Lovari and Valentini, 2020). Empirical studies about the use of SM highlight that these channels are becoming a fundamental instrument to reach citizens and to manage crisis events as they allow to communicate with people in real time (Marsen, 2020). Through SM, governments are also able to reach citizens smartly and to give them accurate and official information by avoiding misleading information and fake news (Vraga and Bode, 2018).

Moreover, thanks to the specific characteristics of SM, it is possible to share messages about the public health situation and information to be acted on by citizens in order to reduce anxiety and stress (Marynissen and Lauder, 2020), to give clear and timely data and to anticipate audience needs (Jin, 2009). In conclusion, public government can use SM to reduce and contain harm, to provide specific information and to spread initiatives aimed at generating support and assistance, and to explain and justify the public choices that could decrease personal freedom but contain the pandemic (Bowen *et al.*, 2019).

Previous researchers analysed health risk communication through SM investigating the principal strengths and weakness of the tool (Heldman *et al.*, 2013), focusing on interviews and surveys (Lee *et al.*, 2019; Lovari and Bowen, 2020), or investigating the pandemic communication according to the CERC framework (Lu, 2020; Powell, 2021; Reyes Bernard *et al.*, 2021). According to previous studies, the use of SM in managing health emergencies requires rethinking the informational perspective in order to change the communication process, from mainly top-down to an open engagement challenge aimed at building a consensus model based on a rational approach.

The CERC model

As discussed before, we argue that it is necessary to improve the communication to citizens about the risk and crisis using new tools, such as SM. As a consequence, the literature in the field of health risk communication is increasing in the last years, also by suggesting integrative models such as Crisis and Emergency Risk Communication (CERC) (Reynolds *et al.*, 2002; Reynolds and Seeger, 2005). Previous research studies indeed applied the binomial "risk communication – CERC model" to deep investigate the effectiveness of strategies' communications using SM (Lachlan *et al.*, 2016; Lwin *et al.*, 2018; Panagiotopoulos *et al.*, 2016).

Lachlan *et al.* (2016) use the CERC model to analyse risk communication through SM in order to deep investigate the communication strategies. Powell (2021) and Reyes Bernard *et al.* (2021) highlighted the public governments' difficulties in effective communication during a sudden crisis, as Covid-19 disease. In particular, they pointed out that there is a need to deep investigate the CERC application for pandemic events in order to suggest a possible evolution of it by analysing communication in different countries and according to their specific timeline evolution of the Covid-19.

The CERC model highlights five different stages, and it provides an answer to emerging global threats to public health as it considers the whole crisis process from the beginning by trying to inform about the risk and to prevent the development to the management of the full-blown pandemic event (Table 1).

For each different stage of risk communication, the model suggests some issues about the communication (CDC, 2018). In more depth, for the pre-crisis one, public organizations have to be prepared by developing consensus recommendations, fostering alliances and referring to spokespersons for information and to improve trust. In the initial event phase, they have to explain risk, to express empathy and to inform by describing response efforts and also by

N	Stage	Description
1	Pre-crisis (risk messages; warnings; preparations)	Communication and education campaigns targeted to both the public and the response community
2	Initial event (uncertainty reduction; self-efficacy; reassurance)	Rapid communication to the general public and to affected groups
3	Maintenance (ongoing uncertainty reduction; self-efficacy; reassurance)	Communication to the general public and to affected groups
4	Resolution (updates regarding resolution; discussions about cause and new risks/new understandings of risk)	Public communication and campaigns directed toward the general public and affected groups
5	Evaluation (discussion of adequacy of response; consensus about lessons and new understandings of risks)	Communication directed toward agencies and the response community

Source(s): Adapted from Reynolds and Seeger (2005)

Table 1.
The stages of the CERC model

promoting actions. During the third phase—the maintenance—public organizations need to listen to citizens' necessities and their feedback to explain the ongoing risk according to the different audiences, providing information and avoiding fake news and misinformation in order to keep trust in public sources and spreading unnecessary alarmism (Lu, 2020). Some issues are present in each single stage of communication, for example, the information about the pandemic event and its connected risk or the necessity to improve trust in public efforts. However, they become more frequent and deeper compared to the previous stage.

