Technological Forecasting & Social Change 224 (2026) 124508

Contents lists available at ScienceDirect

Technological Forecasting & Social Change

journal homepage: www.elsevier.com/locate/techfore

Relational coordination in medical work: The role of digital health practices

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ARTICLE INFO

Keywords:
Relational coordination
Digital technologies
Sociomateriality
Coordination
Healthcare

ABSTRACT

The increasing specialization of medical work has amplified the complexity of coordination among healthcare professionals, making its effectiveness a persistent challenge. Digital health technologies – including telemedicine, electronic medical records and generative artificial intelligence – have been introduced to facilitate coordination, yet their impact on relational coordination remains debated. While some studies highlight their potential to enhance structured communication and information sharing, others point to risks such as communication silos, depersonalization and cognitive overload. This study integrates Relational Coordination Theory with the sociomateriality paradigm to examine how digital health practices shape relational coordination among healthcare professionals. Leveraging survey data from a sample of Italian specialist doctors, we analyze the effects of distinct digital health practices (quantification, connectivity and instantaneity) on relational coordination. Our findings reveal that digital health practices exert heterogeneous effects. Consulting and collaborating at a distance through telemedicine positively influences relational coordination, whereas monitoring and visualizing patient data may introduce complexities rather than improving coordination. The role of EMRs and generative AI appears more ambiguous, with mixed evidence regarding their capacity to sustain relational coordination. These findings underscore the need to further understand how digital health practices are integrated into clinical work and their implications for coordination processes.

1. Introduction

The growing specialization of medical work has brought significant advances in diagnosis and treatment (Barlow, 2016; Kahouli et al., 2024), while simultaneously introducing new challenges for the coordination of care (Bailey et al., 2020; Gittell et al., 2000). As responsibilities become more distributed across professionals, effective collaboration is required to manage interdependencies and ensure continuity in patient care.

In response to these challenges, the principles of coordinated and integrated care have gained prominence in health systems around the world (Campbell et al., 1998; Sinn et al., 2022). Integrated care refers to the deliberate organization of services, information and responsibilities across different roles, professional groups and care settings, with the aim of reducing fragmentation and ensuring that patients receive appropriate, continuous and coherent care (Campbell et al., 1998; Liberati et al., 2016; Melchiorre et al., 2018). Consider, as an example, the case of an elderly patient managing multiple chronic conditions such as diabetes, hypertension and early-stage dementia. Coordinated care, for this patient, may involve input from a general practitioner, an endocrinologist, a neurologist, a home care nurse and a social worker. Aligning their contributions around shared treatment goals, medication plans and follow-up routines highlights the operational complexity that integrated care seeks to address (Blanken et al., 2023; Campbell et al., 1998).

Despite strong policy interest and reform initiatives, the implementation of coordinated care remains uneven. One persistent difficulty lies in the increasing fragmentation of medical expertise. The number of recognized medical specialties has expanded markedly over the past century,[1] driven by scientific advancement and technological innovation. While this expansion has deepened knowledge in specific domains, it has also introduced barriers to collaboration, as professionals may rely on divergent terminologies, clinical routines and organizational cultures (Currie and White, 2012; Muzio et al., 2020). Without deliberate efforts to support shared understanding and joint decision-making, specialization can hinder rather than support the collective delivery of care.

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[1] Source: https://careersinmedicine.aamc.org/ (last checked on June 19th, 2024).

https://doi.org/10.1016/j.techfore.2025.124508
Received 25 May 2025; Received in revised form 6 November 2025; Accepted 18 December 2025
Available online 2 January 2026

The digitalization of healthcare has further transformed these coordination dynamics by reconfiguring communication practices and redistributing work across professionals (Barrett et al., 2012). Digital health technologies are now deeply embedded in clinical routines and their influence on professional interaction has become a focal point of scholarly inquiry (Balta et al., 2021; Mauro et al., 2024; Sestino and D'Angelo, 2023; Wang et al., 2021). Technologies, such as telemedicine (Arenas Gaitán and Ramírez-Correa, 2023; Lu et al., 2021), Electronic Medical Records (EMRs) (Zuo et al., 2021), and Artificial Intelligence (AI) (Irgang et al., 2025; Moriuchi, 2025), do not simply support communication but also reshape relational structures, workflows, and even professional hierarchies (Bailey et al., 2020; Barrett et al., 2012; Hinds and Bailey, 2003). Recent advances in AI-enabled infrastructures, such as federated learning, are further extending these transformations, enabling distributed model training across institutions while preserving data privacy, and creating new forms of coordination among clinicians, hospitals, and digital platforms (Abbas et al., 2024).

To better understand how these technological and organizational transformations affect healthcare delivery, it is helpful to consider how coordination unfolds at the relational level. In this regard, a growing body of research has drawn on Relational Coordination Theory (RCT) (Bolton et al., 2021; Gallego Sánchez et al., 2021; Gittell, 2000a, 2006, 2011): a framework originally developed in the context of high-pressure work environments, such as airlines, and later extensively applied to healthcare settings (Bolton et al., 2021; Gittell, 2002; Gittell et al., 2000, 2008; Olive et al., 2024).

RCT posits that coordination depends on relationships characterized by shared goals, shared knowledge and mutual respect, which in turn support frequent, timely, accurate and problem-solving communication (Gittell, 2000a). Research has demonstrated that high levels of relational coordination improve clinical outcomes, yet the growing reliance on digital tools raises questions about whether and how these relationships are maintained or disrupted (Bolton et al., 2021; Claggett and Karahanna, 2018; Olive et al., 2024).

Prior research offers mixed evidence on the role of digital technologies in coordination. Some studies indicate that digital tools streamline workflows and support remote interaction, thereby enhancing coordination (Gittell, 2000b; Olive et al., 2024; Watterson et al., 2020; Zammuto et al., 2007). Others point to risks such as communication silos and depersonalization (Jakobsen et al., 2018; Schölmerich et al., 2014; Solberg et al., 2014). These divergent findings suggest that the mechanisms through which digital technologies shape relational coordination remain insufficiently understood. A core unresolved question is therefore: *what is the effect of using digital technologies, within coordinated processes, on relational coordination among doctors*? The novelty of our research lies in how we approach this question. In fact, to provide a different and complementary perspective, our effort was to combine RCT with the sociomateriality paradigm (Orlikowski, 2007). By integrating these frameworks, we aim to explore not just the structural aspects of coordination but also how digital technologies and social practices are intertwined in shaping relational coordination (Cooren, 2018).

To understand the logic of this combination, a step back must be taken to examine the core assumptions of RCT. The original formulation of this theory focuses on the design of coordination mechanisms (including digital technologies) as a means to achieve a virtuous relational coordination (Gittell, 2002). According to this view, "*the way the coordination is carried out (e.g., what is transmitted, who receives the information, when they receive it) is often predetermined and embedded in the technology*" (Claggett and Karahanna, 2018, p. 704). In other terms, this perspective assumes that, to support relational coordination, with a substantialist and normative view, you must properly design digital technologies. However, this overlooks how users interact with and adapt these technologies in practice, which is a central concern of sociomateriality (Orlikowski and Scott, 2008).

Focusing on how people appropriate, make sense of, use and speak about technologies (Robichaud and Cooren, 2013), sociomateriality provides a complementary view to the 'design of coordination' perspective. A view that changes the focus from the features of digital technologies to the practices that workers perform when using them (Orlikowski, 2007). Sociomateriality suggests that technology and human action are mutually constitutive, and cannot be understood in isolation (Cooren, 2020).

