



LOCAL GOVERNMENTS AS SERVICE ECOSYSTEMS: TECHNOLOGY FOR ACCOUNTABILITY DURING THE PANDEMIC

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Abstract

The paper employs the Service Ecosystem Perspective (SEP) as a scientific framework to investigate the relationships between technology and Local Governments (LGs) accountability at the time of Covid-19 pandemic. A qualitative content analysis is carried out by focusing on in-depth interviews administered to 82 key LG actors, ranging from policymakers to technology general directors of companies. The analysis highlights the critical role of technology in fostering compliance programs and LGs accountability and in improving government performances. However, technology does not emerge as a "silver bullet" since its implementation requires to be reconfigured. In this sense, the results allow formulating recommendations to address LGs accountability and the role of technology in extraordinary times: i) paying attention to the emotional component of LGs accountability; ii) investing in digital education; iii) spreading a result-oriented culture as a technology-based mindset; and iv) stimulating institutional coordination at different government (micro, meso, and macro) levels. The work investigates the relationships between technology and LGs accountability at the time of Covid-19 pandemic by employing the Service Ecosystem Perspective (SEP) to provide

scholars and practitioners with useful recommendations understood as warnings to avoid being caught unprepared in possible new emergency periods.

Keywords

Local Government (LG); Accountability; Technology; Service Ecosystem Perspective (SEP); Qualitative content analysis; Covid-19 pandemic.

1. Introduction

For over a year, the Covid-19 pandemic has been producing dramatic repercussions not only in the health sector, inducing governments of every country in the world to take prompt action through exceptional measures aimed at counteracting the worsening risks for the population and minimizing the damage at an economic and social level (World Health Organization, 2020). Both private and public sector have responded to such pandemic challenges by maintaining and, as far as possible, increasing the level of accountability at an institutional level (Tan and Enderwick, 2006) and by introducing or improving organization technological practices. In this regard, recent literature is rich of empirical research that demonstrate a broad interest in understanding the causal link between the use of technology and LGs (Local Governments) accountability (Bracci, 2008; Welch, 2012; Bertot et al., 2010; Del Bene et al., 2020). This is relevant for actions typically undertaken in extraordinary times, that is, during any situation deriving from a state of crisis that involves a social imbalance (Saint-Bonnet, 2001). However, the pivotal role of technology and its extensive implications have been debated in management literature with scarce focus on its link to accountable government in extraordinary times (Steccolini et al., 2017), as the Covid-19 pandemic. To bridge this gap, this paper aims to investigate the relationships between technology and LGs accountability at the time of Covid-19, building on Service Ecosystem Perspective (SEP). The use of SEP allows responding to calls for more policy and public administration literature engagement to strengthen and widen impact and inter-disciplinarity (Steccolini, 2018). This relates the need to move from public sector to public services, referring more to the attainment of public goals and interests, than to the organizations and concrete spaces where the related activities take place. The present research aims to narrow the identified gap by performing a mapping study, by analysing the emergent literature on the role both of technology for LGs accountability and of accountability in extraordinary times from different fields. To accomplish this objective, a qualitative content analysis is conducted to provide answer to the following Research Question, RQ₁: *What is the impact of the Covid-19 pandemic on LGs accountability?*. Also, to achieve a more complete and inclusive understanding, based on the findings arising from the first question, the main definitions on accountability are identified and employed to develop a more comprehensive interpretation, by answering the RQ₂: *How the role of technology could be reconfigured to lead LGs towards an accountable government in extraordinary times?* The paper is organized into five sections. Section 2 outlines the concept of accountability in extraordinary times as well as the role of technology for LGs accountability; section 3 refers to the research design with the description of the SEP as a scientific framework, method, data collection and analysis. In Section 4, the results are presented and debated by contextualizing the SEP. Section 5 focuses on the emerging issues in terms of technology potential and outlines concrete recommendations able to foster the relaunch of LGs through the accountable government in extraordinary times.