In this sense, with a specific reference to the Covid-19 pandemic, public governments must build new relationships with citizens in order to increase engagement and to develop new governance solutions aimed to gain the consensus about restrictive laws and rules for public health (Ansell *et al.*, 2021).

The engagement

Covid-19 era rises a significative challenge about the role of public administration and their relationship with citizens that should be analysed more in depth by scholars (O'Flynn, 2021). According to Center for Disease and Control (CDC, 2018), within SM the most useful tools for engaging citizens in health emergencies are FB and Twitter (TW) as they allow a wide communication in real time and promote cross-activities within the involved partnerships (Agostino *et al.*, 2017), and SM is able to boost communication (Sancino *et al.*, 2021). However, according to Haro-de-Rosario *et al.* (2018), citizens prefer FB to TW for local government questions while Sáez-Martín *et al.* (2015) point out a positive association between local governments' activity and citizens' dialogue in FB's page. Previous research studies stated that more active a government is in communication, the more engagement level can be reached on SM (Hagen *et al.*, 2017). The level of engagement is measured by the numbers and types of interaction within the SM. Moreover, according to Alhassan and AlDossary (2021), the level of engagement depends also on issues and the timing of messaging. In this sense, it is fundamental to measure the volume of engagement, of the shared contents and the type of messages posted by the governments (Powell, 2021).

Camarero *et al.* (2018) and Su *et al.* (2015) suggested three different elements to measure citizens' engagement in SM: popularity, commitment and virality. Popularity corresponds to the number of "likes" in FB, and it can be matched to risk communication awareness. Commitment measures citizens interacting within the SM, and it can be measured by the number of comments provided by the visitors of the official page. Virality, finally, is the citizens' engagement in disseminating knowledge, and it corresponds to the number of shares in SM.

Method

The study is explorative, and it uses a case analysis (Yin, 2018), focusing on the Italian context. In detail, this study analyses the more involved Italian regions at 27th March 2020: Lombardy, Veneto, Piedmont, Emilia Romagna and Tuscany. In the Italian context, the regions organize the healthcare system within the strategic boundaries set up by the state (Armocida *et al.*, 2020), and they manage the health risk communication. In this sense, the region therefore has a greater knowledge of the territory from a health point of view, but also at a more general level, since it is "closer" to its citizens than the central government.

Data collection

In this research, each region represents the unit of analysis, and each of their FB's post is the unit of observation. The analysis focuses on the content of the FB's posts and on the reaction of citizens by manually collecting them within a specific file. The manual coding allowed us to focus on data (Saldaña, 2021, p. 45) according to the time available and the expertise of the research team (Basit, 2003). Moreover, in the research field of SM, scholars often used a manual coding for the content analysis (i.e. Bellucci *et al.*, 2019; Brainard and Edlins, 2015; Manetti *et al.*, 2017).

The research team was composed of five members: two academic supervisors, an academic coordinator for content analysis and two scholars. Some preliminary tests were conducted to emphasize uncertain interpretations of the coding rules for the content analysis of the posts. In detail, we discussed among the team the first results in reading the posts by highlighting and by discussing the differences in meaning of each member. This process helps us to formulate standard rules for classifying the posts' content. Two scholars read independently the FB posts and proposed a classification. The supervisors and the coordinator matched the results obtained by the two scholars in order to ensure that there was no difference of interpretation. We found a Cohen's kappa coefficient of inter-reliability of 0.73.

We analysed the issue of the posts by dividing them in "Covid posts" and others themes. Subsequently, according to the different type of information provided by the CERC model (Reynolds *et al.*, 2002), we selected the content of Covid posts into six categories: developing consensus, information about crisis, spokespersons for trust improvement, promoting action and efforts, listening to citizens and avoiding fake news and misinformation.