We ground our elaboration on empirical data, through a quantitative, exploratory approach (Forza, 2002, p. 200). In particular, we test the effect of various sociomaterial practices of digital health (Marent and Henwood, 2023) on relational coordination, measured according to Gittell's original formulation (Gittell, 2006). We relied on survey data from a sample of Italian doctors. Moreover, we specifically consider three digital health technologies: generative AI, telemedicine and EMRs.

Focusing on sociomaterial practices associated with these technologies, our objectives are to determine: (i) whether digital health practices have an effect on relational coordination and, if so, (ii) whether different practices, even when associated with the same 'material' technology, have distinct effects on relational coordination, or (iii) whether, conversely, similar practices, associated with the use of different material technologies, do not show significantly different effects on relational coordination.

Through this research, we aim at contributing to RCT through theoretical development: starting from recognizing that RCT, in its current use, does not provide a complete understanding of the phenomenon under investigation, we revisited the foundational assumptions of this theory and made a 'shift' (Okhuysen and Bonardi, 2017) by applying the lens of sociomateriality. We argue that the 'traditional' perspective on relational coordination helps explaining 'one side of the coin' of the impact of digital technologies on coordinated processes, particularly when professional work is involved. Combining sociomateriality with RCT allows us focusing on the practices that workers perform with digital technologies, thereby providing lenses to understand the theoretical foundations of relational coordination.

2. Theoretical background

2.1. Relational coordination theory

RCT proposes a relational perspective to explain coordination (Gittell, 2000a). Relational coordination is the main concept of this theory, consisting of a "mutually reinforcing process of communicating and relating for the purpose of task integration" (Bolton et al., 2021). This concept reflects the value of the quality of communication among individuals or groups in coordination processes, in terms of frequent, timely, accurate and problem-solving-focused communication (Gittell, 2002). High-quality communication is supported by (and, vice versa, supports) high-quality relationships, based on shared goals, shared knowledge and mutual respect (Gittell, 2016).

According to RCT, the effectiveness of coordinated work does not directly depend on coordination mechanisms, traditionally meant as the organizational arrangements through which collective performance is achieved (Mintzberg, 1993). In fact, "as opposed to coordinating mechanisms, which are structures that either facilitate interaction or reduce the need for it, relational coordination represents the process of interaction itself" (Gittell, 2002, p. 1423). In other terms, by putting relationships at the center, RCT argues that interactions among individuals may be understood as the 'process' through which coordination unfolds, while coordination mechanisms, such as shared technologies, are organizational arrangements facilitating or hindering these interactions. This perspective underscores that, while tools and structures are important, it is the quality of relationships that truly drives effective coordination (Gittell, 2002).

Consequently, in addition to conceptualizing relational coordination, RCT introduces two other propositions. The first one is that virtuous relational coordination leads to better performances: when

high-quality communications reinforce high-quality relationships (and vice versa), groups tend performing better. For instance, Gallego Sánchez et al. (2021) examined online university systems and found that the use of ICT improved relational coordination among students and faculty, ultimately enhancing the quality of education. There is copious evidence confirming this claim, especially in the healthcare domain (e.g., Cramm and Nieboer, 2012; Gittell, 2000a, 2016; Hustoft et al., 2018; Lenz and Sarens, 2012).

Secondly, relational coordination can be supported (or undermined) by 'cross-cutting' organizational arrangements (Bolton et al., 2021), which are any kind of structure or practice that affects interdependent work, including coordination mechanisms and, as such, 'shared information systems' (Bolton et al., 2021; Olive et al., 2024). A graphical representation of the theory is provided in Fig. 1:

This research focuses on the left part of Fig. 1. Digital technologies can affect relational coordination (Bolton et al., 2021) as they affect visibility, proximity and accountability (Okhuysen and Bechky, 2009). However, evidence of the effect of digitalization on relational coordination has been scarce and contradictory (Bolton et al., 2021; Olive et al., 2024). For instance, in Gittell (2000a), the use of an IT system in the management of flight departures was detrimental to relational coordination, as it reduced interpersonal contact. Nonetheless, Olive et al. (2024) found that the use of teleconsultation among doctors has a positive effect, by providing structure to team communications. Similar results were found on electronic health records in the study by Watterson et al. (2020). These contradictory findings highlight a gap in understanding how digital technologies truly impact relational coordination, suggesting the need for further investigation.

Claggett and Karahanna (2018) tried to explain the roots of these contradictions. They base their claim on the distinction between two components of coordination mechanisms: actor selection vs. content delivery, and structured vs. unstructured coordination mechanisms (Claggett and Karahanna, 2018). This further distinction allowed them to argue that: (i) in cases of coordination mechanisms that involve unstructured actor selection, high levels of relational coordination improve the selection of the actor(s) through high-quality relationships; (ii) in cases of coordination mechanisms that involve unstructured content delivery, high levels of relational coordination improve content delivery through high-quality relationships (Claggett and Karahanna, 2018).

2.2. Sociomaterial practices of digital health

Sociomateriality scholars argue that the social and the material are inherently entangled in organizational life, meaning that technology and human action cannot be meaningfully separated (Orlikowski and Scott, 2008). According to this paradigm, previous studies on technology in organizations had disregarded materiality (Barad, 2003) or focused on the diffusion and use of technologies (e.g., Barley, 1986; Rogers, 2003; Sproull and Kiesler, 1991). Focusing on the features of technologies bounds these artifacts to something 'other' than the organization, which is occasional and incidental (cf. Orlikowski, 2007).

Sociomateriality, instead, acknowledges that "there is no social that is not also material, and no material that is not also social" (Orlikowski, 2007, p. 1437). Through this perspective, in studying organizations, the focus is on how people appropriate, make sense of, use and speak about technologies (Cooren, 2020). Within this view, the notion of entanglement (Orlikowski, 2007; Orlikowski and Scott, 2014) specifically posits that there is no separation between entities that have inherent, independent properties. This perspective allows understanding how technology and social practices are co-constitutive, shaping and being shaped by each other in organizational contexts.

Cooren (2018, 2020) has recently proposed a reviewed perspective on sociomateriality, recurring to the lenses of the communicative constitution of organization view (McPhee, 2004; Schoeneborn, 2011; Taylor et al., 1996). Instead of entanglement, Cooren proposes to discuss materiality and sociality in terms of 'properties', which characterize (at least, to some degree) everything and everyone. Assuming that everything and everyone have a social dimension, this approach emphasizes that technologies acquire meaning and function through their use in social practices.

Assuming the lens of sociomateriality changes the discourse around digital technologies in healthcare settings. The term 'digital health' is used by practitioners to describe a variety of technologies that are employed by health professionals or patients for health-related purposes. Through the lenses of sociomateriality, Marent and Henwood (2023) conceptualized digital health as "*sociomaterial practices that process manifold forms of quantification, connectivity, and instantaneity and involve reconfigurations of knowledge, relationships, and control that are important analytical foci to understand digitalisation processes*" (p. 39). This conceptualization, as explicitly stated by the authors, originates from Barad's (2003, 2007) relational ontology and agential realism, coherently with Cooren's (2018, 2020) view. This ontological stance treats the