2. Theoretical setting

2.1 Accountability over extraordinary states

The COVID-19 diffusion, originally born as a health emergency, has exposed deep inequalities around the world, rapidly evolving into a violent social and economic crisis (De Vito and Gómez, 2020), followed by exceptional measures - such as lockdown, suspension of public and commercial activities, implementation of technological tools for remote study and work - adopted by government institutions at different levels to counteract the negative effects of the pandemic (Andrew et al., 2020). The tragic consequences deriving from the uncontrolled spread of the virus has required timely institutional interventions to maintain and, as far as possible, to increase the level of accountability towards citizens and other stakeholders in order to respond to the emerging needs of safety, health, protection, contain damage and preserve people's trust in institutions (Ahrens and Ferry, 2020). These extraordinary measures fall within the scope of actions typically undertaken in extraordinary times, that is, during any situation deriving from a state of crisis that involves a social imbalance (Saint-Bonnet, 2001) and, consequently, a sudden and temporary modification of governance powers for risk management through unconventional practices. The onset of an extraordinary state requires a rapid reconsideration of risk management and uncertainties, as well as the adaptation of accountability practices at an institutional level (Tan and Enderwick, 2006). In fact, in such situations, accountability plays a decisive role, given that the suspension of "normality", although temporary and partial, may generate uncertainty regarding the attribution of responsibility to government bodies (Welch, 2007). In this sense, the conduct of accountability processes in extraordinary times offers a common framework for the shared understanding of every social reality, since it arises as a subjectively constructed notion, which varies according to the context of reference (Pesci et al., 2020). This means that the connotation that an accountability system can assume depends on the social conditions under which relations between institutions and stakeholders are established (Sinclair, 1995). In this regard, in his study focused on the 2009 earthquake in the Italian region Abruzzo, Sargiacomo (2015) states that, during extraordinary times, provisional exceptional measures must take on the role of a government technique capable of safeguarding individuals through accountability processes that take into account not only the reporting of damages, emerging problems, and possible solutions but also the individuals' perception. Likewise, after the spread of the Severe Acute Respiratory Syndrome (SARS), in 2004, the central government formally promulgated policies and regulations that hold public officials accountable for their responsibilities and performances by specifying how and for what to be considered accountable by stakeholders, empowering and encouraging high-level governmental and disciplinary officials to take a zero-tolerance attitude toward negligence and misconduct (Wang et al., 2021). Similarly, studying the destructive effects of Hurricane Wilma in the Yucatán Peninsula, Mexico, Cuba, and Florida, Atkinson and Sapat (2013) point out that,

over exceptional situations, government institutions should not rely solely on calculative accountability but relying on the potential for accountability to increase stakeholder accountability levels (McKernan, 2012). Coherently, with reference to the consequences generated by Hurricane Katrina that struck the United States in August 2005, Baker (2014) argues that relying exclusively on computational accountability is inappropriate, given that this one-way approach fails concretely take into account people's perception. Indeed, whilst the calculative form of accountability refers to the objective facts, hard evidence, and the numbers - such as number of victims, extent of material damage, and accounting records of resource allocations, laws, and regulations (Jayasinghe et al., 2020) -, emotional (or narrative) accountability in extraordinary times relates to the stakeholders' qualitative opinions and emotions - such as judgments of the disaster victims regarding the effectiveness of disaster relief efforts (Perkiss and Moerman, 2020) -. In line with these considerations, Joanis, (2014) introduces the concept of "shared accountability" to define a process in which all stakeholders have a responsibility for their own well-being. According to the author, the choices made by institutional governments in terms of shared accountability must be communicated to the community to allow stakeholders to actively participate in risk management in extraordinary times. In this regard, Andreaus et al. (2021) argue that the stakeholders' participation in the shared accountability process represents a desirable key feature to enhance and satisfy the individuals' needs during extraordinary times. Thus, the way in which the various stakeholders are involved affects the perception of the goodness of the interventions undertaken to resolve crisis situations in extraordinary times (Demirag et al., 2020; Boedker and Chua, 2013; Carlsson-Wall et al., 2020) according to an approach oriented towards emotional accountability, centred on the management of emotional expectations, such as anxiety, suffering, sadness, negative memories, and so forth. This means that, especially in extraordinary times, accountability needs to be interpreted as a collaborative, multifaceted, and holistic governance model rather than being narrowly defined as a merely financial, political, or social concept (Taylor et al., 2014). The management of exceptional situations implies to take into consideration a multilevel conception of accountability - vertical, horizontal, downward, and diagonal - surrounded either by collaborative working or cross-organizational working relationships (Jayasinghe et al., 2020).

