

Unpacking the knowledge dimensions of digital innovation: implications for accountability in public and private sectors during extraordinary times

Gennaro Maione, Giulia Leoni and Michela Magliacani

Abstract

Purpose – This study aims to explore what and how digital innovation, as a knowledge-based and multi-dimensional process, can be used to increase the accountability of public and private sector organizations during the COVID-19 pandemic.

Design/methodology/approach – Taking an interpretivist approach, qualitative research is designed around Strong Structuration Theory (SST). A content analysis of relevant documents and semi-structured interviews focusing on the relationships between digital innovation and accountability in extraordinary times is conducted.

Findings – The results show the existence of digital innovation barriers and facilitators that can have an impact on accountability during extraordinary times. The research highlights how managers of public organizations focus largely on the social dimension of knowledge (i.e., competencies shaped by collective culture), while managers of private organizations focus mainly on the human dimension of knowledge (i.e., skills gained through learning by doing).

Research limitations/implications – The paper enriches the accountability literature by historicizing SST for extraordinary times and by utilizing a multiple-dimensional approach to digital innovation. Also, the work underlines specific strategies organizations could usefully adopt to improve accountability through digital innovation in the public and private sectors during extraordinary times.

Originality/value – This article emphasizes the crucial integration of technological components with knowledge. In particular, the digital innovation is considered as a strong synergy of human and social dimensions that compels organizations toward enhanced accountability, particularly in the face of extraordinary challenges.

Keywords Knowledge, Accountability

Paper type Research paper

1. Introduction

Accountability is a means for recognizing responsibility and democracy by all organizations (e.g. public and private), and actors (e.g. elected and non-elected ones) (Narayan, 2002; Lynn, 2006; Dillard and Vinnari, 2019).

In our contemporary era, digital innovation poses several opportunities for accountability, making organizations more dialogic, inclusive and pluralistic (Brown *et al.*, 2015; Manetti *et al.*, 2017).

By digital innovation we mean not only the recombination of technological components for a wide range of innovations (new products, services or processes) within and across organizations (Nambisan *et al.*, 2017; Corvello *et al.*, 2023; Felicetti *et al.*, 2023), but a more

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comprehensive focus centered on knowledge (Balachandran and Hernandez, 2018; Bonfanti *et al.*, 2018; Del Giudice *et al.*, 2021). This conceptualization is grounded in a multi-dimensional process to be inclusive of not only technological processes, but also non-technological ones (skills, competencies, culture, etc.) (Troisi and Grimaldi, 2022; Perri *et al.*, 2020). Digital innovation includes the willingness and capacity of all individuals involved (human dimension), and the inclusion of a diverse and dynamic set of actors (social dimension) (Trabucchi and Buganza, 2019).

One of the digital innovation potentialities for accountability includes enhanced availability, richness, and usability of data, as well as the facilitation of dialogue and interaction with stakeholders on management issues (Secinaro *et al.*, 2022), even more so during extraordinary times, i.e. any situation deriving from a state of crisis that involves a social imbalance (Saint-Bonnet, 2001).

While previous studies focused on how extraordinary times affected accountability (Leoni *et al.*, 2021) or prompted the implementation of digital technologies (Martinez-Rojas *et al.*, 2018), less attention has been paid to the relationship between digital innovation and accountability during extraordinary times. To fill this gap, this study aims to understand how public and private sector managers perceive the potential of digital innovation to enhance accountability in extraordinary times. The following research question was raised:

RQ1. Does digital innovation enhance the accountability of public and private sector organizations in extraordinary times? If so, how?

To this end, a qualitative research design was outlined (Bryman and Bell, 2011) according to an interpretive and cross-sectional approach (Margerison *et al.*, 2019; Myers, 2013; Chowdhury, 2014). In-depth, semi-structured interviews were administered to public and private sector managers, and documentary analysis was carried out (Qu and Dumay, 2011). The relationships between digital innovation and accountability in extraordinary times were analyzed by contextualizing Strong Structuration Theory (SST) (Stones, 2005), one of the primary and most interesting schools of thought to study accounting and accountability (Mutiganda and Järvinen, 2021).

The findings underline how digital innovation is critical to improving accountability (Schillemans *et al.*, 2013; Velez-Arocho *et al.*, 2018) in extraordinary times (Maione *et al.*, 2022; Moser-Plautz and Schmidhuber, 2023). Furthermore, according to SST, the results highlight different perceptions of the internal structures prevailing in public and private sector managers' positions and practices.

This study is intended to provide both theoretical and practical contributions. The paper's theoretical contribution can be seen in enriching the accountability literature by contextualizing SST in extraordinary times and applying a multi-dimensional approach to digital innovation. Regarding the practical contribution, interpreting the findings according to SST provides organizations with a better understanding of how to handle knowledge to enhance accountability in extraordinary times.

The remainder of the article is organized into five sections. Section 2 provides the theoretical background of the paper. Section 3 describes the research design. Section 4 presents and discusses the findings. Section 5 outlines the conclusions.

2. Theoretical background

2.1 Accountability in extraordinary times

Accountability covers a broad set of activities pivoted on transparency, responsiveness and compliance core dimensions (Bovens, 2014)– such as reporting performance, communicating the results, and guaranteeing transparency that aim to satisfy multiple stakeholders' expectations (Chatzivgeri *et al.*, 2020; Gray, 1992; Roberts, 1991). Accountability is not an end but a prerequisite to motivate action for establishing and

maintaining the common good, which implies the satisfaction of stakeholders' information needs as organizations' ultimate objective (Dillard and Vinnari, 2019; Pesci *et al.*, 2020).