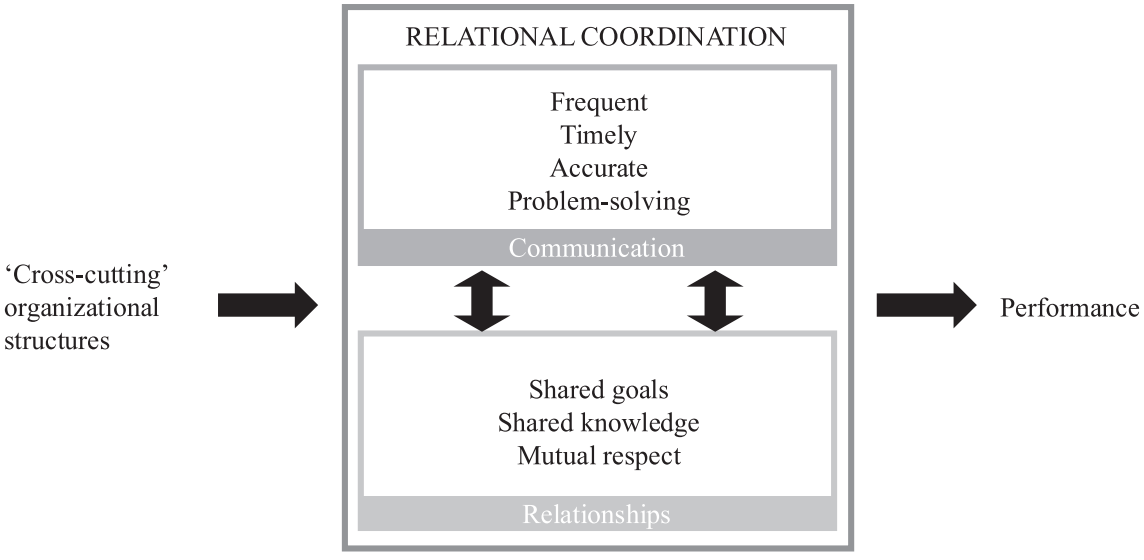

Fig. 1. RCT framework.
Source: authors' elaboration on Bolton et al. (2021) and Gittell (2006).

functionalities of digital health technologies not as 'given' or fixed, but rather as emerging from the interactions between technology and users (Cecez-Kecmanovic et al., 2014). Therefore, sociomaterial practices of digital health 'actualize' the possibilities of the technology in their situated meanings (Marent and Henwood, 2023; Pickering, 1995).

Shifting the focus from technological artifacts to the practices through which they are enacted, digital health can be understood as comprising three interrelated sociomaterial practices (Marent and Henwood, 2023).

The first is *quantification*, which involves creating, collecting and organizing health-related data that make aspects of care measurable, visible and comparable across contexts. Through quantification, digital tools generate shared informational spaces that can enhance transparency but may also introduce new forms of surveillance or standardization.

The second practice is *connectivity*, referring to the maintenance of professional interaction across spatial, organizational or temporal boundaries. Connectivity enables clinicians to consult and collaborate at a distance, sustaining coordination even when co-presence is not possible.

The third practice, *instantaneity*, concerns the temporal acceleration of information processing and decision-making enabled by real-time data flows and automation. Instantaneity can support timely coordination and responsiveness, yet it may also compress reflection and negotiation among professionals.

These practices are deeply intertwined: for instance, remote monitoring of health parameters typically involves quantification (data collection and storage on a shared platform), connectivity (interaction between patient and clinicians in different locations), and instantaneity (the immediate availability and analysis of data in real time).

By adopting a sociomaterial perspective, we aim to explore how these digital health practices influence relational coordination among healthcare professionals. Following Okhuysen and Bonardi's (2017) distinction between juxtaposition, synthesis and shift combinations of theoretical lenses, our approach represents a shift. Rather than merging the ontologies of RCT and sociomateriality, we use the latter to reorient how the former conceptualizes coordination, from the design of mechanisms that embed relational principles to the situated enactment of relational processes through digital practices. This type of theoretical shift maintains the explanatory strengths of RCT while extending its analytical reach to encompass the material-discursive constitution of coordination.

3. Hypotheses formulation

To formulate the hypotheses, we selected three digital health technologies: telemedicine, EMRs, and generative AI. Telemedicine encompasses technologies that allow the provision of health services at a distance, such as doctor-to-patient consultations, doctor-to-doctor consultations, and remote monitoring (Arenas Gaitán and Ramírez-Correa, 2023; Jandoo, 2020). EMRs are technologies that allow data gathering, storage, visualization and analysis, used within hospitals (De Benedictis et al., 2020; Zuo et al., 2021). Generative AI refers to algorithms that generate new audio, video, text and content based on available data. In medicine, they can support writing reports or treatment plans (Fui-Hoon Nah et al., 2023).

Consequently, we 'dis-entangled' these technologies from their use in medical practice. In doing so, we described how practices are performed by doctors using these technologies, based on extant literature and the specific empirical context under inquiry.

For telemedicine, by practicing quantification, doctors use telemedicine platforms to monitor and visualize patients' data on a shared dashboard, accessible to other specialist doctors involved in the patient's care (Lukas et al., 2020; Nicolini, 2007). Through the practice of connectivity, telemedicine also enables doctors to consult and collaborate with other specialists remotely, ensuring coordinated and comprehensive patient management regardless of physical location (Olive et al., 2024).

In the case of EMRs, through the practice of quantification, doctors gather and visualize patients' data in EMRs, which are accessible to other specialists involved in the patient's care (Watterson et al., 2020). Additionally, by practicing instantaneity, doctors can quickly define and implement treatment plans based on the data stored in the records, following established guidelines (Lenert et al., 2014; Sutton et al., 2020).

Regarding generative AI, through the practice of instantaneity, doctors use generative AI to quickly define treatment plans based on the information they provide (Fui-Hoon Nah et al., 2023). The AI processes this data in real-time, generating immediate recommendations or reports that support clinical decisions.

On these grounds, we formulated two 'groups' of hypotheses: one related to the effects of digital health practices on relational coordination, and the other aimed at testing whether there are significant differences in these effects when comparing technologies associated to distinct practices.

3.1. Effects of digital health practices on relational coordination

Previous studies on the effect of digital technologies on relational coordination have typically focused on directional, causal effects (Bolton et al., 2021). In other terms, the effect of the use or design of a certain technology on relational coordination was tested, along with other possible explanatory factors (Bolton et al., 2021; Gittell, 2006; Gittell et al., 2008; Olive et al., 2024; Watterson et al., 2020). Consistently with this approach, we assumed a direct causal relationship, but instead of investigating the use or design of technologies, we tested the effects of sociomaterial practices – for instance, the effect of doctors practicing connectivity with telemedicine – assuming that they all significantly affect relational coordination on the basis of previous studies (Bolton et al., 2021; Gittell and Douglass, 2012).

Not all hypotheses are directional. Thus, we did not always specified whether the effect is positive or negative (Bagozzi and Phillips, 1982; Forza, 2002). When possible, we analyzed previous studies focused on analogous technologies and their effect on relational coordination, disentangling the investigated technology from the practice that was described in the study (specifically, in the cases of Olive et al., 2024; Watterson et al., 2020).

To elaborate our hypotheses, we considered how each digital health practice might influence relational coordination based on theoretical reasoning and empirical evidence.

Firstly, with telemedicine, doctors can engage in the practice of quantification by monitoring and visualizing patients' data on a shared dashboard accessible to other specialists involved in the patient's care (Lukas et al., 2020; Nicolini, 2007). This shared dashboard centralizes and standardizes information, potentially structuring the way data is accessed and interpreted. According to Claggett and Karahanna (2018), this structuring can influence relational coordination by shaping communication flows, affecting not only how tasks are integrated, but also how roles are aligned across the team. However, the impact may not be strictly positive or negative, as centralized data could enhance shared knowledge but might also reduce direct interpersonal communication (Gittell, 2000a). Therefore, we hypothesize:

H1a. The practice of quantification through telemedicine has a significant effect on relational coordination (non-directional hypothesis).

Secondly, telemedicine enables doctors to consult and collaborate with other specialists remotely, engaging in the practice of connectivity. By introducing more regular and structured communication, this practice potentially alters the frequency, timing and focus of exchanges between professionals (Deldar et al., 2016), thereby impacting how effectively they can align their actions and integrate their tasks (Olive et al., 2024). Given that structured communication is a key component

of relational coordination (Gittell, 2002), we expect a positive effect. Thus, we hypothesize:

H1b. The practice of connectivity through telemedicine has a significant and positive effect on relational coordination.