2.2 Technology-based accountability of LGs

The confluence of policies based on New Public Management (NPM) methodologies, the rapid expansion of new technologies and the search for new forms of governance, has favoured the transformation of LG administrations, making them more accountable, that is modern, efficient, transparent, and attentive to social problems and citizens' requests (Ruano de la Fuente, 2014). Most of the current approaches to LG development focus on public-private partnerships resulting in networks of dependency that involve multiple stakeholders, complex relationships of accountability (Offenhuber and Schechtner, 2018), and technology-based governance models, developed to foster citizens' participation and involvement. In the LG environment, the allocation of human and economic resources for compliance with regulations requires new strategies and approaches, as well as the integration of technology and web tools for a more efficient use of time and financial accountability. Attention to concepts such as LGs

accountability and transparency is fundamental since any incomplete access to certain data may negatively affect the social role that these organizations play, hindering the public debate, and generating distrust among citizens (Cabezuelo-Lorenzo et al., 2016; Yavuz and Welch, 2014). This consequence is due to the availability of new technologies, which has accelerated the process of LGs accountability almost in real time (Link and Scott, 2012), stimulating the citizens' interest in community issues. Technologies promise to increase transparency, accountability, and civic engagement of the LG administration by providing information on government activities, enabling electronic interaction with community stakeholders (Feeney and Brown, 2017), and, in remote areas, helping to break down the barriers associated with distance, proximity or mobility (Ricucci and Holzer, 2011). Furthermore, technology offers LG governments the possibility to rationalize work processes, reduce corruption practices, increase transparency, and maximize accountability towards stakeholders, providing information and including citizen feedback in interactive monitoring processes (Baud et al., 2014). Nowadays, thanks to the development of new technologies, not only large LGs but also small and medium-sized ones, have the opportunity to provide services to their citizens in a more effective, efficient, and accountable way (De Tuya et al., 2017). The adjunct value generated by technologies within LGs facilitates urban societal problem solving (Angelidou, 2017; Harrison, 2017) and fosters more accountability and democratic legitimacy (Nesti, 2020). Within a democratic society, the right to access services and technologies for social development plays a fundamental role in the progression towards accountable LGs (Nguyen et al, 2018). To achieve objectives of transparency, accountability, and civic participation, LGs must develop skills related to measurement, reporting and management procedures of technologies (Evans et al., 2018). In this regard, recent literature is rich of empirical research that demonstrate a broad interest in understanding the causal link between the use of technology in local government processes and LGs accountability (Welch, 2012; Bertot et al., 2010), especially in order to verify how the diffusion technological tools may increase citizens' accessibility, transparency, and civic engagement (Grimmelikhuijsen and Meijer, 2015; Tolbert and Mossberger, 2006). Essex and Goodman (2020), for instance, investigate the link between technology and accountability with reference to administrative elections in Canada and, through interviews administered to officials and experts, come to argue that online voting produces positive effects on participation, integrity, accountability, and transparency of the election. Consistently, Evans et al. (2018) examine how twenty LGs in Canada and the USA implement the relationship based on accountability and the level of trust between LGs and citizens through the administration of social media technologies. The study provides an in-depth characterization of the administration and use of social media technologies, underlining that LGs can develop a greater capacity for governance, open to greater accountability of LGs and wider citizens' participation in the decisions that affect them daily. Likewise, Feeney and Brown (2017) carry out a content analysis on 500 websites of US LGs with a population between 25.000 and 250.000 from 2010 to 2014, underlining the high impact of Information & Communication Technologies (ICTs) on the LGs' accountability in the eyes of the communities they serve. Similarly, Cabezuelo-Lorenzo et al. (2016) conduct a research focused on local governments' transparency, based on the analysis of LGs accountability tools on the websites of municipalities with more than 10.000 inhabitants, in order to investigate the role of the intensive use of new technologies in ability to control, monitor, supervise and influence the behaviour of citizens, local institutions and political actors. Compatibly, in their article, Im et

al. (2013) assess whether the use of sophisticated technologies in Seoul, Korea, can stimulate interaction with citizens, increasing the accountability, efficiency, and competitiveness of the government. The results of the analysis, based on a case study and interviews administered to government officials, suggest that the LG's use of technology serves as a means of making local government bureaucracies more accountable and responsive to community demands.