Analysis phases according to the CERC model

For each regional official FB profile, we conduct an analysis for the period 31st December 2019–3rd May 2020. According to the decisions of Italian government (Sanfelici, 2020) and based with the phases used in Mori *et al.* (2020), we identified the periods of the first three CERC's (Reynolds *et al.*, 2002) phases as follows:

(1) Pre-crisis: from 31st December 2019 to 30th January 2020. The phase begins on 31st December 2019 when the Chinese government informed the World Health Communication about cases of pneumonia of unknown aetiology (unknown cause) detected in Wuhan, Hubei province, China. During this period, the causal agent was not identified. On 30th January, the World Health Organization (WHO) declared the worldwide health emergency. In this phase, the Covid-19 seems to be a Chinese issue; however, on 30 January the First People, two Chinese tourists in Rome, were identify as Covid-19 cases in Italy.

(2) Initial event: from 31st January 2020 to 23rd February 2020. On 31st January 2020, the Italian government officially declared the "health emergency state" restricting personal freedom in order to protect public health issues. On 21 st February, the first cases of Italian residents were registered in a hospital in Milan province and in a small Veneto's town. Moreover, in the same day, lockdown was declared in Codogno city.

(3) Maintenance: from 24th February to 3rd May 2020. The Italian government declared the lockdown of 11 municipalities of Lombardy and 1 in Veneto; afterward, on 11 March, it extended the decision to the whole Italian territory. The phase finishes on 3rd May as the Italian government decided to end the lockdown and to start the so-called "phase two" by authorizing a gradual return to a "normal life".

As the research data collection ends on the 3rd May, the subsequent CERC stages have not been investigated.

Results and discussion

The public government communication in risk emergency

The research collected 2,220 posts for the five selected Italian regions within the period from 31st December 2019 until 3rd May 2020 (Table 2).

Mainly, the focus of communication was about Covid-19 with a total of 1,360 posts (61%); only Veneto has a percentage significantly lower (28% of Covid-19 post). The most focused region about health risk is Emilia Romagna with 83% on this issue. About the post content, the topics more spread are, in order, "Information about crisis", "Promoting action and efforts" and "Listen to citizens". With reference to the content, there are differences about the focus of each region. If we consider the percentage, Tuscany and Veneto are more polarized on giving information compared to other entities. However, even if with differences in intensity and in frequency, the results highlight that health risk communication is a challenging topic for governments.

In order to understand the risk communication, we analysed the content of Covid posts according to the six categories derived from the CERC model (Reynolds *et al.*, 2002) (Table 3).

The majority of the posts about Covid-19 are focused on "Information about crisis" and on "Promoting action and efforts". Results highlight that the above-mentioned categories cover 72% of whole information by spreading fundamental news about how to avoid the risk of contagion and to let people know the opportunities deriving from government decisions (Heldman *et al.*, 2013). This news aims to mitigate the difficulties linked to the health emergency situation and to maintain a high level of trust by also reducing the anxiety with clear and timely information (Jin, 2009).

Table 2.
Summary of posts and topics

	Regions					
	Lombardy	Emilia Romagna	Veneto	Piedmont	Tuscany	Total
Total posts	*522*	*451*	*385*	*462*	*400*	*2,220*
Covid-19	332	374	110	318	226	1,360
Developing consensus	28	17	5	24	14	88
Information about crisis	83	122	52	120	123	500
Spokespersons for trust improvement	37	26	0	10	4	77
Promoting action and efforts	91	123	51	131	80	476
Listen to citizens	87	79	1	26	1	194
Avoiding fake news and misinformation	6	7	1	7	4	25
Post no Covid-19	190	77	275	144	174	860
Daily average number of posts	4.18	3.61	3.08	3.70	3.20	17.76
Daily average number of no Covid-19 post	–	–	–	–	–	6.88
Daily average number of Covid-19 post	–	–	–	–	–	10.88