For EMRs, doctors engage in the practice of quantification by gathering and visualizing patients' data, which are accessible to other specialists involved in the patient's care (Watterson et al., 2020). Therefore, we posit:

H1c. The practice of quantification through EMRs has a significant and positive effect on relational coordination.

Additionally, by practicing instantaneity with EMRs, doctors can quickly define and implement treatment plans based on the data stored in the records, following established guidelines (Lenert et al., 2014). The ability to rapidly access and apply stored data affects relational coordination by influencing how quickly and effectively team members can align their actions and decisions (Sutton et al., 2020). However, the speed introduced by instantaneity could either enhance coordination through timely communication or hinder it if it reduces deliberation among team members. Thus, we state:

H1d. The practice of instantaneity through EMRs has a significant effect on relational coordination (non-directional hypothesis).

Regarding generative AI, doctors tend to use it to quickly define treatment plans based on the information they provide, engaging in the practice of instantaneity. Generative AI automates and standardizes decision-making processes, which can affect the speed and consistency of actions taken by the team (Moulaei et al., 2024). Given the potential for both positive and negative impacts, we propose:

H1e. The practice of instantaneity through generative AI has a significant effect on relational coordination (non-directional hypothesis).

3.2. Different effects from the same technologies or the same practices

This study aims to further elaborate on the implications of adopting a sociomaterial lens in RCT by testing two further perspectives. First, when examining the same digital health artifact, the effects of practices associated with that same technology may be significantly different. Second, when comparing distinct material artifacts, such as a telemedicine platform and an EMR, but testing similar practices performed by doctors under the same or comparable conditions, it is expected that no significant differences will emerge.

Specifically, we consider that different practices associated to the same technology might have distinct effects on relational coordination due to the varying ways in which they reshape communication and relationships among professionals (Marent and Henwood, 2023). For instance, the practice of quantification through telemedicine (monitoring and visualizing data) may impact relational coordination differently than the practice of connectivity through telemedicine (consulting and collaborating remotely), because one focuses on data sharing while the other emphasizes interactive communication (Marent and Henwood, 2023). Therefore, we hypothesize:

H2a. The effect on relational coordination of quantification through telemedicine is significantly different from the effect of connectivity through telemedicine.

Similarly, within EMRs, the practice of quantification (gathering and visualizing data) may influence relational coordination differently than the practice of instantaneity (quickly defining treatment plans based on stored data). The former may enhance shared knowledge, while the latter might affect the speed of decision-making and alignment among team members (Marent and Henwood, 2023). Thus, we propose:

H2b. The effect on relational coordination of quantification through EMRs is significantly different from the effect of instantaneity through EMRs.

On the other hand, when comparing similar practices across different technologies, we anticipate that the effects on relational coordination will not significantly differ because it is the practice itself, rather than the specific technology, which shapes coordination dynamics (Orlikowski, 2007). For instance, the practice of quantification through telemedicine and quantification through EMRs both involve sharing and visualizing patient data among specialists (Marent and Henwood, 2023). Given that both practices facilitate shared understanding regardless of the technology used, we hypothesize:

H2c. The effect on relational coordination of quantification through telemedicine is not significantly different from the effect of quantification through EMRs.

Lastly, comparing the practice of instantaneity through generative AI and instantaneity through EMRs, both allow doctors to rapidly define treatment plans based on available data. Despite differences in the underlying technology, the practice may similarly influence relational coordination by affecting the speed and nature of decision-making processes (Marent and Henwood, 2023). Therefore, we hypothesize:

H2d. The effect on relational coordination of instantaneity through generative AI is not significantly different from the effect of instantaneity through EMRs.

Fig. 2 provides the overall research framework, considering both the first and the second groups of hypotheses.

4. Methodology

4.1. Research setting

The empirical context of this research is the Italian healthcare system, which is recognized for its efficiency and effectiveness, with low per capita healthcare expenditure compared to other developed countries, as well as one of the highest life expectancies worldwide (OECD, 2023).

Nonetheless, the system is facing unprecedented challenges due to demographic change (an aging population and a low birth rate).

A related issue is the prevalence of chronic diseases (Bernell and Howard, 2016), which are complex and, thus, require attention from various groups of health professionals (Campbell et al., 1998; Sinn et al., 2022). For instance, managing dementia often involves geriatricians, neurologists and psychiatrists.

Since the onset of the COVID-19 pandemic, structural policies have supported the digital transformation of the Italian healthcare systems, in particular, the National Recovery and Resilience Plan.[2] These policies have targeted the management of chronic diseases to prevent hospital overcrowding and long waiting lists for health services (Filippini and Vinceti, 2021). One of the key objectives is to manage chronic patients within local health authorities across Italy and, whenever possible, in their own homes, unless emergencies or acute care situations arise that need to be managed within hospital walls. However, managing chronic conditions poses significant coordination challenges, as they necessitate a multidisciplinary approach in all care settings, from hospitals to patients' homes (Raine et al., 2014).

To address these challenges, more than 15 billion euros (more than 10 % of the total annual public healthcare budget in Italy) were made available for transforming the healthcare system. In particular, new digital technologies were developed and designed to support the remote management of chronic patients, reducing the need for hospital visits, and improving coordination of care among involved parties. Significant

[2] For further information: https://www.pnrr.salute.gov.it/portale/pnrrsalute/homePNRRSalute.jsp (last checked on September 2nd, 2024).

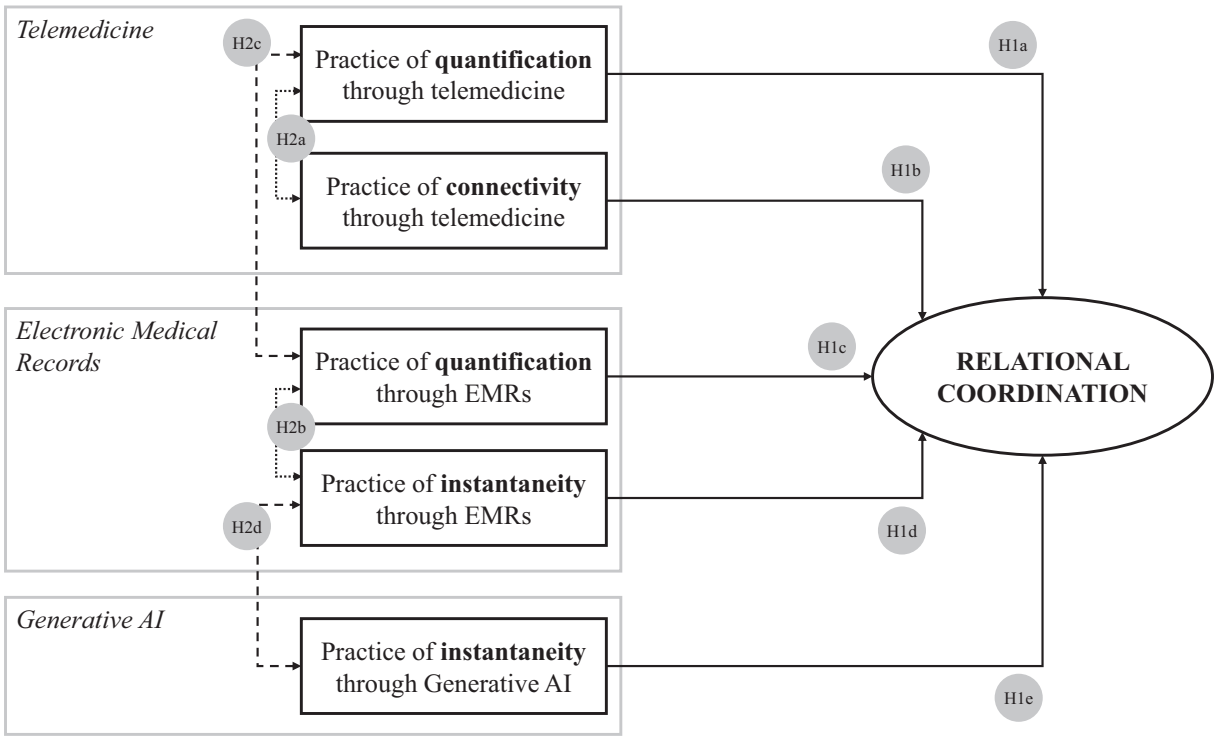

Fig. 2. Research framework.