Accountability is not only based on the relationship between government and citizens with a focus on public servants, but extends to all type of organizations (e.g. public and private) involving also the empowerment of "nonelected officials" to act in the name of the powerful (e.g. funders) and less powerful (e.g. beneficiaries) stakeholders (Narayan, 2002; Lynn, 2006; Dillard and Vinnari, 2019). Namely, managers can be identified as accountable actors for making organizations responsible to society. This is true both for corporations (e.g. Waddock *et al.*, 2002) and public organizations (e.g. Lynn, 2006).

There is little, but growing, literature that addresses the role of accountability in extraordinary times and when inequalities among stakeholders could potentially evolve into a violent social and economic crisis (De Vito and Gómez, 2020).

Extraordinary times require responsibilities for sensitive issues, such as human rights protection (Welch, 2007) and healthcare (Lytras *et al.*, 2019) for frail and vulnerable individuals (Andreus *et al.*, 2021), requesting an adaptation of accountability practices (Tan and Enderwick, 2006) to shape the common good (Pesci *et al.*, 2020).

Several examples of this accountability practices adaptations can be found in the current literature.

For instance, Erkens *et al.* (2012) investigated how companies changed their governance and accountability practices during the 2008 financial crisis, shedding light on financial norms, standards, and procedures. Tricker and Tricker (2015) focused on how private organizations' structures adapt to crises, emphasizing the importance of corporate governance in maintaining accountability during turbulent times.

With reference to the public sector, Wang *et al.* (2021) debated how, after SARS in 2004, the Chinese central government formally promulgated policies and regulations that hold public officials accountable for their responsibilities and performance by transparently 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.

Similarly, studying the destructive effects that Hurricane Wilma produced in 2005 in the Yucatán Peninsula, Mexico, Cuba, and Florida, Atkinson and Sapat (2013) pointed out that, in exceptional situations, organizations should reduce vulnerability and increase resilience in their communities while enhancing the transparency of procedures. This confirmed how the connotation that an accountability system may assume depends on the social conditions under which relations among institutions and society are established (Sinclair, 1995).

Especially in extraordinary times, people's feelings and perceptions should be considered in accountability processes, which should address social, environmental, economic, and ethical expectations (Unerman and Bennett, 2004; Agostino *et al.*, 2020). In his study focused on the 2009 earthquake in the Italian region of Abruzzo, Sargiacomo (2015) suggested that, during extraordinary times, provisional exceptional measures must safeguard individuals through accountability processes, considering not only the reporting of damages, emerging problems, and practical solutions but also individuals' perceptions of those aspects.

2.2 Digital innovation for accountability

In our contemporary era, digital innovation poses several opportunities for accountability, making organizations more dialogic, inclusive, and pluralistic (Brown *et al.*, 2015; Manetti *et al.*, 2017). Thus, accountable agents must be aware of their responsibility, role, and task in guaranteeing accountability through digital innovation.

The concept of digital innovation is defined as a multi-dimensional process that should be grounded in a complex mix of knowledge-based social and human dimensions (Trabucchi and Buganza, 2019). The social dimension is based on the interaction of people and knowledge exchange to internalize a data-driven culture and effectively use digital technologies. The social dimension can be defined as competencies shaped by a collective culture based on the relevance of data, which can generate new knowledge to create innovation opportunities. Data orientation culture can activate the dynamic integration of knowledge among actors, which can foster the creation of new skills (human dimension) and the empowerment of human resources. The human dimension focuses on individual-level skills, such as the renewal of employees' management and research skills (hard skills), and proactive attitude and creativity (soft skills). Employees' management and research skills involve data collection and analysis, which are considered prerequisites for digital innovation. On the other hand, employees' empowerment and commitment needed for the attainment of innovation also require the activation of individuals' subjectivity and creativity (soft skills), since they are considered value-added resources for data interpretation. Thus, what is today recognized is that, even if technology is a lever for innovation, it should be integrated with knowledge management strategies to activate the capability to use data for creating and co-creating value (Visvizi et al., 2021).

While value creation and co-creation are the aspirations of most individuals, they require not only smart infrastructure – in terms of technological advancements -, but also smart people, both in terms of well-trained actors and as a cultural fabric where innovation can be supported and exploited. Despite the awareness of this broader digital innovation conceptualization, literature tends to stress merely technology rather than people skills, as well as the spread of culture based on learning and data necessary for seizing innovation opportunities (Perri et al., 2020).

Since the beginning of the new century, the gradual advancement of technology should have favored the transformation of organizations, making them more accountable, i.e. transparent, and attentive to stakeholders' problems and expectations (Ruano de la Fuente, 2014).

Despite the "dream" of a rational and perfect information seem to be still impossible (Radcliffe et al., 2017; Quattrone, 2016; Roberts, 2009), in today's society, accountability can be enhanced through digital innovation processes. Digital innovation allows for enhanced availability, richness, and usability of data, which are presumed (but not guaranteed) to favor the transparency of organizations' procedures (Maione et al., 2022), helping to articulate new forms of stakeholder involvement and participation on management issues (Secinaro et al., 2022), even more so during extraordinary times (Saint-Bonnet, 2001).

Namely, digital innovation can provide active participation tools which allow stakeholders to define how they intend to receive services and what action should be taken. Passive participation is oriented toward perceiving stakeholders' sentiments through algorithms capable of collecting online opinions (Manetti et al., 2017).

