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# Which mechanisms of Telemedicine influence the Relational Coordination between Specialist Doctors and General Practitioners: evidence from an Italian survey

TESI DI LAUREA MAGISTRALE IN  
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# Abstract

Tele-expertise has become a crucial tool in medical practice, particularly during the Covid-19 pandemic, due to its enhanced accessibility, quality, and efficiency. This study explores the impact of Telemedicine integration on relational coordination between Specialist Doctors and General Practitioners. The Author has decided to refer to the Relational Coordination Theory as a valuable theoretical framework. Through the investigation of a sample of Italian Specialist Doctors' perception, this Research aims at evaluating whether the integration of Telemedicine into medical practices improves their relationships and communication with General Practitioners. The Author proved also these effects are mediated by the frequency and willingness of the Specialist to utilize Tele-expertise. A Survey, designed and conducted by the Digital Healthcare Observatory of Politecnico di Milano, allowed the Author to analyze the perception of about 1.900 Italian Specialist with regards to their experience and consideration of Telemedicine. This research applies Structural Equation Modeling (SEM) to design the statistical framework of analyses.

The research validated several hypotheses, indicating that Telemedicine improves performance, productivity, and time management, enhancing relational coordination with General Practitioners and other specialists. These positive impacts are facilitated when Telemedicine is integrated and comes with organizational support. The findings emphasize the importance of implementing telemedicine services to ensure effective communication between Specialist Doctors and patients, make them confident in evaluating patient eligibility, and allow them to plan their activities without wasting time.

The Research also emphasizes the role of integrating Telemedicine in various dimensions of a healthcare system, including governance, processes, and treatments. The practical impact of this research suggests evaluating the effects of implementing Telemedicine on Specialist Doctors at both personal and professional levels to ensure quality communication and relationships with General Practitioners.

**Key-words:** Telemedicine, Healthcare, Coordination



# Abstract in Italiano

Il Teleconsulto ha acquisito un ruolo fondamentale nella pratica medica, soprattutto in risposta alla pandemia di Covid-19, grazie alla sua maggiore accessibilità, qualità ed efficienza. Questo studio esplora come l'integrazione della Telemedicina influenzi il coordinamento relazionale tra i medici specialisti e i medici di medicina generale (MMG).

L'Autore ha scelto di adottare la Teoria del Coordinamento Relazionale come quadro teorico valido per questa indagine. Attraverso un modello Survey, oltre 1900 medici specialisti in tutta Italia sono stati coinvolti nell'indagine condotta tramite l'Osservatorio Sanità Digitale del Politecnico di Milano. L'Autore ha utilizzato il Modello di Equazioni Strutturali (SEM) per progettare il framework statistico dell'analisi.

I risultati della ricerca convalidano diverse ipotesi, suggerendo che la percezione della Telemedicina come miglioramento delle prestazioni, produttività e gestione del tempo da parte dei medici specialisti contribuisce positivamente al coordinamento relazionale con i medici di medicina generale e altri specialisti. Questi impatti positivi sono maggiormente evidenti quando la Telemedicina è integrata e supportata organizzativamente.

La ricerca sottolinea l'importanza dell'implementazione dei servizi di Telemedicina che non solo migliorino la comunicazione tra i medici specialisti e i pazienti, ma che rendano i medici specialisti più sicuri nella valutazione dell'adeguatezza del paziente per tali servizi, consentendo loro di pianificare attività in modo efficiente.

Inoltre, l'analisi mette in luce il ruolo cruciale dell'integrazione della Telemedicina nella governance e nei processi del sistema sanitario. I risultati emersi da questa ricerca suggeriscono la necessità di valutare gli effetti dell'implementazione della Telemedicina non solo sul piano professionale, ma anche su quello personale dei medici specialisti, con l'obiettivo di garantire una comunicazione di alta qualità.