investments have been made, particularly in three technological domains: (i) around 1.5 billion euros were invested in the development of a national infrastructure for telemedicine services, which serves as the fundamental interoperability and integration layer for regional health services; (ii) around 1,2 billion euros were invested for the development of EMRs in hospitals and related technological and consulting services; (iii) around 37 million euros are directed to the development of a national AI platform for primary care in territorial settings.[3]

The nationwide diffusion of digital health technologies in Italy during the period during which this research is elaborated makes this empirical setting the ideal 'theatre' to observe whether their introduction affects coordination practices.

While the study focuses on Italy, this single-country design provides an analytically coherent context for examining coordination in digitalized healthcare systems. Italy represents a paradigmatic case of a publicly funded system currently undergoing large-scale digital transformation. Focusing on a single national framework allows us to control for institutional and regulatory variability that typically complicates comparative analyses. Moreover, as the healthcare structures, funding models, and digitalization trajectories of Italy are closely aligned with those of other comparable systems, findings derived from this context may be analytically transferable to similar settings, even if not statistically generalizable in the strict sense.

4.2. Data collection

The questionnaire was administered through email to a sample of 4240 Italian specialist doctors between February and April 2024, with the support of three medical associations, in compliance with privacy regulations. Completion required approximately 10 min. 594 complete answers were gathered, with a 14 % response rate.

Women represented 45 % of respondents. Regarding professional setting, 34 % were employed in general hospitals, 13 % in research hospitals, 14 % in individual private practice, and the remaining 39 % within local health authorities (public community-based services operating under the Italian National Health Service). This distribution provides a balanced representation of specialist doctors across institutional environments and professional arrangements, capturing the diversity of coordination settings within the national healthcare system.

Engagement with digital technologies was also heterogeneous. Among respondents, 47 % reported using teleconsultation with other specialists, 30 % used telemonitoring systems, 47 % used EMRs for data visualization, 15 % employed EMR-based decision-support tools, and 4 % reported the use of generative AI.

The response rate that was achieved requires contextualization within current healthcare survey research. Physician response rates have declined over the past decades and are typically significantly lower than general population surveys (Flanigan et al., 2008; Meyer et al., 2022). This reflects increased time pressures, survey fatigue and the proliferation of research requests in digital formats (Flanigan et al., 2008; Meyer et al., 2022). While this response rate limits claims to perfect representativeness, it remains within acceptable ranges for exploratory research in healthcare settings with respect to the design and objectives of the research (Dykema et al., 2013).

4.3. Measures

We designed a survey that would capture digital health practices within a specific and consistent context, to ensure reliability (Pinsonneault and Kraemer, 1993). At the beginning of the survey, respondents were provided with a specific situational scenario describing the management of a chronic patient they had interacted with in the past two weeks, requiring coordination with another specialist doctor.

To determine whether respondents engaged in specific digital health practices within this scenario, they answered 'yes' or 'no' to five items, each describing a distinct practice associated with a specific digital technology. For instance: "*In the management of that patient with other*

[3] For further information: https://www.pnrr.salute.gov.it/portale/pnrrsalute/dettaglioContenutiPNRRSalute.jsp?lingua=italiano&id=5833&area=PNRR-Salute&menu=missionesalute (last checked on September 2nd, 2024).

doctors, I have monitored and visualized patients' data on a dashboard, which is shared with them through a telemedicine system". This approach aimed to ground respondents' answers in their recent professional experiences (Forza, 2002).

To measure relational coordination, we employed, with a minimum adaptation to the empirical context, the 'Relational Coordination Survey' (Gittell et al., 2008). This survey consists of a 7-item, 5-Likert scale assessing the various dimensions characterizing relational coordination: frequent communication, timely communication, accurate communication, problem-solving communication, shared knowledge, mutual respect, and shared goals. The items of this construct were professionally translated from English to Italian to ensure linguistic and conceptual equivalence. A reverse translation was conducted by a different professional translator to ensure the accuracy of the translation. This process was complemented by a thorough review by a bilingual practitioner proficient in both Italian and English, who verified the consistency and accuracy of the translations. This method aimed to minimize the risk of misinterpretation and ensure the measures' validity (Forza, 2002).

While the *Relational Coordination Survey* (Gittell et al., 2008) has been widely validated across healthcare contexts, we recognize that its items capture the relational quality of coordination (shared goals, knowledge, and respect) rather than the situated enactments through which coordination occurs in practice. From a sociomaterial perspective, these relational dimensions can be understood as emergent outcomes of sociomaterial practices, reflecting the underlying relational infrastructure that supports digital coordination. Although the scale does not trace the moment-to-moment dynamics of coordination, it offers a reliable measure of the relational properties that sociomaterial practices produce and sustain.

Table 1 provides the results of Exploratory Factor Analysis, which confirms the reliability of the relational coordination construct. All seven items of the relational coordination construct loaded significantly on a single latent factor, with loadings between 0.59 and 0.81 ($p < 0.001$) and a Cronbach's alpha of 0.90, confirming internal consistency and convergent validity. These statistics demonstrate that the measure performs reliably in this empirical context and provide a sound basis for the subsequent structural modeling.

Moreover, the model controlled for several variables: age, digital literacy, gender, and type of organization where the doctor is employed (whether it is a hospital, a research institution, or individual practice) (Kim and Park, 2017; Weik et al., 2024; Zachrison et al., 2021). Through the employment of control variables, we tackled potential confounding effects aiming to isolate the specific impact of the primary predictors on relational coordination.

A detail of items investigated through the questionnaire is provided in Supplementary materials.

4.4. Data analysis

To test our hypotheses, we used Structural Equation Modeling (SEM). Model specification involved defining both the structural and measurement components of the SEM based on the theoretical premises of this research (Bollen, 1989; Kline, 1998). SEM was chosen because it enables simultaneous estimation of multiple relationships and accounts for measurement error in latent constructs (Hair et al., 2010).

Table 1
Measurement model.

Measure	Factor loading	Cronbach's alpha
Frequent communication	0.591	0.902
Timely communication	0.745	
Accurate communication	0.781	
Problem-solving communication	0.790	
Shared knowledge	0.813	
Mutual respect	0.760	
Shared goals	0.791	

Model identification was conducted to ensure that the model was over-identified (Anderson and Gerbing, 1988). This was verified by confirming that the degrees of freedom were positive, as indicated by the Likelihood Ratio (LR) test, which showed a chi-square value of 314.79 with 80 degrees of freedom. This indicates that there are more known data points than estimated parameters, making the model statistically estimable (Kline, 1998).

The estimation of the model parameters was performed using the Maximum Likelihood estimation method, which is appropriate for the sample size (Bentler, 1990). The adequacy of the model fit was evaluated using several goodness-of-fit indices, including the Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Standardized Root Mean Square Residual (SRMR), and Tucker-Lewis Index (TLI) (Hu and Bentler, 1999). Overall, the indices indicated an acceptable model fit (Kline, 1998), with the TLI approximating the 0.90 threshold (see Table 2).