Although acknowledging the importance of digital innovation is key, this does not necessarily imply effective accountability. Extant research confirms the definition of innovation as both an outcome and a process (Kahn, 2018), where process precedes the development of outcomes. Innovation as a process refers to how organizations should encourage the development of novelties for enjoyable outcomes (Visvizi et al., 2021). Digital innovation's human and social dimension should involve the creation of new knowledge, which can enhance accountability stimulating civic interest in community issues, as well as increasing stakeholder engagement, and enabling electronic interaction with community stakeholders (Feeney and Brown, 2017; Panori et al., 2021). In remote areas, these advantages would also allow breaking down the barriers associated with distance, proximity, or mobility (Riccucci and Holzer, 2011).

The added value of these digital innovations facilitates societal problem-solving and fosters more accountability and democratic legitimacy (Nesti, 2020). Within a democratic society, the right to access services through, for example, digital platforms plays a fundamental role in the progression toward accountable organizations (Nguyen *et al.*, 2018).

Accountability literature shows a broad interest in investigating the relationship between the use of digital technology and accountability (Bertot *et al.*, 2012; Del Bene *et al.*, 2020). Despite this interest, the role of digital innovation remains under-discussed in the literature, especially considering how digital innovation, meant as a knowledge-centric and multi-dimensional process, can challenge the underlying mechanisms of accountability.

2.3 Strong structuration theory as a conceptual lens

In the disciplines of accounting and management, there is a substantial body of research that, following Stones' scientific impulse (2005), draws on SST (e.g. Kholeif and Jack, 2019; Daff and Jack, 2018; Coad *et al.*, 2015; Feeney and Pierce, 2016). Over the years, SST has strengthened its position as one of the main and most interesting schools of thought to study accounting and accountability (Mutiganda and Järvinen, 2021; Englund and Gerdin, 2014). It addresses theoretically informed qualitative research and scientific works focused on digitalization (Jack and Kholeif, 2007).

In his book "Structuration Theory", Stones developed the SST by providing a reinforced ontology to Giddens' theory, allowing for substantive empirical research by contextualizing theory. Stones argued that Giddens worked in a relatively abstract ontology, which he called "ontology in general". He then thought about "ontology *in situ*/ontic" and the reintroduction of epistemology into ST. "Ontology *in situ*/ontic" is when actions and structures are seen in concrete situations by asking "why", "where", and "what", and by understanding the habits and practices of agents. Another key element of SST is the "meso-level" ontology, where researchers can analyze the action and structure in relative terms (Stones, 2005, p. 78).

Stones (2005) also introduced the concept of the quadripartite nature of structuration, describing the following four components of the recursive relationship between structure and agency (pp. 84–85):

1. external structures, which represent the conditions – in the form of independent causal influences or irresistible external influences – that may constrain or enable an action;
2. internal structures, which are based on the agents in focus and are divided into conjuncturally-specific knowledge of external structures and general dispositions or habits;
3. active agency, which is what agents do in particular social situations; and
4. outcomes, i.e. the results of – both intended and not intended – active agency affecting structures, which could be preserved or changed.

Considering the external structures, Stones distinguished "independent causal influences", where the external structures may influence the actions of the agent in focus independently by the agent's wishes, from "irresistible external influences", where the agent in focus can resist the external influence while feeling not having the ability to do so (Stones, 2005, pp. 111–112).

Regarding the two types of internal structures, general dispositions focus on those aspects that can be used by the same agents across different situations (Greenhalgh and Stones, 2010). They include transposable elements from moral, religious, political, economic, professional, and organizational discourses and principles to cultural, esthetic, and other tastes and habitual desires. General-dispositional internal structures refer to something that

is not rigidly thought about by the agent but is fluid and assessed through a clever evaluation of the changing situations.

General dispositions include enlightenment values that diverge from those related to vested proprietorial interests. Their link to conjuncturally-specific internal structures is clear, as the latter is always perceived from a general-dispositional perspective. However, contextual specificities refer to contextualized knowledge of particular conditions of action that is oriented toward a particular job or task as it relates to the role or position that an agent or cluster of agents occupies toward external structures, considering its interpretative schemes, normative expectations, and power to mobilize authority and resources.

Contextually specific internal structures involve a hermeneutic process in which the agents-in-focus draw upon skilled knowledge to be confident of the conclusions of their agency. Conjunctural specificities are embodied over time, considering an “inner temporality” built on what the actor has done in previous situations that influences possible future actions. They cannot be easily transposed and generalized since they have contours, shapes and textures whose specificity within time and place is critical to the agent facing the external structures. The concept of conjuncturally-specific internal structures often acts as a kind of hinge between external structures, on the one hand, and general-dispositional frames and agent’s practices, on the other.

How agents draw upon their internal structures (conjunctural specificities and general dispositions) and apply them to the situations in which they operate reflects their observable behavior (active agency) and the results (outcomes) of confronting external structures (Stones, 2005, p. 100). In empirical studies, SST allows for identifying agents’ position-practices (Jack and Kholeif, 2007, p. 210), understood as “institutionalized positions, positional identities, the sense of prerogatives and obligation” (Stones, 2005, p. 63). Stones and Tangsupvattana (2012) argue that position-practices and their networks of relationships help explain events and phenomena through a “theorized contextual frame” (p. 223). Position-practice actors are assumed to be reflexively knowledgeable about their social positions and the network of practices surrounding them, as well as how agency is carried out and structures are reproduced. Position-practices “can serve as a more robust link between structure and institutionalized modes of conduct” (Cohen, 1989, p. 209). By placing practices in their societal and organizational structural contexts, SST strengthens the link between individuals and institutions by developing an ontology-in-situ and paying attention to the position-practice relations network.