**Parole chiave:** Telemedicina, Sanità Digitale, Coordinamento



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# 1. Steps of the Thesis

Pili's Dissertation Thesis follow a six-phase method:

1. The Research field is identified, and the relevance of the topic is established. The initial section introduces the subject of Telemedicine and its effects on the many stakeholders and entities engaged in its implementation.
2. Review of Relevant Literature and Clarification of Research Question. After establishing the primary research topic, a comprehensive literature review was conducted to gain an understanding of the current state of knowledge in the selected field and identify any potential gaps in the existing literature that could be addressed through future research endeavors.
3. Methodology identification. Once the research question was identified based on the Literature gap, the methodology was established. The most suitable methodology for addressing the research topics at hand is the Survey approach, which has been employed with the intention of providing explanatory insights.
4. Survey. The survey was implemented across a range of healthcare organizations with various structures. The objective was to construct a robust theoretical model and subsequently formulate hypotheses that could be empirically verified using STATA software.
5. The process of constructing theoretical frameworks. Among the several approaches available for constructing a theoretical model and formulating testable hypotheses, the Structural Equation Modeling (SEM) approach is deemed most suitable for the present investigation. The model was constructed based on the emergent findings and aims to present the interrelationships among all the detected dimensions.
6. Implications for Managers and Limitations of the Study. In conclusion, this study provides suggestions for managers and highlights limitations that may impact future progress. These recommendations and constraints serve as valuable insights for other academics in the field.



## 2. Introduction

This Chapter presents a comprehensive introduction to the entire Dissertation, covering key factors essential for understanding the context in which Telemedicine operates, including its uses and evolution.

Furthermore, this Chapter is crucial for explaining why it is essential to address the relational coordination and communication components related to Telemedicine in this research.

The Chapter will be structured into distinct sections that explore various facets of Telemedicine and its global applications, with a specific emphasis on the Italian context. Additionally, there will be an increasing focus on management and business-related components.

The opening section will explore various definitions of Telemedicine, providing clarification on related terms and applications in the digital health realm. This discussion will highlight key distinctions and areas of implementation. Upon realizing the intricacies of the digital health realm, it becomes necessary to delve into an analysis of the various facets of Telemedicine services.

Subsequently, an examination of the legislation, regulations, and directives promulgated by the National Authorities in recent years pertaining to the Italian context will be presented. The objective is to establish the parameters within which various Italian entities may operate while undertaking the implementation of Telemedicine initiatives.

The presentation of a Research Topic description is a direct outcome of the comprehensive preliminary study conducted in this Chapter. This statement will lay the foundation for future investigations carried out by the Author in this Dissertation Thesis.

### 2.1. What is Telemedicine?

The concept of Telemedicine has evolved since its first definition in 1971. In this context, Bird referred to Telemedicine as “the practice of medicine without the usual physician-patient physical confrontation” [1]. The same physician has presented an alternative rendition of the definition of Telemedicine, considering the technological capabilities of the era. He referred to a concept known as "bidirectional television" and has engaged in

a discussion regarding the highly favorable consequences of an audio-video system that may ensure interactivity. The natural consequence is the following definition: “Telemedicine is the practice of medicine via interactive television (or by means of any interactive audio-video communications system)” [1].

Although both the definitions provided by Bird are still very actual 50 years later as there are plenty of different systems providing interactive audio-video communications, today most acknowledged definition of Telemedicine is the one provided by World Health Organization (WHO) that defines it as “the provision of health services at a distance” [2]. This is a general definition of Telemedicine but, going more in deep, it is possible to define the client-to-provider and the provider-to-provider versions. What differs are the parties in the relationship while the common aspect is the geographical separation between them.

According to most definitions, a crucial determinant in the Telemedicine service is the spatial separation between the participants involved. The utilization of Information and Communication Technologies (ICTs) has contributed to the reduction of this distance. Indeed, Telemedicine is constructed upon and heavily relies on technological infrastructure. The use of Telemedicine is contingent upon the presence of technology, as the type and advancement of technology significantly impact the potential applications of Telemedicine and their level of intricacy. Technology is an essential prerequisite for the establishment of Telemedicine, serving as the primary enabler. The ongoing advancement of technological innovations not only supports the continuing evolution of Telemedicine practices but also fosters their growth. The ongoing evolution of Telemedicine can be attributed to this underlying factor.

Referring to what WHO called “health services at a distance”, WHO has discussed about the positive implications of virtual care solutions that have “the potential to save organizations money on healthcare while keeping employees healthy and productive” [3]. This definition of Telemedicine was provided in 2022, at a time when the significant role that Telemedicine played in addressing and surmounting pandemic-related limits and challenges had unsurprisingly resulted in the emergence of various use cases and corresponding business solutions [3].