3. Methods

3.1 The Service Ecosystem Perspective as a scientific framework

Starting from the scientific foundation of system theories, this work employs the SEP to investigate the role of technology in enabling LGs accountability in extraordinary times. According to the prevailing system thinking, no organization may be considered completely autonomous, depending on the relationships established over time both internally and externally (Guihua, 2013). Like individuals, who interact in accordance with commonly accepted and shared rules, organization adopt social patterns and cultural attitudes in their interactions with other systems (Rutherford and Meier, 2015). This requires the continuous improvement of the interactions to optimize the resource allocation and reciprocal collaboration and cooperation conducts (Newell and Meek, 1997), with relationships ranging from the information exchange to a full trust. Nothing happens in isolation, in accordance with the accredited concept of “embeddedness” (Provan et al, 2009). In compliance with this view, every organization tends to adapt itself as part of a larger and interdependent system, a sort of ecosystem, in which it lives and operates, acts and changes, relates and grows. However, being part of an ecosystem does not mean losing the own identity but, more correctly, it means being able to influence the other stakeholders’ behaviour and be influenced in turn. All actors are qualified on the basis of their own subjective reference context (Hager et al., 2004). Thus, ecosystem takes shape and changes according to the evolution of potentially infinite contexts (Erić and Dabetić, 2019). What matters is not the sum of the identifiable dimensions but the dynamic interaction that derives from the system of distinctive resources aimed at achieving a common goal, under and over-ordered. The drivers to analyse an ecosystem can be based on different aspects, such as the sustainability of the common action, the viability of the ecosystem as a whole, the spirit of service that animates the intersections and favours an upgrade of individual and collective performances (Pittman and Kolakowski 2020). This logic affects the concept of organizations’ competitiveness, as well as the definition of general development paths, offering important insights in terms of greater accountability, better process management, less resources depletion, and strengthening of the competition logic in which all stakeholders cooperate to achieve a common benefit and compete with other actors belonging to different ecosystems or to the same one (Marrone et al., 2020, Manna et al., 2018). In the context of system theories, the expression “service ecosystem” denotes a self-regulating system of stakeholders that integrate resources according to the alignment of purposes, shared institutional agreements, and the creation of