The position-practice distinctive characteristic of SST permits to consider the point of view of time-space positioned agents, emphasizing external structures (i.e. digital innovation and the spread of the COVID-19 virus), in relation to specific time-space positioned agents – the agents-in-focus. This means that these structures are perceived as external by the agents-in-focus, but not from agency, allowing to analyze the relationships between structure and agency. By applying the SST, it would be possible to understand how and why the quadripartite elements of structuration (external structures, internal structures, active agency and outcomes) interact to influence accountability practices during extraordinary times. Thus, the use of SST allows for the analysis of how agents draw and act on their knowledge of structures and other agents of the network.

3. Research design

3.1 Study approaches

The perimeter of the analysis was outlined by considering the opinions of several public and private organization managers through a qualitative research design (Bryman and Bell, 2011) and an interpretivist approach (Margerison *et al.*, 2019; Parker, 2014).

This approach allows for studying the world through the subjective thoughts, ideas, and perceptions of the people involved (Chowdhury, 2014), and accessing reality via social constructs such as language, opinions, and shared meanings (Myers, 2013). A cross-sectional design was adopted through in-depth, semi-structured interviews with managers and documentary analysis (Yates *et al.*, 2019). This choice allowed for understanding the meaning of different discourses on digital innovation's role during the extraordinary COVID-19 pandemic.

Discourse includes things that are said (e.g. interviews) or written (e.g. texts) about a subject and the practices, structures, rules, and norms operating in a social context (Abdullah and Khadaroo, 2017). This work uses the SST lens to investigate accountability practices meant as the ways in which a person or an organization accounts to the society through digital innovations in an extraordinary time. In particular, our study locates accountability in both public and private sector settings when agents faced with radical changes due to the COVID-19 virus and digital innovation, which constitute the external structure respectively in terms of independent and irresistible causal influences.

The use of SST allows to understand whether and how changes in structures influence the agency of accountable actors (here the managers).

Like Mutiganda and Järvinen (2021), we followed Greenhalgh and Stones' approach (2010), which suggests conducting the position-relation analysis by investigating both the general dispositional frames of the meaning of agents-in-focus and conjuncturally-specific internal structures set within the agent's general dispositional boundaries of definition. Thus, this analysis examined the agent's internal structures.

We investigated the internal structures (both general dispositions and contextually-specific knowledge) of public and private organization managers (agents *in situ*) to understand their perception (active agency) of the capacity of digital innovation (external structure: irresistible external influences) as a knowledge-centric, multi-dimensional process in enhancing accountability (outcome) during the extraordinary time of the COVID-19 pandemic (external structure: independent causal influences).

3.2 Data collection

Interviews allowed for the capture of insights into events associated with managers' perceptions through the personal account of their individual experiences (Useem, 1993). Over the period ranging from March 2020 to April 2021, 158 potential interviewees were approached via mail and then via a purposeful "snowballing" sampling method (Jabbour and Abdel-Kader, 2016). All of them were working in Italian organizations with a number of employees between 50 and 250. 80 of these organizations work in the private sector and are profit-oriented companies while 78 of them operate in the public sector. The mailing list was drawn from secondary sources publicly available on the Forum PA online portal, a landmark in Italy concerning digital transformation, technological innovation, and modernization of private and public sector organizations.

All the interviewees were given a standard set of questions that were loosely arranged into topics to enable the logical development of the conversation. We encouraged the respondents to talk broadly about their ideas, opinions, and general thoughts (Barone *et al.*, 2013; Uche *et al.*, 2016) on digital innovation in extraordinary times. Questions evolved during the interview (Uche *et al.*, 2016). For instance, the participants were asked to comment on which sphere (moral, religious, political, economic, professional, organizational or cultural) most influenced digital innovation during the COVID-19 crisis.

The interviewees were also asked whether and how, during the pandemic, digital innovation affected their ability to account for their actions, performance and outcomes. Other questions aimed at understanding whether the managers felt that the potential of digital

innovation could be further exploited to better satisfy stakeholders' needs and expectations. Notably, we asked whether specific knowledge, a given condition, a particular action, job, role, task, or position fostered or could have enabled adequate exploitation of digital innovation.

The respondents frequently focused on particular aspects of the predetermined topics in response to our questions, and occasionally they entered a "free-form" discussion (Wilson, 2014).

To avoid conditioning the interviewees, no definition of accountability was provided, and no explicit reference to accountability was made, except for the study's title, which was revealed on the ethical approval forms (Yates *et al.*, 2019). Questions were asked conversationally (Patton, 1992; Yasmin *et al.*, 2018). The interviewees were encouraged to speak freely, as we assured them that their identities would not appear in the final version of the paper (Abdullah and Khadaroo, 2017). Having promised confidentiality (Barone *et al.*, 2013), we used numerical codes to hide the managers' identities (Uche *et al.*, 2016).

Overall, we administered 46 semi-structured interviews to the managers; 24 were public sector managers, while 22 were private sector managers (see Appendix 1). The interviews, on average, lasted about 87 min, with a minimum of about 63 min and a maximum of about 114 min. Four interviewees were re-interviewed to seek clarification where contradictions were identified or new issues emerged during the data set analysis (Margerison *et al.*, 2019).

To triangulate the data collected (de Villiers and Molinari, 2021; Andreaus *et al.*, 2021), in addition to interviews, information was also drawn from documentary sources (Appendix 2). Documentary evidence is crucial to understanding the context surrounding the investigated phenomenon and the stakeholders' context (Biondi and Lapsley, 2014; Barone *et al.*, 2013), amplifying the insights from other data collection techniques. Initially, the documents were used to learn about the respective managers' organizations' cultures, norms, and values. The documentary analysis also assisted in the formulation of the interview questions and helped to build a relationship with the participants.