Topic categories	Post content	Example
Developing consensus	Improve trust and corporate identity by spreading good news and by developing consensus recommendations	[Lombardy Region, 12 April] Happy Easter and a huge thanks to all from Lombardy Region. Spend a good day with people we love, even if virtually at home. Don't let the guard down, together we win! Best wishes! [like 732, share 63, comments 203]
Information about crisis	Provide information about health emergency risk	[Emilia Romagna Region, 6 April] Coronavirus, breaking news: today 17,556 positive cases in Emilia-Romagna (+467). Ill people at own home are 7,795. Increasing trend in healing up to 2,397 (+196). Two patients less in intensive care, decreasing trend in hospitalized patients (−35). Read the news [link]. [like 273, share 38, comments 2]
Spokespersons for trust improvement	Persuade people to support public policy and to improve citizens' trust by using spokespersons	[Piedmont Region, 17 March] Webathon for Piedmont 70 VIPS for the first social solidarity marathon Wednesday 18 March from 12 to 24 Instagram channel @webathon.it and Piedmont Region Facebook page Piero Angela, Massimo Giletti, Giorgio Chiellini, Bebe Vio, gli Eugenio in via di Gioia, Cristina Chiabotto, Gabry Ponte, Ivan Zaytsev, Samuel Romano dei Subsonica, Salvo Sottile, Raul Cremona, Michele Foresta, Rudy Zerbi, and more. [like 125, share 185, comments 10]
Promoting action and efforts	Explain specific actions to improve crisis system, to answer public needs, and to solve health, social and economic problems	[Veneto Region, 26 March] Region care Decree: how to ask for contributions for families, workers and companies. Parental leave, baby-sitting bonus, layoff and 600 euros bonus for self-employed. [like 92, share 158, comments 27]
Listen to citizens	Listen to stakeholders and audience feedback	[Lombardy Region, 4 April] #Coronavirus | Breaking news (04/04/2020) Follow the Facebook live [like 316, share 61, comments 391]
Avoiding fake news and misinformation	Avoid fake news and correct misinformation	[Tuscany Region, 29 March] #Coronavirus #covid19 | Are the children immune to the coronavirus? Are pets able to pass the virus? Avoid fake news, read the most spread fake news, and trust in official channels. [like 83, share 36, comments 6]

Table 3. Topics' categories according to the strategies

The first general overview also highlights the use of online streaming to engage citizens and to set up a real two-way communication instantly. This type of communication has been traced by the topic "Listening to citizens" that has 194 posts (14%), especially during the maintenance phase. However, the use of live streaming is not the same for each region as it

has been mainly used by Lombardy, Piedmont and Emilia Romagna, probably because these are the most involved areas with a pro-capita contagious index, respectively, of 0.86, 0.69 and 0.62 at 3rd May from the website of Italian Ministry of Health.

The regions' health risk communication is concentrated overall within the maintenance phase aimed to reduce uncertainty, to spread information about managing the emergency and to inform citizens about efforts and actions (Table 4).

The results show an increasing trend in frequency of posts about Covid-19 and, on the opposite side, a slight contraction of no Covid-19 posts. The daily average of posts is 18. However, the average number of posts about Covid-19 is 11 and 7 about other topics. If we consider that since the maintenance phase the communication about the health risk emergency is quite limited, the research data show a huge commitment of governments in Covid-19 challenges, especially in the maintenance phase with about 34 posts per day. In this sense, our results confirm the Wang *et al.* (2021b) findings, underlining that the government's reaction to an unexpected health crisis is a "work in progress" with an increasing trend in communication.

Another challenging result is the delay of the Italian regions in facing the communication about Covid-19 health emergency. If we wonder that the Italian government declared the lockdown in some cities in Lombardy and Veneto on 24th February and on that date the number of posts about Covid-19 was up to 68, while during the maintenance phase this rose up to 1,292.