The final model provided standardized estimates for the paths from the exogenous variables to the latent construct. All analyses were performed by using Stata® v14.1.

5. Results

The results of the structural model are presented in Fig. 3. All coefficients are standardized, allowing for direct comparison across different practices.

Monitoring and visualizing patients' data through telemedicine was found to have a negative and marginally significant effect on relational coordination ($\beta = -0.087$, $p < 0.10$), confirming H1a. The results indicate that consulting and collaborating at a distance, through telemedicine, has a positive and significant effect on relational coordination ($\beta = 0.137$, $p < 0.01$), confirming H1b. Gathering and visualizing patients' data using EMRs did not significantly affect relational coordination ($\beta = -0.030$, $p = 0.670$), leading to the rejection of H1c. Defining treatment based on data stored in EMRs showed a marginally positive effect on relational coordination ($\beta = 0.109$, $p < 0.10$), confirming H1d. Defining treatment through generative AI, based on information provided by doctors, did not show a significant impact on relational coordination ($\beta = -0.060$, $p = 0.497$), resulting in the rejection of H1e.

Among the control variables, working in a hospital was associated with a significant positive effect on relational coordination ($\beta = 0.137$, $p < 0.05$), while other control variables did not show significant effects.

The comparison between the effects of different practices through Wald's tests revealed that the impact of consulting and collaborating at a distance through telemedicine is significantly greater than that of monitoring and visualizing patients' data through telemedicine ($\chi^2(1) = 9.49$, $p < 0.01$), confirming H2a. A marginally significant difference was found between gathering and visualizing data and defining treatment based on stored data in EMRs ($\chi^2(1) = 2.21$, $p = 0.0972$); however, since one of the underlying coefficients is not significant, H2b can only be partially considered. A marginally significant difference was observed between defining treatment based on stored data in EMRs and using generative AI ($\chi^2(1) = 2.37$, $p = 0.0823$). As this result provides limited evidence against the hypothesis of no difference, H2d is not supported No significant difference was found between monitoring and visualizing data through telemedicine and gathering and visualizing data through EMRs ($\chi^2(1) = 1.00$, $p = 0.3164$), confirming H2c.

It is important to note that, for H2b and H2d, despite the results of

Table 2
Goodness of Fit statistics.

Fit statistic	Value
RMSEA	0.070
CFI	0.904
TLI	0.882
SRMR	0.031

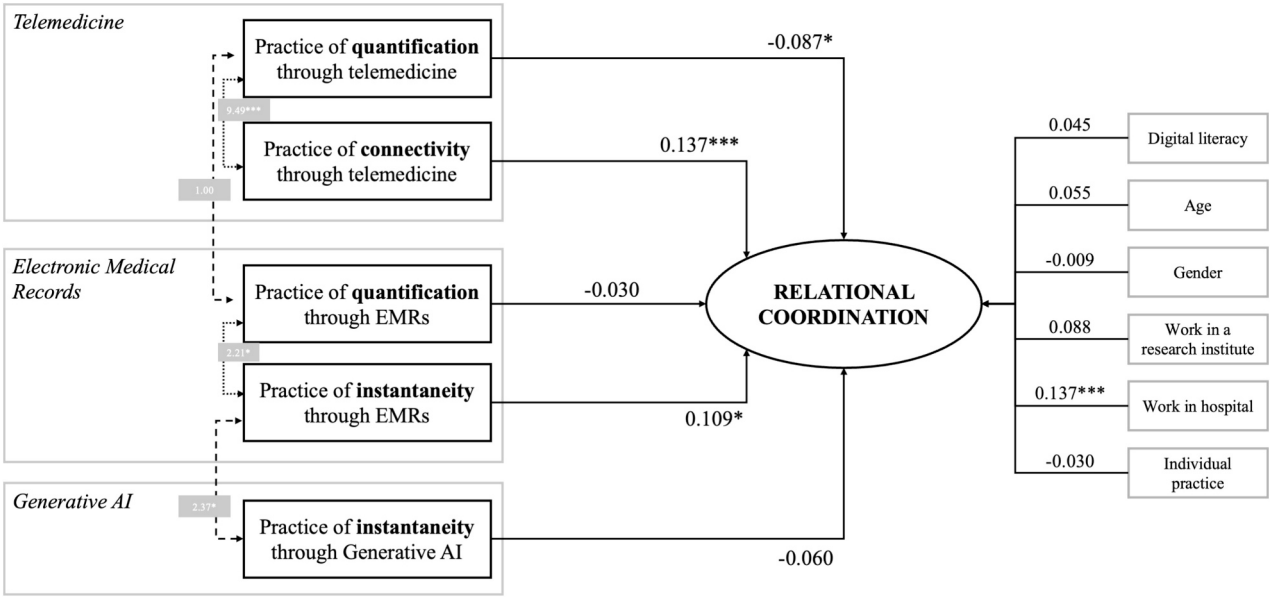

Fig. 3. Structural model (***p < 0.01, **p < 0.05, p < 0.1).

Wald's tests, the underlying coefficients in the structural model were not statistically significant. Therefore, these findings can only be partially interpreted within the theoretical premises of this study.

6. Discussion

This study started from the observation that, while digital technologies are increasingly embedded in healthcare coordination processes, their impact on relational coordination remains debated (Bolton et al., 2021). The literature presents both positive (e.g., Olive et al., 2024; Watterson et al., 2020) and negative (Gittell, 2000a) effects, often attributing discrepancies to differences in how digital coordination mechanisms are designed and implemented (Claggett and Karahanna, 2018). However, this perspective tends to assume that the material features of digital technologies directly determine relational coordination, overlooking the ways in which professionals appropriate and enact these technologies in practice.

Through our research, we aimed contributing to this debate by shifting the focus from digital technologies as predefined coordination mechanisms to the digital health practices that emerge as professionals engage with these tools. By integrating the sociomateriality paradigm (Orlikowski, 2007) within RCT (Gittell, 2000a), we not only examined the effects of digitalization on coordination but also provided an analytical framework that accounts for the situated, emergent nature of relational coordination.

Within the empirical setting of the Italian healthcare system, currently undergoing a rapid process of digitalization, we studied the effect of three different digital health technologies used by specialist doctors (telemedicine, EMRs and generative AI). Rather than focusing on these technologies as static coordination media, we examined how different digital health practices (Marent and Henwood, 2023) shape relational coordination.

In exploring whether distinct sociomaterial practices affect relational coordination through empirical analysis of survey data, the results partly aligned with our theoretical expectations but also revealed some unexpected findings. The positive and significant effect of consulting and collaborating at a distance through telemedicine on relational coordination supports the idea that structured and regular communication among specialists enhances coordination. This finding is consistent with prior studies (Olive et al., 2024), which emphasized the benefits of teleconsultation as the practice of connectivity (Marent and Henwood, 2023) in fostering effective collaboration.

However, the marginally negative effect of monitoring and visualizing patients' data through telemedicine was surprising. Despite our initial hypothesis, which predicted a positive impact based on the centralization and standardization of information (Claggett and Karahanna, 2018; Lukas et al., 2020; Nicolini, 2006, 2007; Okhuysen and Bechky, 2009), the results suggest that the practice of quantification through telemedicine (Marent and Henwood, 2023) may introduce complexities in coordination, potentially leading to information overload or difficulties in aligning team actions, as suggested by Gittell (2000b). One possible explanation for this unexpected finding is that the mere availability of shared data does not automatically translate into improved relational coordination. Instead, it may require additional interpretative work and mutual adjustment among team members (Beane and Orlikowski, 2015).