3.3 Data analysis

The NVivo software package was used to gather, sort, and catalog the interview transcripts, notes, and documentary evidence for the analysis. The data were also reported into a purpose-designed Microsoft Excel spreadsheet containing information on each manager interviewed, i.e. name, surname, role, level, organization's sector (public or private), interview duration (in minutes), and some significant extracts, which we defined by selecting quotes where the participants talked about digital innovation's role in enhancing accountability in extraordinary times.

The interviewees were categorized by their organization's sector to ensure that different perceptions could be unfolded. Then, we discarded those interview extracts falling outside the research scope by investigating the dynamics of the analysis of who said what, why, where, when, and with what consequences regarding the link between digital innovation and accountability (Englund and Gerdin, 2014). The data were analyzed on a thematic basis (Crabtree and Miller, 2022). The themes were extrapolated from the data and then used to draft a coding template. Such a template summarizes the key themes in a meaningful and helpful format.

The coded data were then screened through narrative analysis techniques, which included finding similarities and differences, looking for recurring themes and patterns, and making notes of significant keywords and expressions (Yasmin *et al.*, 2018). Given the nature of the topic, it was essential to address any issues that arose during the interviews on an ongoing basis (Adler *et al.*, 2003). To enable further exploration of any emerging themes in

subsequent interviews (Miles and Huberman, 1994), we conducted the data analysis not only at the end of the data-gathering phase but also after the first five interviews and alongside the overall data collection process. We considered each interview as a “case” for the text transcription and qualitative content analysis.

Detailed handwritten notes supported data gathering (Uche *et al.*, 2016). The content of the interviews was replayed, *verbatim* transcribed in the original language (i.e. Italian), read several times, and finally interpreted according to SST. Only the relevant quotations were translated into English. Each author drafted a report autonomously (Patton, 2002) by following a detailed protocol (Neimeyer *et al.*, 1983; Rosenberg *et al.*, 1990) that was developed according to SST. This protocol helped us screen, evaluate, and put together the interviews.

In the case of any divergences, we thoroughly reviewed and discussed the findings to reduce discrepancies, guarantee the homogeneity of interpretation, and reach a scientifically significant agreement. The document source analysis supported the review and helped dispel any doubts. The investigation resulted in a summary of the critical issues in the data set and a comparison among the responses (de Villiers and Molinari, 2021).

4. Findings and discussion

In this section, the findings are presented and discussed to show and explain how we addressed the research question. Despite knowing that the examination of any agent’s internal structures is complex since it involves labeling something that is entirely subjective (Feeney and Pierce, 2016, p. 1164), we provide through an interpretivist approach which kind of internal structure prevails in the public and private sector managers’ positions-practices in extraordinary times.

To distinguish the different actors’ quotations, each sentence or extract is expressed through a sequential numbering system, which refers to the interview responses of the private and public sector managers listed in Appendix 1.

4.1 Public sector managers’ position-practice

The analysis of the public sector managers’ responses revealed a highly perceived need to create cultural discontinuity with the past in digital transition processes to enhance accountability. Interpreting this finding according to SST leads to guessing that, in extraordinary times, public sector managers’ positions-practices tend to be mainly unfolded through general-dispositional internal structures (Stones, 2005). In particular, our analysis highlights that public sector managers mainly focus on the social dimension of knowledge, which in our case can be conceptually framed as the need to indulge in new competencies shaped by collective culture (Daff and Jack, 2018). The outbreak of the COVID-19 pandemic as an extraordinary event emphasized the urgency to modernize public organizations, contributing to breaking down some cultural barriers while also fostering accountability.

By interpreting the interviews in light of SST suggestions, the general-dispositional internal structures became even more evident when the public sector managers referred to their views, values, and beliefs about the future of digital innovation (Daff and Jack, 2018):

“Socio-economic recovery requires a cultural transition in which stakeholders feel that public sector organizations serve the community. The key to this cultural change is the enhancement of personnel for new organizational paths” [37]. “In improving the processes of public sector organizations, technologies are insufficient and we need to put people at the center” [7].

New governance models seemed to be needed to outline policies capable of seizing and exploiting the potential of digital innovation according to more inclusive cultural and interpretive schemas (Daff and Jack, 2018):

"New schemas should contemplate digital technology not as a mere tool but as an enabling factor for cultural change" [31]. "It is easy to make the mistake of believing that only the availability of new technologies fosters organizational change [...] However, to shape a conscious and participatory social reality [...] it is necessary to reorganize cultural processes [...] by calling into question the old models of service delivery to stakeholders" [15].

Notwithstanding some personal considerations, in the answers provided, certain concepts such as transparency, responsiveness, and compliance – i.e. the core dimensions of accountability (Bovens, 2014) – emerged as a general-dispositional internal structure. According to the interviewees' prevailing orientation:

"[...] public organizations need transversal governance models defining who is responsible for the decision made [...] and this should also consider the need to improve the communication with both internal and external stakeholders" [10];

"We must remember that technologies in terms of social media, clouds, big data and so on are important to innovate, but real change is cultural, organizational, political, and economic" [35].

This statement helps understand what Stones (2005) meant when referring to general dispositions as a comprehensive worldview, including social orientations, behavioral patterns, and culture as discourse. All these features are integrated into the general-dispositional frame, where purposes are understood as flexible and evaluated in response to changing circumstances (Coad *et al.*, 2016):

"Only by changing the old logic of governance will it be possible to bridge the digital gap that the public sector has accumulated over the years [...] and simplify access to services by stakeholders [...] We need to abandon the opportunistic logic of thinking of one's own interests and espouse a broader vision that pursues the wellbeing of the whole community" [40].