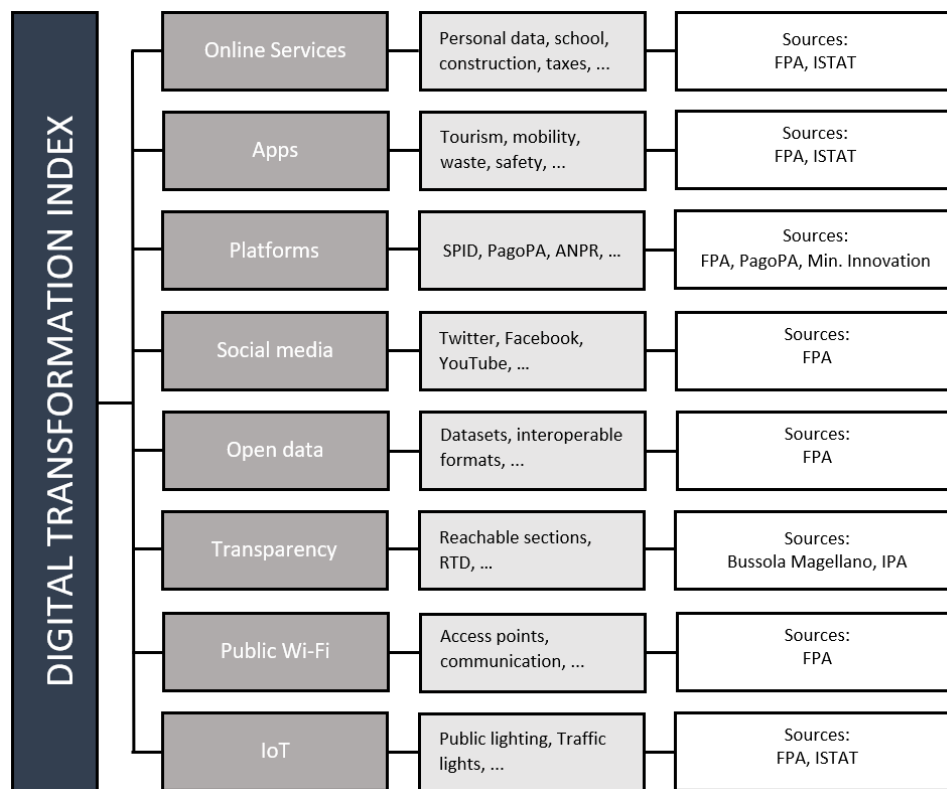
mutual value through the service exchange (Ciasullo et al., 2020). Within a service ecosystem, perfect collaboration is a utopia (Mele and Polese, 2011): any collaboration needs to be adapted and redefined according to the emerging necessities and expectations of the stakeholders belonging to the same or another ecosystem. Consequently, according to the SEP, the stakeholders' interaction supports the development of service ecosystems in which all elements are mutually and synergistically involved (Barile et al., 2017). Hence, any ecosystem appears as more competitive whether the relationships between its sub-elements and its super-elements grow. Referring to ecology or economics, the prefix "eco" indicates that everything is grouped in a system as a result of the integrated stakeholders' behaviour (Polese et al., 2017a). Therefore, this perspective recognizes all actors as motivated to participate and share resources, maintaining their own identity and, at the same time, overcoming the myopic optics of maximizing their exclusive advantage (Barile et al., 2017). Service ecosystems can be framed by considering a three-level setting (Vargo and Lusch, 2016), starting with the micro-level, passing through the meso-level and reaching the macro-level (Polese et al., 2017b). The micro-level represents the integration of resources and the exchange of value among stakeholders (Frow et al., 2014). Since this paper focuses on LGs accountability, the micro boundary is outlined by considering all those interactions that produce effects at the city level. The meso level identifies a network of stakeholders that interact by exchanging resources and pursuing compatible objectives (Chandler & Vargo, 2011). In this regard, for the purposes of this research, the perimeter of the meso environment is traced by taking into consideration all the interactions concerning a larger level than the city, such as metropolitan city, union of municipalities, province, and region. Finally, the macro-level emerges through the combination of different networks governed according to institutional arrangements (Akaka et al., 2013). Hence, in this work, the macro context boundary is defined by accounting all those stakeholders' interactions that affect the broadest level of city networks, such as central government and community government. The three levels are "nested" (Mars et al., 2012) since every stakeholder may have access to resources shared in each service ecosystem level (Frow et al., 2016). The levels are linked through value propositions, offering to stakeholders the access to resources that foster well-being. Furthermore, the levels of any service ecosystem are changing since they depend on the role played by the stakeholders within them, the exchanged and integrated resources among them and the institutional arrangements regulating their interactions (Chandler and Vargo 2011). Moreover, each level constitutes the other two, i.e., the macro does not exist without the micro and meso level and vice versa (Akaka and Vargo, 2015). The considerations reported so far constitute the scientific framework for the analysis and discussion of the results proposed in the following paragraphs.

3.2 Approach, data collection and analysis

A qualitative content analysis has been carried out by focusing on in-depth interviews administered to multiple key LG actors, ranging from policymakers to technology general directors of companies. This research method takes shape as the most appropriate methodology to address the inquiry, given the absence of previous empirical research and the nature of research questions. Data has been retrieved from secondary sources available on the Forum PA

online portal¹, a reference point in matters of innovation and modernization of Public Administration in Italy. All the interviews, carried out and published between March 2020 and March 2021, had the aim to examine technology implementation during the Covid-19 pandemic at national, regional, and municipal level. The analysis has been developed as follows. First, information was gathered from all the 122 interviews-related reports made available on the Forum PA online portal, Digital PA section, dedicated to the Italian issues during Covid-19 pandemic. Second, a manual content analysis (Neimeyer et al., 1983; Rosenberg et al., 1990) has been performed by following a detailed protocol to guide the screening, evaluation, and synthesis of the interviews. The protocol included eight selected dimensions that represent the key processes involved in the planning and implementation of digital transformation. Conceptually, the eight dimensions (Figure 1) represent more than 30 variables on technical conditions that may determine whether and to what extent digital transformation has been achieved.

Figure 1: The eight dimensions of digital transformation

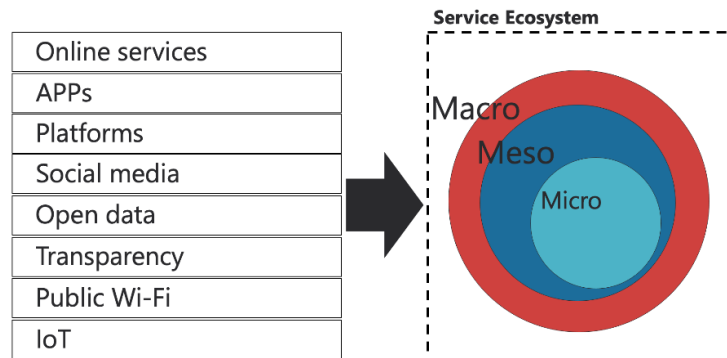


Source: Elaborated from IcityRank2020, available at <https://www.forumpa.it/>

Figure 2 shows a graphical representation of the key processes of digital transformation, analyzed according to the SEP, employed as scientific framework to interpret the findings in the light of the stakeholders' interactions at the macro, meso and micro level.