The data show that communication strategies involve all the topics about Covid-19 with an increasing trend and mostly focused to give information and to diffuse to spread actions and efforts in order to limit the negative effects of the lockdown to citizens. The main topics used in the third phase of communication are "Developing consensus", "Spokespersons for trust improvement" and "Listen to citizens". The communication strategy within these topics aims to improve people trust in the emergency management and create consensus about public health policy.

The engagement between government and stakeholders

The overall data (likes, shares and comments) about stakeholder engagement in government communication for the period from 31st December 2019 to 3rd May 2020 highlight an increasing trend in two-way communication on the FB platform (Table 5). In this sense, SM represents a useful instrument for the engagement improvement.

Although the daily average number of posts is slightly high also for no Covid-19 posts, the engagement is extremely higher for the Covid-19 ones; for example, for likes reaction, we found an average of 444 for Covid-19 posts against 93 for no Covid-19 ones. Moreover, the

Table 4.
Phases, posts and topics

Topics	CERC's phases			
	Pre-crisis	Initial event	Maintenance	Total
Covid-19	4	64	1,292	1,360
Developing consensus	0	2	86	88
Information about crisis	3	38	459	500
Spokespersons for trust improvement	0	2	75	77
Promoting action and efforts	1	14	461	476
Listen to citizens	0	6	188	194
Avoiding fake news and misinformation	0	2	23	25
Post no Covid-19	328	258	274	860
Total	*332*	*322*	*1,566*	*2,220*
Daily average number of posts	11	13	41	18
Daily average number of no Covid-19 post	11	11	7	7
Daily average number of Covid-19 post	0	3	34	11

frequency of posting, the updating and the ability to answer promptly to citizens' requests on SM are key issues to engage. The government has to clearly inform about the crisis and promoting efforts, also by listening to citizens; at the same time, citizens are searching for updated information.

The overall increasing engagement – measured by likes, shares and comments – can be divided into each element (Table 6). The average like reaction trend rises from 79.5 to 447.54 with a growth rate in awareness about risk communication of 463%. These data need to consider that, according to Summer *et al.* (2018), the like button is predominant compared to the action of comment. In this sense, we can observe the growth rate of comments (+1,457%) that measures the two-way communication between citizens and governments. At the same time, the grow rate of shares reaction is increasing (+262%) but with a different development. From the first to the second stage, the rise is significant (+778%), and during the third stage, it decreased to 59% as the virality in disseminating knowledge drop.

The pre-crisis phase

Within the initial stage of the health crisis, the stakeholder engagement grows fast, even if the government communications about emergency are rare with only four posts about pandemic. In this sense, citizens show a great engagement in it, as they are more aware about Covid-19 posts compared to the no Covid-19 ones (Table 6).

In the first phase, citizens are willing to know fundamental information about crisis and efforts. However, they are more interested in knowing the action and efforts of their own government, as they need to understand the measurements adopted by it because the FB profile is the official source of information, and they can gain other general news from the other channels, like newspapers, websites, blogs, etc. From the point of view of public governments, posts about actions and efforts are useful to confirm the self-efficacy of adopted measures within a difficult health situation.

The initial event phase

The increase in the citizen engagement interest is astonishing during the transition from the pre-crisis phase to the initial event one as people are much more involved within all the topics (Table 6).

The results show the higher-level awareness about "Developing consensus" posts, and this can be interpreted as a need to be encouraged to overcome the emergency also by increasing their level of trust in public government. This is also confirmed by the similar results in "Avoiding fake news and misinformation" because citizens are willing to understand the real emergency situation also by avoiding fake news, and they want to learn this news from the government because it is nearer to their needs.

If we look at the "virality", the most challenged topic is the "Avoiding fake news and misinformation" again as the "Facebook people" want to strengthen their consciousness and keep other people correctly informed also by avoiding fake news. Moreover, the "virality" is also linked to the need to inform about the crisis and to spread actions and efforts that could be useful to other people. Compared to the other stakeholder actions, the commitment, measured by the number of comments, is lower, and the most challenging topics are "Promoting action and efforts" and "Information about crisis".