Telemedicine is becoming an integrated tool in the delivery of health care and will soon be a part of mainstream medicine, but the practice of Telemedicine is difficult and complex [4]. Telemedicine assists collaborating medical professionals with shared decision-making in medical diagnosis and treatment. Physicians should involve patients in the decision to seek further medical actions involving the choice of a specialist, as a starting point for more in-depth investigations into underlying causes. The procedure allows the specialist to investigate more thoroughly the compatibility of the medical scheme with the specific situation and to pursue discussions with the referring physicians about the proposed management plan including supposed

diagnosis and corresponding treatments. It is the duty of the requesting physician to provide the patient with the information necessary for a free and informed consent. For their part, the specialist must ensure to have in hand all the necessary information since he is responsible for the diagnosis and treatment formula recommended [4].

To enhance the medical decision-making process, clinicians may seek the input of other medical professionals. When the opinion is institutionalized and communicated to medical professionals through a clearly defined set of norms, it can be manifested as a clinical protocol of treatment, practice guidelines, or consensus conferences. These decision aids are derived from expert opinion and a systematic analysis of the literature, following a structured approach. Telemedicine is an emerging form of decision support that has undergone continuous advancement and demonstrated its ability to effectively integrate technological growth with superior quality [4].

Effective collaboration is essential among physicians, as well as between physicians and other healthcare workers engaged in Telemedicine protocols. This collaboration should be based on the recognition and utilization of diverse and complementary skill sets. By doing so, each individual participating assumes accountability for their own actions and decisions.

Telemedicine today refers to a health-related service that utilizes telecommunication and electronic information technology. The concept of Telemedicine pertains to the whole assemblage of deliverables that have been specifically devised to facilitate effective communication and collaboration between patients and their physicians or between healthcare professionals [5].

The utilization of Telemedicine has resulted in enhanced accessibility to healthcare treatments of superior quality. Patients will now receive healthcare services that are tailored to their individual needs and preferences [6-7].

In addition, individuals can conveniently connect with healthcare professionals through the utilization of video application software. This enables consultations to be conducted remotely that facilitates the engagement of specialists, hence augmenting the overall patient experience, while clinicians benefit from enhanced networking capabilities, improved data storage and management systems, and the ability to leverage each other's specialized expertise. This enhancement contributes to the overall improvement of medical practice by reducing the time doctors allocate to rural assignments, so enabling them to allocate more time and resources towards patient care [7]. Furthermore, the adoption of electronic files enables a more streamlined and easy process, where clinicians

can access patient information more easily, leading to reduced overall wait times and enhanced productivity [6-7].

When providing a definition for Telemedicine, it is crucial to emphasize that in certain instances, alternative terminology may be employed interchangeably with the term

"Telemedicine." The two most prevalent terms in the field are "Telehealth" and "E-Health". The word "Telemedicine" had limited dissemination after its initial emergence in the early 1970s but gained popularity in the scientific literature starting in 1994. However, the term "Telehealth" emerged some years later and experienced significant development in 1996, although it initially had a far lower level of use compared to "Telemedicine". The final term among the three under consideration for gaining popularity is "E-Health." Although it has just gained popularity, this word is now widely utilized in numerous scientific works [8].

The initial formulation of the concept of E-Health was established by Mitchell in 1999 defining E-Health as "a new term needed to describe the use of electronic communication and information technology in the health sector" [9]. One widely recognized and significant definition of E-Health is the one proposed by Eysenbach that has referred to it as "an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies" [10]. However, as in the context of Telemedicine, the prevailing and widely recognized definition of E-Health is that provided by the World Health Organization defining it as "the use of information and communication technology in support of health and related fields" [2].

Hence, based on the definitions, E-Health encompasses the comprehensive range of information and communication technologies (ICTs) and their application within the healthcare industry, serving various purposes. Telemedicine is exclusively restricted to the utilization of technology for the purpose of facilitating and delivering therapeutic services from a remote location.