The internal structure of a cultural change should be typified (Feeney and Pierce, 2016). In this sense, cultural planning is fundamental not only in creating a digital structure that guarantees network access to all stakeholders but also in managing the changes that some emerging practices are triggering, e.g. remote working. Remote working is changing stakeholders' general-dispositional internal structures, favoring the development of new habits that can foster accountability:

"Remote working has accustomed people to reconsidering accountability, opening significant cultural changes regarding two main aspects. The former is overcoming the fulfillment logic, i.e., the need to focus on performance and start working by processes, valorizing the public employee's work. The latter is the public workers' productivity, which needs to be supported by digitalization" [45]. "Remote work is one of the most obvious examples of cultural discontinuity in the world of work caused by the pandemic" [22]. "The next step is the transition from remote work to smart working by exploiting the flexibility of the technology to be more effective" [35]. "Due to the health crisis, which can be understood as an accelerator of ongoing trends, we surprisingly found out how performing remote management is easy" [38].

A new cultural approach aimed at consolidating the innovation-accountability combination by stimulating the spread of digital culture in the public sector should take shape as a conceptual substrate to seize the opportunities deriving from the complex transition toward digitalization. The findings highlight the need for conceptual thickness, depth of analysis, and strategic vision that are not limited to acquiring purely technical skills (Visvizi *et al.*, 2021):

"Although in the extraordinary period of the pandemic, a great step forward has been taken towards the culture of results" [30], "a true cultural change cannot be based only on the use of digital platforms. We must learn to work with data and by objectives" [42].

In this sense, the competencies shaped by the digital culture of public organizations cannot be declassified as a mere sum of technical notions. Still, they should interpret the

complexity, depth, and interrelationship of the systems that manage contemporary society (Nooteboom, 2000). The mere acquisition of skills seems unsatisfactory since the evolution of digital platforms makes every competence obsolete after a few years or even months, providing benefits for an increasingly shorter period (Ozlanski *et al.*, 2020). Following a strategic-cultural approach centered on a wide-ranging and long-lasting vision is essential. Competencies shaped by digital culture represent a profound theoretical basis favoring progress with full awareness of expediencies and threats. Therefore, to be perceived as accountable in the stakeholders' eyes, organizations are called upon to embrace a new pervasive and all-encompassing mindset to exploit the potential of digital innovation.

4.2 Private sector managers' position-practice

The analysis of the private managers' responses highlighted that, during an emergency period, accountability depends on learning by doing (Senge, 1990). This calls for a shift to enabling digital innovation skills, i.e. the knowledge of how to become aware of and exploit digital innovation's potential. Interpreting this finding according to SST suggests that, in extraordinary times, private managers' positions-practices tend to be mainly unfolded through the conjuncturally-specific internal structures of a time-place situated setting (Stones, 2005). Our analysis highlights that private sector managers primarily aim at the human dimension of knowledge. This result can be conceptually framed as experiencing skills through an individual's learning by doing, which reflects how the agents perceive their external terrain from the perspective of their role or task (Feeney and Pierce, 2016).

The findings confirm that pursuing digital innovation objectives does not mean being accountable, as acquiring the appropriate skills in the field is needed (Trabucchi and Buganza, 2019). The shared opinion that emerges from the interviews suggests that:

"To implement and enable digital innovation, it is necessary to provide for conscious development in terms of people's training, on the part of both organizations and stakeholders [...] New contextualized uses of digital innovation are needed" [4].

Our analysis shows that, for private sector managers, conjunctural specificities prevail over general dispositions in fostering accountability.

By pooling theoretical skills and contextual digital knowledge, these contextualized uses would allow for the definition of more effective accountability strategies. Interestingly, as in the case of public sector managers, the reference to remote working also emerged in the interviews administered to private sector managers. However, the latter understood it as a practice capable of changing conjuncturally-specific internal structures (and not as general dispositions as for public sector managers), fostering learning by doing, and developing skills and contextual knowledge (and not new habits as public sector managers stated):

"The remote working that the government's restrictive measures imposed during the extraordinary time of the COVID-19 pandemic underlined the need to invest in transversal digital innovation skills that can enhance the approach to organizational change" [3]. To be accountable, "[...] it is necessary to invest in training, retraining, and professional change" [13]. In this sense, the common thinking of the private sector managers interviewed considers remote working as "[...] a structural and not a temporary organizational solution, which requires further investment to enable the acquisition of knowledge through learning by doing to adequately foster digital innovation" [21].

The exploitation of contextual knowledge in fostering digital innovation allows for the consolidation of the organizations' capacity to cope with extraordinary times, improving data collection and information disclosure, while also ensuring accountable public service provision (Moser-Plautz and Schmidhuber, 2023). The availability of pragmatic digital knowledge allows for avoiding negative performance resulting from the incompetent implementation of digital innovation, which reduces accountability:

"If we had not received the necessary practical training in the past, the pandemic would have been a much more difficult time to deal with in terms of accountability" [36].

Digital innovation skills emerge as critical to enhance accountability (Velez-Arocho *et al.*, 2018), while they also help improve organizational performance (Gong *et al.*, 2020). Digital contextual knowledge simplifies organizational procedures (De Vito and Gómez, 2020), contributing to minimizing uncertainty regarding the transparency of procedures and the possibility to address managers' responsibilities (Welch, 2007):

In many cases, "[...] to the need for simplicity, we responded with simplism[...] From now on, we need to focus on the content to be disclosed and on the methods of disclosure to be used" [4] to conduct accountability processes that "[...] aim to engage stakeholders, not just by transmitting data but by weighing the impact that each message produces on them" [4].