For EMRs, the hypothesized positive effect of gathering and visualizing patients' data on relational coordination was not confirmed, contradicting previous evidence (Watterson et al., 2020). On the other hand, the marginally positive effect of defining treatment based on stored data within EMRs aligns with our expectations, highlighting that immediate access to data can reinforce relational coordination by supporting a shared and agreed-upon decision-making process (Lenert et al., 2014; Okhuysen and Bechky, 2009; Sutton et al., 2020). These mixed results suggest that the impact of digital health practices on relational coordination is situated and context dependent.

The findings on generative AI did not confirm our hypothesis that its use would significantly influence relational coordination by standardizing part of decision-making and outputs (specifically, the definition of medical treatments) (Fui-Hoon Nah et al., 2023). This lack of significance suggests that, while AI can support and accelerate decision-making processes, it may not directly enhance coordination among healthcare professionals, potentially due to the reduction in the need for direct communication that AI entails.

The second group of hypotheses focused on comparing the effects of different practices associated with the same technology, as well as similar practices across different technologies. The results of these comparisons, based on Wald's tests, need to be interpreted with caution, especially considering that some of the independent variables did not show significant effects in the structural model.

The significant difference between the impact of consulting and collaborating at a distance (connectivity) versus monitoring and

visualizing data (quantification) through telemedicine supports the hypothesis that, even when associated with the same 'material' technology, different 'digital health practices' (Marent and Henwood, 2023) may have different effects on relational coordination. This reinforces the sociomaterial perspective that the effects of technology on organizational outcomes are mediated by the practices through which technology is enacted (Orlikowski, 2007). However, while Wald's tests suggested marginal differences in the case of EMRs and generative AI, these results provide limited evidence against the hypotheses of no difference and therefore do not support H2b and H2d, given the lack of statistical significance of the underlying coefficients in the structural model.

The ambiguous results observed for EMRs and AI can be better understood considering the distinct coordination mechanisms they afford. EMRs often enhance visibility and standardization of patient information, which can support shared knowledge, yet they may simultaneously reduce dialogical communication and flexibility, leading to weaker relational links. Similarly, AI-based tools accelerate decision-making processes and relieve cognitive load, but in doing so may reduce opportunities for mutual adjustment and interpersonal trust, core elements of relational coordination. These dual effects explain the "mixed evidence" found in our analysis.

Taken together, these findings illustrate how digital health technologies become integrated into clinical work through distinct yet interrelated configurations of digital health practices that affect the quality of coordination (Claggett and Karahanna, 2018; Gittell et al., 2008; Orlikowski, 2007). Quantification practices, such as data visualization and monitoring, reorganize how information is shared and compared, enhancing transparency while reducing space for interpretive negotiation. Connectivity practices, such as remote consultation, sustain collaboration across distance and organizational boundaries, maintaining shared understanding and mutual adjustment despite reduced copresence. Instantaneity practices, such as real-time data analysis and AI-supported decision making, accelerate coordination and improve responsiveness but may also compress opportunities for reflection.

Through these situated dynamics, digital health practices do not simply assist coordination: they actively constitute the relational processes through which coordination occurs. Understanding these dynamics helps explain how digital transformation reshapes the everyday organization of clinical work.

6.1. Theoretical implications

While RCT has primarily been applied to explain how coordination can be designed through mechanisms that embed relational principles into structures, roles and technologies (Bolton et al., 2021; Claggett and Karahanna, 2018; Gittell, 2000b), this study proposes a complementary perspective. In the context of increasing digitalization in healthcare, it becomes essential to explore not only how coordination is planned and formalized, but also how it is enacted in practice. Our contribution focuses on how coordination unfolds through professionals' interactions with digital technologies in their situated work activities.

To develop this perspective, we integrated the sociomateriality paradigm (Orlikowski, 2007) into the RCT framework. This allows us to account for the fact that coordination is shaped by the interdependence between material artifacts and social practices. Rather than treating digital tools as external supports to relational coordination, we consider how specific digital health practices (Marent and Henwood, 2023), such as quantification, connectivity and instantaneity, participate in producing or destabilizing coordination dynamics. In other words, technologies such as telemedicine, EMRs and generative AI do not have a univocal effect. Instead, their impact depends on how they are enacted within professional routines.

This theoretical repositioning has several implications. First, it shifts the analytical focus from the design of coordination mechanisms to the situated enactment of relational coordination. Second, it helps interpret the heterogeneity observed in our empirical findings, showing that different practices associated with the same technology can have divergent effects. Third, it contributes to strengthening the theoretical centrality of coordination itself, both as an object of empirical investigation and as a foundational dimension of professional work in complex systems.

Our contribution is positioned as an initial step in a broader process of theory elaboration. The empirical evidence presented is exploratory in nature and derived from a cross-sectional survey. Accordingly, we do not claim to offer a definitive reformulation of RCT. Rather, we suggest that incorporating a sociomaterial perspective into the theory can offer useful tools for interpreting how coordination is configured in digital environments. Therefore, this extension does not diminish the original strengths of RCT. Shared goals, shared knowledge and mutual respect remain essential dimensions of effective coordination. What changes is the analytical angle: these relational elements are not only designed into systems, but are also constructed and reconstructed through everyday interactions with technology.

In the specific case of healthcare, where relational coordination is critical for ensuring quality and continuity of care, digital technologies introduce new configurations that require careful observation. Tools designed to enhance efficiency may produce unintended effects when translated into practice. Understanding these dynamics calls for theoretical frameworks capable of capturing the complex interplay between structure and action. RCT, when reinterpreted through a sociomaterial lens, can fulfill this need.

6.2. Practical implications

Coordination remains a central and timely concern in discussions of technological innovation and organizational change. Far from being a residual topic, it continues to represent a core dimension of how work is organized, especially in professional environments where interdependence is high and decisions are time sensitive. In healthcare, coordination is not merely a background process, but a key determinant of clinical quality, continuity, and safety. Digital transformation strategies often refer to coordination as a general goal, yet they rarely address how coordination is concretely shaped through technologies' use. This study invites a more specific reflection on the forms of coordination that emerge in practice and proposes relational coordination as a useful lens to assess how professionals collaborate with the aid of digital tools.

This study contributes to practice by clarifying how specific digital health practices become integrated into clinical routines and influence the quality of relational coordination. Quantification tools make patient information more visible but require deliberate interpretive dialogue to avoid over-standardization. Connectivity tools, such as teleconsultation, strengthen shared understanding and continuity of care across sites, provided that communication remains dialogical rather than procedural. Instantaneity tools, including real-time monitoring and AI-based decision support, enhance timeliness but can inadvertently erode the reflective space necessary for mutual respect and learning. However, one of the central findings of this study is that different digital health practices involving technologies with different affordances, lead to different outcomes. For practitioners and policymakers, these insights highlight that the success of digital health initiatives depends not only on interoperability or usability but on how technologies sustain the relational foundations of (relational) coordination within clinical work.

Technologies are not neutral enablers. They interact with established routines, professional roles and relational dynamics. As such, their effects depend on how they are integrated into everyday work. This observation has concrete implications for the design, implementation and evaluation of digital tools.

First, efforts to support coordination through digitalization should begin with a careful consideration of how different technologies influence professional interaction. Practices that foster structured communication, joint framing of problems, or reciprocal consultation, such as

remote clinical discussions, are more likely to support coordination than those that simply aggregate information without creating shared understanding. The capacity of a technology to reinforce relational coordination should be treated as an evaluation criterion, alongside more conventional indicators of efficiency or usability.