¹ <https://www.forumpa.it/>.

Figure 2: The key processes in the light of the SEP



Source: Authors' elaboration

The selected interviews are those referred to the eight dimensions, which have revealed to be useful to assess the RQs of this paper. Hence, only the interviews focused on at least one of the eight dimensions of the Digital Transformation Index have been analyzed. Each selected interview has been considered as a “case” and every sentence has been singled out and coded. Those sentences, related, on the one hand, to the Covid-19 pandemic-accountability relationships, and, on the other, to the role of technology in LGs accountability, have been translated and coded by contextualizing the scientific framework. The authors have examined the reports collected, and, in case of divergences, the results have been thoroughly reviewed and discussed to reduce discrepancies and reach a scientifically significant agreement (Badia et al., 2020). Data has been extracted for each dimension investigated in relation to the micro, meso and macro levels of the SEP and then synthesized into relevant categories, as detailed in the next paragraph.

4. Findings and discussion

Out of the 122 interviews published on the Forum PA online portal and screened by the authors, 82 have provided useful information for answering the RQs, whose the majority are embodied at the macro and micro-level. Specifically, out of these 82, 42 provided information at the macro level, 8 at the meso level, while 32 at the micro one. The macro level sample is composed of the stakeholders (key actors) coming from both national and international companies and associations of public and private bodies operating in Italy as well as Italian government (i.e., minister). The micro level refers to local authorities, including both executive and legislative bodies, research laboratories, and universities. Whereas the meso level sample includes regional governments, metropolitan LGs and related agencies (i.e., education agencies). Table 1 highlights the distribution of the topic discussed over the selected interviews. The interview analysis has shown that poor emphasis seems to be placed on apps and social media. However, these dimensions have been discussed by some stakeholders at the macro level (apps) and others at both the macro and micro-level (social media). Specifically, app innovation has been mentioned to help fight the Covid-19 pandemic, alerting users who have a risky-exposure

without gathering sensitive information (i.e., identity, location), thus taking care of people's privacy. Moreover, app projects have been discussed regarding users' needs with the aim to deliver quick, simple, and personalized public services.

Table 1 – Results distribution at micro, meso and macro level per dimension

DIMENSION	SEP LEVEL		
	Micro = 32	Meso = 8	Macro = 42
Online services	25 (78,13%)	6 (75,00%)	27 (64,29%)
Apps	0 (0,00%)	0 (0,00%)	2 (4,76%)
Platforms	2 (0,06%)	1 (12,50%)	3 (7,14%)
Social Media	2 (0,06%)	0 (0,00%)	1 (2,38%)
Open data	5 (15,63%)	2 (0,25%)	11 (26,19%)
Transparency	2 (0,06%)	1 (12,50%)	3 (7,14%)
Public Wi-Fi	3 (0,09%)	1 (12,50%)	8 (19,05%)
IoT	3 (0,09%)	1 (12,50%)	7 (16,67%)

Concerning social media, it has emerged that there is often an inadequate information content, which could have negative consequences especially in emergent times. Indeed, it has highlighted the need for a deep understanding of the audience and an information alignment with this understanding. This strategy would help to meet the follower expectations, increasing involvement of civil society and community. Yet, also platforms, transparency and IoT dimensions have gathered low attention, but still providing insights to help understand LGs accountability, although the results are mainly derived respectively by online services, open data, and public Wi-Fi dimensions. It has been underlined how the macro-level political commitment in times of emergency is imperative, but to be converted into LGs accountability, it is crucial to implement appropriate institutional setups, adequately funded programmes, meaningful stakeholder engagement, and collaboration across multiple levels and sectors (RQ₁). Within most LGs, new processes in pre-existing organizations have been set up given the need for collaborative governance. In this regard, as pointed out by Taylor et al., (2014), accountability should be considered as collaborative, which refers not only to the impact towards individuals, but also as a society as a whole. Political commitment for health system supports and multi-sectoral technology implementation is mostly being framed within the macro context. Italian government has introduced urgent measures to limit the spread of the current Covid-19 pandemic, including the lockdown of many stakeholders, both individuals and organizations. Despite the much-needed investment, this situation has accelerated the digital transformation of LGs regarding an extensive range of activities - from smart working to the provision of remote health services, leading to a more seamless interaction at a lower cost. The ICT companies are moving towards both public and private innovative business model services and solutions (i.e., mobile and cloud-based services). However, it has been claimed that ICT leader companies should have a more prominent role in the service (re)design process. In fact, it has been argued that technology should not be implemented by guessing what users might want but, instead, it should support the service design with the aim of responding to the needs of citizens and customers. To this aim, a prominent role seems to be played by task force: “the task force has focused on how technology can support workers, in terms of education, skills, and culture, as well as the development of citizen/customer-centric services”. However,