Accountability should be considered a collaborative tool that can affect society as a whole (Taylor *et al.*, 2014):

"The pandemic highlighted the need to enhance the system of data collection and information disclosure" [11]. However, "[...] to be able to concretely respond to stakeholders' needs, it is necessary to concretely know how to plan and develop digital skills, especially to support decision-makers" [1].

The next challenge will be to develop more contextualized digital knowledge capable of enabling and bringing stakeholders closer to organizations already in the service design phase, rather than dropping a given technology into already defined innovation processes, which often do not respond to the accountability logic:

"It will be crucial to invest in digital training and education". In this regard, "the keyword is 'capacity building', through which we will tackle problems such as digital knowledge poverty" [2]. "The implementation of post-pandemic change needs more attention to human capital and practical skills development" [19].

Digital skills are as important as technological infrastructure and specific learning experiences:

"Italy is among the first countries in terms of 5G development, with a good spread of broadband. However, we are lagging in terms of digital knowledge and education. To close this gap, we need to recalibrate the educational asset of schools and universities and offer training and refresher courses to workers" [18]. "Digitalizing is not enough without the right skills" [9].

Investments in technological infrastructure and education for the development of up-to-date and timely digital innovation skills must involve not only organizations but the entire community. Only in so doing, the skills, such as conjuncturally-specific internal structures, can be acquired and embodied over time, since there is an inner temporality within the agents-in-focus' knowing about what the agent-in-context is likely to do (Urry, 2000):

"Considering the great potential that digital innovation proved to offer in emergency, it is not possible to further delay a skills upgrade" [5]. "One must start with an awareness of current skills and develop the knowledge that may be needed to make the most of this potential, not only in an emergency period" [9].

This statement confirms that, when the agents-in-focus draw upon their conjuncturally-specific internal structures, through a hermeneutic process, they tap into deep and detailed knowledge to be confident of the conclusions of their agency (Mutiganda and Järvinen, 2021). Although ensuring rational and perfect information is a utopia (Radcliffe *et al.*, 2017; Quattrone, 2016; Roberts, 2009), pragmatic skills allow for sharing ideas and dialogue (Secinaro *et al.*, 2022), increase stakeholders' participation, detect their expectations and foster new contextualized learning paths to cope with extraordinary times:

“We need to move away from the rhetoric that digital innovation is only achieved through the use of new software and hardware, when instead there is a need for a process of accompaniment to change, also during emergency periods” [14] “[...] based on the development of concrete digital skills” [17], also “[...] through training courses for organizations that lead to certifications” [19].

5. Conclusions

Our analysis suggests that digital innovation is crucial for enhancing accountability (Schillemans *et al.*, 2013; Velez-Arocho *et al.*, 2018) in extraordinary times (Maione *et al.*, 2022; Moser-Plautz and Schmidhuber, 2023). The findings also highlight that, in extraordinary times, while public sector managers' positions-practices tend to be primarily unfolded through general-dispositional internal structures – which are here conceptually framed as the competencies shaped by culture –, private sector managers focus on conjuncturally-specific internal structures – which are here conceptually framed as the skills gained through learning by doing. These two knowledge development processes have been identified as key for increasing transparency, so that stakeholders can exert more effective control over organizations' moves, by facilitating greater access to services and using new ways for gathering and utilizing data. Accountability also depends on the capacity to learn, acquire, and put into practice skills to perform digital innovation tasks (Moser-Plautz and Schmidhuber, 2023). These skills turn out to be critical to enhancing accountability (De Vito and Gómez, 2020; Velez-Arocho *et al.*, 2018), while also helping to enhance performance (Gong *et al.*, 2020), reducing uncertainty regarding the transparency of procedures and managers' responsibility (Welch, 2007), and bringing stakeholders closer to organizations.

Considering these findings, this study intends to provide both theoretical and practical implications.

As a theoretical contribution, the paper enriches the accountability literature by contextualizing SST in extraordinary times and applying a multi-dimensional approach to digital innovation.

The SST framework allowed for unpacking the complex relationships and structuration processes in nuanced ways, namely, the role of the internal structures of managers' witnesses in the digital innovation's implementation for accountability during the COVID-19 pandemic. Through SST, we analyzed these complex relationships and structuration processes at an “ontology *in situ*/ontic” level – i.e. in concrete situations – (Jack and Kholeif, 2007) to foster the understanding of managers' (agents) dispositions and practices. Contextualizing SST allowed focusing on active agency, investigating in detail the communications, actions, and power (Englund and Gerdin, 2014) that managers use in embedding accountability (Rinaldi, 2022), as well as their understanding of the conditions of action.

To clarify the managers' perception of the difference between general dispositions and conjunctural specificities, SST also allowed the outlining of the main internal structures that prevail in the public and private sector managers' position-practices (Kholeif and Jack, 2019; Coad *et al.*, 2015). Even if Giddens' work implicitly recognized that between the two kinds of internal structures there is no clear distinction as they are often conflated (Stones, 2005), we consider this distinction indispensable for SST dealing with ontology-in-situ, directed at the ontic and at questions of “which” structures and “what” agencies (Stones, 2005, p. 90). Such a distinction also draws attention to the fact that there are likely to be significant differences – despite overlaps – between how the two types of internal structures come to be constituted (Mutiganda and Järvinen, 2021).