Second, relational coordination should not be considered a natural outcome of digitalization. It is a dynamic process that may be supported or undermined depending on how technologies are enacted. Systems that function well from a technical perspective may still weaken collaboration if they reduce opportunities for dialogue or introduce asymmetries in access to information. Implementation strategies should therefore examine whether technologies help sustain shared goals, enable knowledge exchange, and foster mutual respect within and across professional boundaries.

Third, the same technology may generate different outcomes depending on the organizational and relational context in which it is introduced. A platform that supports coordination in one setting may hinder it in another, depending on local routines, communication patterns and distribution of responsibilities. Digital tools should not be implemented based on assumptions of uniform impact, but aligned with the specific conditions of use. In fragile settings, technologies misaligned with interdependencies may further complicate collaboration.

These considerations are particularly relevant in the context of integrated and coordinated care, where collaboration must occur across multiple services, settings and professional profiles. Health systems increasingly promote integration as a response to complexity and fragmentation, but the contribution of digital tools to this effort depends not only on interoperability or workflow redesign. It depends on whether technologies support the relational conditions required to work across boundaries. For instance, a telemedicine platform may support integration when it enables clinicians and care professionals to engage with one another on patient needs, but may undermine coordination when it limits interaction to the exchange of pre-structured data.

Relational coordination provides a useful perspective to assess whether digital systems support these relational conditions. As integrated care models expand, technologies should be evaluated not only for their ability to connect information systems, but for their ability to connect people engaged in care delivery. This requires recognizing coordination as a practice that must be cultivated and sustained, not assumed as a by-product of digitalization.

7. Limitations and future research directions

This study has several limitations. The primary limitation stems from the research design, which is cross-sectional. Longitudinal studies could provide insights into the dynamics of technology adoption and the evolution of relational coordination over extended periods (Ployhart and Vandenberg, 2010).

Our response rate, while consistent with current trends in physician survey research (Dykema et al., 2013; Flanigan et al., 2008; Meyer et al., 2022), may introduce selection effects. Physicians who responded might be more engaged with digital technologies, potentially representing early adopters whose experiences preview broader transformation patterns. Future research could therefore adopt stratified or mixed-method designs to include less digitally active professionals and assess whether similar patterns emerge across adopter groups.

Another significant limitation stemming from the research design is the reliance on self-reported data, which may be subject to biases such as social desirability or recall bias (Forza, 2002; Pinsonneault and Kraemer, 1993). Self-reported measures may not accurately reflect actual behaviors or interactions, potentially affecting the validity of the findings. Future studies could combine survey data with behavioral indicators or digital trace data, to better triangulate reported perceptions and observed practices.

We recognize that Gittell (2006) validated survey instrument, which captures key relational dimensions underpinning coordination. However, this standardized approach cannot fully account for the situated, emergent interactions emphasized by sociomaterial perspectives. Even within the field of quantitative studies, future research could explore how advanced analytical techniques such as self-supervised learning and other machine-learning approaches might extend current modeling capabilities. Future work could also rely on new instruments or embedded metrics that capture both structural (quantitative) and emergent (qualitative or processual) dimensions of coordination.

Whereas structural equation modeling offers a theory-driven framework well suited to our exploratory aims, data-driven or hybrid methods could reveal non-linear, multi-level, or temporal patterns linking digital health practices to relational coordination. Thus, future research could fundamentally benefit from incorporating objective data sources, such as direct observations, system usage logs, or patient outcome measures, to triangulate the findings and enhance validity.

The rapid evolution of digital health technologies presents a limitation, as the technologies and practices examined may change significantly over time. This technological dynamism can impact the relevance of the findings (Venkatesh et al., 2012). Longitudinal replications or rolling-panel studies could track how emerging technologies, such as AI-assisted decision tools, reshape relational coordination over successive waves of digital innovation.

Moreover, our focus on Italian specialist doctors provides analytical depth within a coherent institutional context but also imposes boundaries on generalizability. As discussed in the Methodology, Italy's healthcare system is a publicly funded, specialist-based model currently undergoing a nationwide process of digital transformation. This configuration makes Italy a theoretically rich “critical case” for studying how digital practices reconfigure coordination among professionals. Concentrating on a single healthcare system enhances internal validity by controlling for differences in regulation, reimbursement, and infrastructure that often confound comparative studies. Indeed, and by design, the characteristics of this research support “analytical” generalization (Tsoukas, 2018) to comparable contexts rather than statistical generalization across all systems. Future studies should nonetheless extend the investigation through cross-country or multi-professional designs to test the robustness and boundary conditions of the observed relationships.

Finally, the theoretical elaboration proposed in this research would benefit from qualitative inquiry, which could provide an in-depth understanding of the mechanisms that link sociomaterial practices to relational coordination. Qualitative studies could better encapsulate the situated nature of sociomaterial practices (Pickering, 1995) and extend our understanding of relational coordination (Orlikowski, 2007). For instance, in future studies, ethnographic research or in-depth interviews with healthcare professionals could reveal how individual perceptions, organizational culture, and contextual factors influence the enactment of digital health practices and their impact on coordination (Yin, 2013).

While we have suggested specific directions based on methodological constraints, the theoretical pathway opened by this study also calls for broader development. The integration of relational coordination with a sociomaterial lens is still at an early stage, and future studies could expand it in multiple directions.

One avenue would be to explore different contexts beyond healthcare. While healthcare providers offer a particularly relevant setting due to the complexity and interdependence of clinical work, other sectors – such as education, justice, public administration or social services – face similar coordination challenges under digital transformation. Investigating how relational coordination is shaped by digital practices in these contexts could help refine the theory and assess its broader applicability.

Moreover, comparative studies across different professions could illuminate how role-specific routines and professional cultures influence the enactment of digital technologies and their effects on coordination. For instance, the ways in which teachers, social workers or legal professionals integrate digital tools into their collaborative routines may reveal context-dependent patterns of relational coordination as well as

common dynamics.

In addition, future research could investigate hybrid or cross-professional settings, where coordination must occur not only within a profession but across disciplinary or institutional boundaries. Digital platforms are increasingly used to facilitate collaboration across sectors, such as in community health initiatives or integrated care models. These configurations may offer valuable insights into how relational coordination is maintained or reconfigured when professional norms, technological infrastructures and institutional logics intersect.

Beyond the professional domain, another promising direction involves examining relational coordination in less structured or more informal settings. As digital platforms mediate coordination in community-based initiatives, voluntary organizations or even grassroots innovation networks, understanding how relational patterns evolve outside formal hierarchies could broaden the conceptual scope of RCT.

There is also room to investigate how emerging technologies such as AI, algorithmic decision-making systems or remote monitoring devices are shaping new forms of relational coordination. Future studies might explore how the delegation of decision processes to non-human agents affects mutual respect, shared knowledge and the negotiation of responsibilities among professionals.

Rather than concluding the development of this theoretical perspective, these directions reflect the early stage of a line of inquiry that is still in formation. The integration of sociomateriality into relational coordination theory requires further conceptual work and empirical testing to assess its value and relevance across diverse settings and professions. This effort will benefit from continued dialogue between empirical research and theoretical refinement, and from engaging with a range of organizational and technological configurations that challenge the traditional boundaries of RCT.

CRediT authorship contribution statement

Mattia Vincenzo Olive: Writing – original draft, Methodology, Data curation, Conceptualization. **Luca Gastaldi:** Writing – review & editing, Supervision, Methodology, Conceptualization. **Francesco Paolo Appio:** Writing – review & editing, Supervision, Methodology.

Declaration of competing interest

The authors declare that they have no competing interests related to this research.

Acknowledgements

We would like to acknowledge the support of our colleagues at the Digital Health Observatory at Politecnico di Milano, which was essential in making this research possible

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.techfore.2025.124508.

Data availability

The data that has been used is confidential.

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