it has been stated that “an approach that begins with strategic planning and continues through performance evaluation is needed”. All interviewees show a deeper appreciation of technology and are keen to see the Covid-19 pandemic as an opportunity to reset organizations. This resetting is seen as a determinant of LGs accountability. Thus, the fundamental role of technology based on value of LGs accountability in extraordinary times has been highlighted (RQ2). Specifically, through technological interactions and integrations, a multiplication of innovation opportunity in terms of accountability seem to be possible. The role of technology offers a shared vision by which LGs can begin to strategically align the micro-level with both the regional (meso) and national (macro) agendas. This nexus is crucial in facing the Covid-19 pandemic and, more generally, all kinds of emergency. The key messages emerging from this analysis suggest that a multipronged approach may be necessary. The ecosystem should lie on large number of public and private stakeholders who invest their resources and collaborate, driving to adoption of new technologies across all sectors. For instance, the role of academic and research institutions seems to be crucial for managing major emergencies and overcoming the key challenges to technology by improving both hard and soft skills: “digital competence has becoming crucial for employability”. These are key competences, especially in emergencies where citizens increasingly demand public services that are faster and online. The Covid-19 pandemic has reinforced online services, increasing the ease of access to services through multi-channel delivery, exploiting the advantages of platforms, open data, transparency and IoT. The latter has revealed important for mediating relations and enhancing transparency. Indeed, IoT generates more information and provides opportunities for a greater control on activities by implementing checking mechanism by objectives needed specially to face emergencies. The Covid-19 pandemic implications have accelerated the digital transformation, but the analysis of stakeholders’ interactions at all the three levels confirm that there is still lack of multidisciplinary skills and know-how as well as a lack of result-oriented culture and a predominance of a normative culture based on regulatory oversight (i.e., auditing requirements). The spread of a specific platform which electronically prove user identity and connects citizens with the public administration and the payment service processors have been progressively extended. It can ensure simple and secure payments, but it seems there is still implementation disharmony among LGs. The increasing availability of open data initiatives is perceived as critical for understanding how the virus is spreading and for preserving individual wellbeing through social service provisions. However, open data still requires a proper planning and a comprehensive approach. Indeed, LGs accountability seems to be threatened by a lack of availability of periodic data gathering and a lack of interoperability and data sharing between private and public sectors, but also among European countries, consequently leading to poor data integration. “Organizations can use the technology to compare the content and quality of their reports with other organizations. This comparison holds importance not only to improve the information quality disclosed through data integration, but also to understand how other organizations attempt to adjust their operations to the requirements of a time crisis like covid-19 pandemic”. The macro and meso level report a poor coordination between national and subnational partners, while the micro one outlines a limited involvement of civil society. For example, it has been stated that “the involvement of technology providers would benefit from using modern technologies and improving user experience”. “There is still a missing private and public sector awareness on the value of data sharing and integration”. “The importance of limited data integration has sometimes prevented the system from collecting relevant data in