Telehealth serves as a viable solution bridging the gap between E-Health and Telemedicine (Figure 1). The word "Telehealth" is frequently employed interchangeably with "Telemedicine," despite a subtle distinction between the two. Telehealth is a more encompassing phrase compared to Telemedicine, as it accounts for both remote healthcare services (referred to as Telemedicine) and non-clinical activities, such as administrative tasks [11].

The concept of Telehealth entails the idea that Telemedicine significantly impacts medical work [12]. This is particularly true in the context of Tele-expertise, wherein two or more healthcare professionals engage in a collaborative exchange to seek guidance or discuss



the health condition of a patient. This scenario exemplifies the common dynamic between Specialist Doctors and General Practitioners. Specialists possess specialized knowledge within their unique field, while General Practitioners have a broader responsibility for overall health condition of the patient. Additionally, General Practitioners commonly serve as the initial point of contact within healthcare systems and are regarded as an essential and recognizable component of the patient's social environment [13-14].

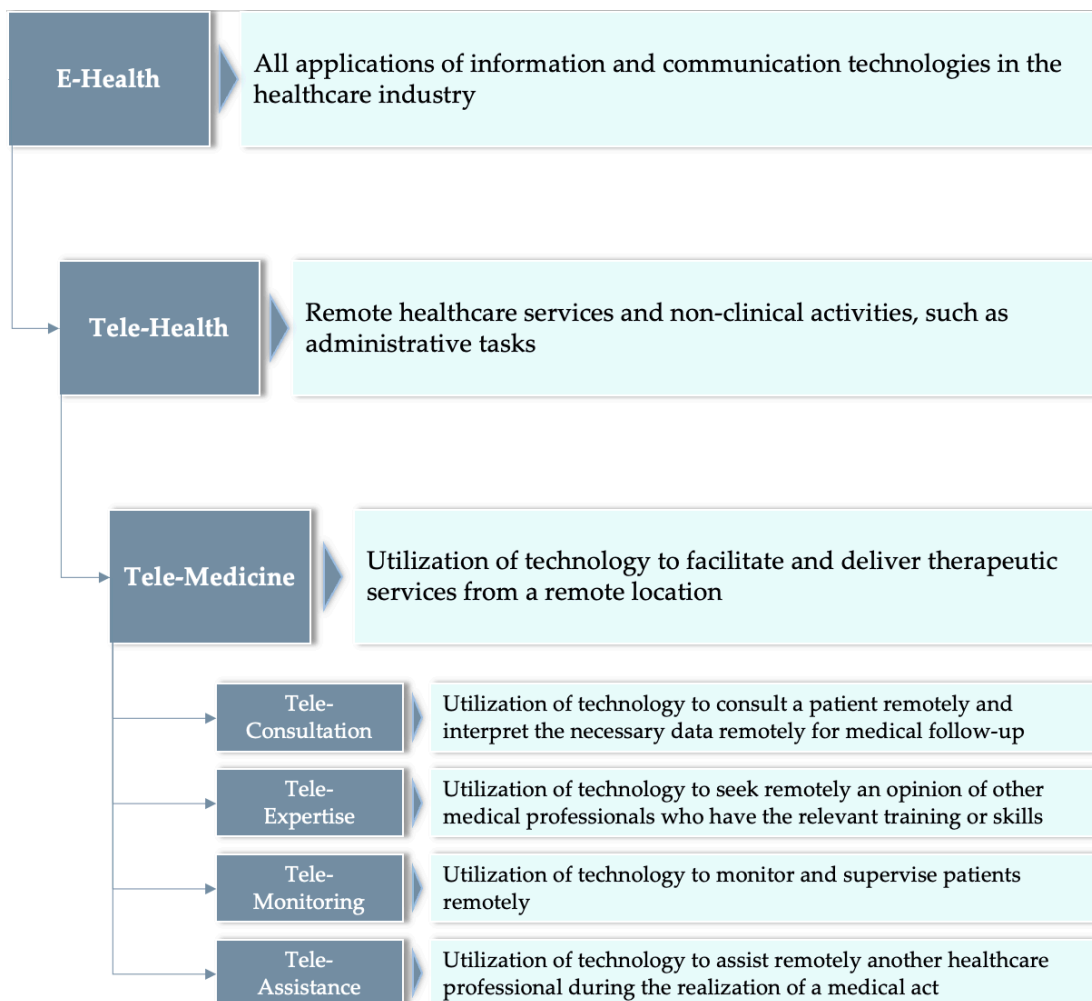


Figure 1: Classification of Digital Health among E-Health, Telehealth and Telemedicine

In the context of chronic care management, Tele-expertise can be understood as a coordination mechanism facilitated by digital artifacts [15], facilitating the flow of information and knowledge. Nevertheless, it is imperative to acknowledge that the technology aspect of tele-expertise necessitates the presence of organizational frameworks, such as routines and procedures, to facilitate efficient coordination.