Table 5.
Average level of engagement about Covid-19 and other topics according to the number of posts

Posts	*N.* of posts	Average likes for post	Average shares for post	Average comments for post
Covid-19	1,360	444	255	167
No Covid-19	860	93	33	7

Table 6.
Level of engagement of pre-crisis, initial event and maintenance phases

Topics	Pre-crisis phase			Initial event phase			Maintenance phase		
	Likes	Shares	Comments	Likes	Shares	Comments	Likes	Shares	Comments
Developing consensus	0.00	0.00	0.00	787.00	264.00	99.00	604.55	249.02	95.29
Information about crisis	50.00	34.00	10.33	426.03	682.58	102.87	410.20	252.67	146.18
Spokespersons for trust improvement	0.00	0.00	0.00	120.00	95.00	18.00	423.27	153.13	101.27
Promoting action and efforts	169.00	163.00	13.00	295.21	465.64	112.50	346.79	255.82	105.05
Listen to citizens	0.00	0.00	0.00	310.00	178.83	46.67	722.74	142.89	464.32
Avoiding fake news and misinformation	0.00	0.00	0.00	519.50	1481.00	78.50	454.35	697.39	112.22
Average reactions to each Covid-19 post	79.75	66.25	11.00	391.17	581.41	96.17	447.54	239.72	171.20
Average reactions to each no Covid-19 post	66.6	21.7	4.9	60.29	30.92	3.39	155.43	48.24	13.64

During the initial event phase, the topics' posts are aligned with the CERC model; however, their number is increasing, but it is not seemed to be the "rapid communication" required by the CERC model, especially considering the higher quantity of posts in the maintenance phase.

The maintenance phase

The maintenance phase has a high level of engagement; however, compared to previous stages, the results highlight a different mix of engagement issues as the popularity and the commitment increase while the virality decreases even if it shows a level of engagement higher compared to the no Covid-19 issue (Table 6).

The topic "Listen to citizens" shows the higher level in popularity and commitment. This type of post is more useful for getting an effective two-way communication, as people are able to have timely information, and at the same time, public governments can use them as eyewitnesses in order to know their specific needs and troubles.

The top-level sharing is related to "Avoiding fake news and misinformation" in order to stop the virality of fake news. Fake news within an emergency crisis could be very dangerous for public health. Research results, by comparing the previous phase, also highlight a stable engagement in posts aimed at providing information and explaining efforts ("Information about crisis" and "Promoting action and efforts"). The topic "Developing consensus" confirms that citizens are aware about spreading trust. In conclusion, the higher level of commitment measured by comments has been reached in the maintenance phase with an increase in the average comments up to 85% compared to previous phases.

Conclusions

The Italian regions' communication and its impact on engagement is useful to better face new emergencies that could be rise. With regard to the first research question, during the first three phases, the topics used to communicate by the regions are increasing according to the emergency timeline. The results also suggest that the content topic is a challenging element in order to attract citizens (Lwin *et al.*, 2018). However, there are two issues that are always present in each phase: "Information about crisis" and "Promoting action and efforts".

In the second phase, the panorama of topics is fully used to engage citizens that are interested and involved within the dialogue with the governments. With regard to the second research question, the reaction of public governments and citizens showed an increasing trend in awareness and, consequently, in engagement for both categories. However, results also highlight a different perception about the timing of the Covid-19 crisis. In this sense, the research suggests that the first time of the emergency management is not totally in line with the CERC model and WHO (2020) official indications, especially if we considered that the pre-crisis and initial event stages are fundamental to set the basis for a correct health emergency management (Frandsen and Johansen, 2020). In other words, there is a strict connection between the increasing trend in the number of posts from government and the rise of stakeholder engagement – measured by likes, shares and comments – as to worsen the health risk emergencies both became more involved.

The research has a potentially valuable impact from theoretical and managerial implications that can be used in a health emergency situation or also for managing risk communication in general.