support of universal social coverage during the health emergency”. It has been highlighted how the competitiveness of a LG no longer relies on the ability of computational accountability with the aim to show transparent numbers which, in times of crises, often causes negative emotions, and furthermore leads to the risk of spreading false information thereby increasing uncertainty and institutional unreliability. During emergency times empathic behaviours are required, which are essential to ensuring credibility, which sometimes appear to be hindered: “official report appears to have underestimated Covid-19 deaths reporting figures that are much lower than in reality”. In this context, cooperation and co-creation may have, from the points of view of all the interviewees, positive psychological effects where social distancing is not perceived as social isolation: “Such involvement will help organizations to consider valuable stakeholder feedback so as to provide user-friendly services for costumers or citizens and prepare their reports improving their accountability and transparency level. It intends to ameliorate the quality of the reports by identifying weak and strong points of reporting practices”. Thus, cooperation and co-creation should lead to a proactive institutional role in mitigating individual mental health. This corroborates what is stated by several scholars (i.e., Atkinson and Sapat, 2013; Baker, 2014) leading to the necessity to not exclusively rely on computational accountability since it is likely to lead towards negative psychological effects and an increase of uncertainties surrounding the Covid-19 pandemic. However, it has been claimed how this pathway must make sure that ‘no one is left behind’, thus keeping the focus on digital divide and disadvantaged people: “it is needed to engage workers and citizens with low level digital skills (i.e., elderly people)”. Moreover, it has been stated that: “equity is being promoted by improving Wi-Fi” but “an increase of speed in the adoption of high-speed broadband is needed for the whole territory”. Findings from meso and macro-level indicate that digital divide is a major challenge for LGs accountability due to limited infrastructure and a lack of financial resources. This situation would prevent a homogeneous LGs accountability among citizens. However, at the micro level, the collaboration between municipalities, ICT actors and citizens for expanding broadband access has been outlined.

5. Conclusions, recommendations and insights for future research

This paper has been articulated to highlight stakeholder perspectives of the three SEP levels - micro, meso and macro -, particularly focusing on both private and public sector concerns for the LGs accountability, technological implementation strengths and challenges in accordance with the eight dimensions of the scientific framework. The use of technology devices and programs emerges as critical to progress in implementing compliance programs and LGs accountability (Velez-Arocho et al., 2018) and, beyond the transparency and accountability perspective, technological platforms may also help generate insights into how to improve government performance (Bello et al., 2016). However, technology is not a "silver bullet" capable of automatically fostering government accountability, transparency, citizen participation and civic stakeholders' engagement but, rather, a tool through which LG administrations may pursue accountable objectives (Feeney and Brown, 2017) in the medium and long term. In this sense, the use of technologies does not guarantee, by itself, convergence towards the objectives of greater LGs accountability, contributing, rather, to strengthen the previous practices and the styles of relations of those governments that have already achieved

high levels of performance in the eyes of citizens (Pina et al., 2010). The results from the content analysis reveal some key issues that LGs are encountering, allowing formulating recommendations that could opportunely address LGs accountability and the role of technology in the Covid-19 pandemic. The recommendations, understood as warning to avoid being caught unprepared in possible new emergency periods, may be synthesized into four main points: *i*) focusing on the information contents by paying attention to the emotional component of LGs accountability practices; *ii*) investing in digital education and training systems; *iii*) spreading a result-oriented culture as a technology-based mindset to consolidate the innovation-accountability combination; and *iv*) stimulating institutional coordination at different government (micro, meso, and macro) levels to maximize the effectiveness of interventions. This advice implies to adopt a cross-cultural perspective on current and future LGs accountability processes. Indeed, the Covid-19 pandemic has proved that compliance-based or regulatory approaches only limit accountability in practice. It was argued that the technology implementation has advanced different types of accountability mechanisms. First, it emphasizes the computational accountability through the sharing of figures and data. Second, it underlines the need to foster the emotional component of accountability, capable of engaging stakeholders. Doing so could facilitate trust among stakeholders, fostering the collective learning necessary in leading LGs towards an accountable government in extraordinary times. Thus, political and economic actors, at all levels, are reacting to the Covid-19 pandemic by implementing technology and increasing accountability, although these implementation efforts still need coordination, cooperation and integration. Key actors should pay more attention to areas that need further research to guide technology implementation, which include apps and social media, IoT, platforms, and transparency issues. However, the recommendations discussed so far are not proposed as a universally valid scheme, given that, in extraordinary times, the effectiveness of possible solutions depends on many factors, such as the historical moment, the level of preparedness for the emergency, the rate of technological acceptance, and the socio-cultural characteristics of the country. The main limitation of the work is connected to this last aspect since the authors have taken into consideration a limited number of interviews administered to stakeholders operating in Italy. Such limit might affect the possibility of generalizing the results. To this end, further research is needed, possibly outlining a sample by including actors from other countries.

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