While empirically filling the lack of attention paid in current literature to the relationship in extraordinary times between digital innovation and accountability, our study also indirectly

contributes to broadening the meaning of the latter (Rinaldi, 2022). We investigated the perception of accountability mechanisms by involving public and private sector managers, by examining the extent to which they are aware of their responsibilities, roles, and tasks in implementing digital innovation to enhance accountability in extraordinary times.

As a practical contribution, the paper highlights knowledge development processes to be handled to foster accountability considering different organizational settings' needs (public vs private). It identifies the need to spread cultural-based competencies (as public sector managers' general-dispositional internal structures) and the need to shift to learning by doing skills (as private sector managers' conjuncture-specific internal structures). Shaping new cultural schemas by exploiting the potential of digital innovation would entail a modernization of organizations, making them more accountable, not only in extraordinary times.

Based on the evidence from this analysis, it is possible to identify specific strategies organizations could usefully adopt to improve accountability through digital innovation in the public and private sectors during extraordinary times, increasing transparency, efficiency, and organizational effectiveness.

For example, given that public sector managers appear focused on the social dimension of knowledge, which is considered essential for the effectiveness of public policies at critical times (Daff and Jack, 2018), public sector organizations could promote a digital culture that enhances collective expertise and knowledge sharing. Contextually, it could prove useful to implement governance models that improve transparency, internal and external communication, and stakeholder engagement, which are essential for effective management in times of crisis (Lynn, 2006).

On the other hand, as private sector managers focus on individual skills acquired through hands-on learning, which are critical for innovation and adaptability (Trabucchi and Buganza, 2019), private sector organizations might decide to invest in training programs to develop individual digital skills. At the same time, it could be fruitful to integrate operational feedback systems to drive organizational innovation and adaptability, as the use of specific and contextualized feedback would enable improved performance and accountability.

Nevertheless, research limitations are present. This study's perspective is primarily managerial, which might overlook the experiences of other organizational members or service users. However, this opens to future research avenues, as the possibility to incorporate quantitative data and expand the study to include organizations from different countries, which could enhance the generalizability of the findings.

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Appendix 1

Table A1. Interview data

<i>Code</i>	<i>Sector</i>	<i>Scope</i>	<i>Level</i>	<i>Position</i>	<i>Interview length (nearest minute)</i>
1	Private	IT	National	Information system director	81
2	Private	Banking	National	Programme officer	81
3	Private	IT	Regional	CEO	90
4	Private	Healthcare	Municipal	Communication and policies coordinator	111
5	Private	IT	National	Marketing director	81
6	Public	IT	Municipal	Programming director	105
7	Public	Healthcare	Regional	ICT engineer	90
8	Public	Tourism	National	General director	81
9	Private	Electricity	National	Marketing manager	105
10	Public	IT	Municipal	Digital transformation director	99
11	Private	IT	Municipal	President	99
12	Public	Healthcare	Metropolitan	General director	93
13	Private	Transportation	Metropolitan	General director	84
14	Private	Tourism	National	External relations and privacy director	90
15	Public	Education	Municipal	School director	87
16	Public	Transportation	Municipal	Human resource director	102
17	Private	IT	National	Country manager	84
18	Private	Finance	National	General manager	84
19	Private	IT	National	Country manager	78
20	Public	Education	National	Human resource director	99
21	Private	Healthcare	Regional	President and CEO	78
22	Public	IT	Regional	Director	111
23	Public	Communication	National	General manager	105
24	Private	IT	Municipal	CEO	84
25	Public	Finance	National	General manager	96
26	Private	Insurance	National	Country manager	66
27	Private	Tourism	National	General manager	114
28	Public	Transportation	Metropolitan	Digital transformation director	108
29	Public	Education	National	Research manager	108
30	Public	Education	National	Director	96
31	Public	IT	Municipal	Social service and IT director	75
32	Public	Communication	Metropolitan	Human resource director	84
33	Private	IT	National	Certification service director	66
34	Private	Energy	National	CEO	66
35	Public	IT	National	Informative system director	78
36	Private	IT	National	CEO	72
37	Public	IT	Regional	Human resource and IT director	63
38	Public	Education	National	Research director	96
39	Public	Finance	Regional	Project manager	72
40	Public	Trade	National	IT director	66
41	Public	Agriculture	National	IT director	81
42	Public	IT	National	Digital transformation director	81
43	Private	IT	National	CEO	75
44	Private	Consulting	Regional	General manager	102
45	Public	Finance	National	Director	72
46	Private	IT	National	General manager	69

Source: Authors' elaboration

Appendix 2

Table A2. Document analysis data

<i>Document</i>	<i>Disclosure type</i>	<i>Organization sector</i>	<i>Audience</i>	<i>Quantity</i>
Code of ethics	Voluntary	Private	Internal	22
Code of conduct	Voluntary	Private	Internal	20
Annual financial statements	Mandatory	Private/Public	Internal/External	46
Consolidated balance sheet	Mandatory	Private/Public	Internal/External	7
Balance sheet	Mandatory	Private/Public	Internal/External	46
Sustainability report	Voluntary	Private	Internal/External	19
Strategic plan	Voluntary	Private/Public	Internal/External	15
Socio-Economic plan	Voluntary	Private/Public	Internal/External	7
Ministerial decree	Voluntary	Public	External	3
Ordinance	Voluntary	Public	External	2
Resolution	Voluntary	Public	External	3
Directive	Voluntary	Public	External	5
Development and cohesion plan	Mandatory	Public	Internal/External	4
Anti-Covid19 Vaccination Campaign Plan	Voluntary	Public	External	10
Transparency and corruption prevention plan	Mandatory	Public	External	6
Press release	Voluntary	Public	External	21

Source: Authors' elaboration

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