Implications

From a theoretical point of view, the paper proposes an interpretation of communication of the pandemic according to the CERC model in one of the most affected areas of the European

countries. At the same time, research results link it to the stakeholders' reactions by giving an interpretation of the engagement during health crisis. In this sense, it is evident that the Italian regions reacted after the solicitation of people, and this is an unknown emergency scenario. In this research, the citizens' reaction is opposite compared to previous studies (Lachlan *et al.*, 2016; Lwin *et al.*, 2018) as they made pressure of SM in order to have more information about the health emergency. If regions had applied the CERC model since the pre-crisis phase, they should have made the right communication at the right time; consequently, the risk communication could be much more engaging since the begin of the emergency. Similar results have been found by Alhassan and AlDossary (2021) even if the citizens' engagement was different according to the different topics shared on TW. In this study, the engagement is extremely higher for all topics, especially compared to no Covid-19 posts.

Another interesting theoretical aspect found during the research and linked to the CERC model use is about the communication topics as initially they were aimed to answer to citizens by giving them information to mitigate and contain harm. The results confirm the CERC model indication about the fact that different crisis stages require different communication, and it assumes different reactions. At the same time, they highlight the need to rethink the CERC framework by evolving it according to the unexpected, global and uncontrollable exponential increase of the health emergency in order to develop communication intensity to reach a faster two-way engagement, especially in the pre-crisis and initial event stages. In this sense, results confirm previous research studies (Powell, 2021; Reyes Bernard *et al.*, 2021) and suggest the need to improve the CERC framework by paying more attention to the engagement issues from the early stages.

From a managerial point of view, findings suggest a gap between the answer of the public government compared to the citizens' needs that are clear since the first earlier stage of the pandemic event. Moreover, according to stakeholder reactions, results underline, from the government perspective, the need to outline standard protocols for communication also in order to quickly inform citizens by avoiding dangerous conduct that may affect the whole country. In this sense, the institutions have to be more ready to face epochal health emergencies; consequently, they need new managerial competencies in social communication and in managing risk as SM reveal to be a key tool of communication (Agostino *et al.*, 2021).

Limitations and future research development

The underestimation of the effective health emergency involved not only government and citizen categories but also others such as mass media, researchers, the WHO, etc. According to these first results, it needs future development in order to go deeper into the communication aspects of the pandemic event. From the stakeholder point of view, it would be interesting to carry out a content analysis of their interaction (shares and comments) in order to understand the "people's mood" and to prove if they were really conscious about the health situation.

Moreover, further analysis should be undertaken by enlarging the observation period and by investigating in-depth other countries. This further step is needed in order to understand if the Italian delay was related to the absence of previous recent pandemic events. From the stakeholder point of view, even if results highlight the presence of a real two-way communication, they do not explain the sentiment of "Facebook people" as findings did not get into the post's content. So, further research is needed to investigate this crucial and challenging phenomenon in depth.

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About the authors

Silvia Fissi is an Assistant Professor at the Department of Business and Economics of Florence University. She holds a Ph.D. in Planning and Control from the Università degli Studi di Firenze and a Laurea (Master degree) in Economics from the same university. Her research interests include public management, local authorities, tourism management, museums, corporate social responsibility and accounting history. Silvia Fissi is the corresponding author and can be contacted at: silvia.fissi@unifi.it

Elena Gori is an Associate Professor of Financial Accounting. She holds a Ph.D. in Planning and Control from the Università degli Studi di Firenze. Her research interests include public management, local authorities, tourism management, museums, corporate social responsibility and accounting history. She is the Director of the Centro Interuniversitario di Studi sul Turismo (Interuniversity Centre of Tourism Studies) of the Università degli Studi di Firenze.

Alberto Romolini is currently an Associate Professor in Business Administration at the Università Telematica Internazionale Uninettuno, Rome, Italy. He is also the Vice-Dean of the Faculty of Economics in the same university. He holds a Ph.D. in Public Management. His research interests are in the field of corporate social responsibility and nonfinancial reporting, public management in local authorities and health-care entities, museums, history of accounting and tourism management.