Considering all the implication and positive effects that Telemedicine has on the quality of services as well as on the efficiency and effectiveness of relationships in organizations

and cross-organization between professionals in the healthcare system, policymakers are actively working towards the integration of Telemedicine into conventional healthcare practices [15-16].

## 2.2. Fundamental components of Telemedicine

To go deeper into the notion of Telemedicine, the Author deemed crucial to conduct a thorough analysis of its fundamental attributes. A Telemedicine system is distinguished by six fundamental attributes [17]. The initial components that are included in numerous descriptions of this concept are:

- Geographical disconnection;
- Utilization of telecommunication technologies;
- Selection of a suitable team to execute and oversee all operational tasks;
- Development of an organizational structure that aligns with the requirements of the Telemedicine system.

Moreover, the effectiveness of the Telemedicine application can be enhanced by two additional parameters:

- Implementation of appropriate regulations and guidelines to replace traditional face-to-face meetings;
- Establishment of a set of protocols aimed at accurately triaging patients, thereby facilitating accurate diagnosis and treatment.

A systematic representation (Figure 2) of the concept of Telemedicine has been provided by Haleem that reflects the various features and facilities offered by it which ultimately enable this methodology to support the healthcare and medical care services [18].

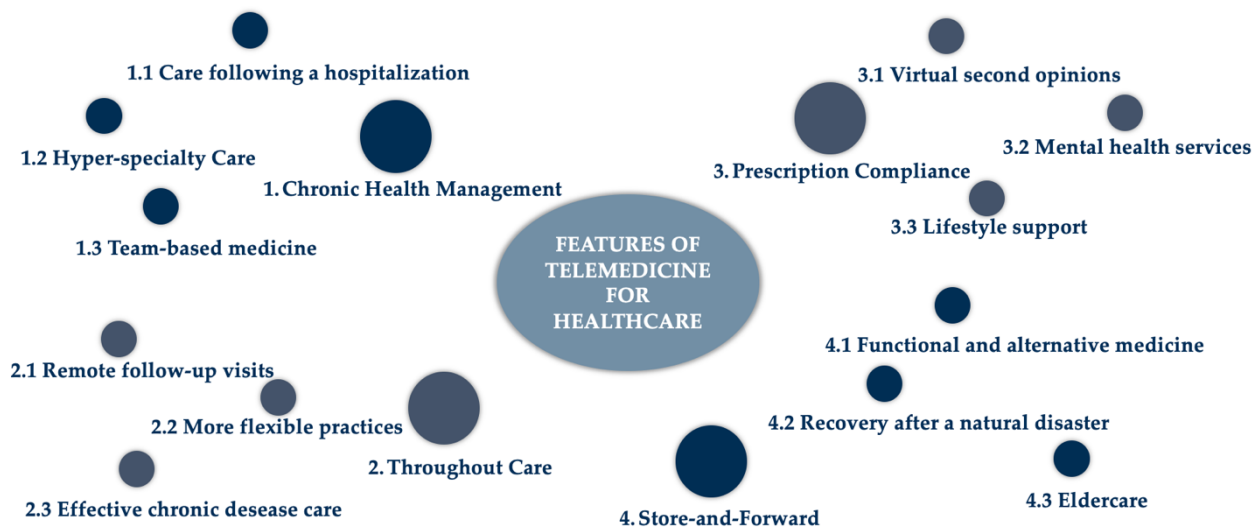


Figure 2: Haleem's classification of capabilities and features of Telemedicine

The application of this technology encompasses a diverse array of functions, such as conducting virtual patient consultations, facilitating remote control operations, enabling Telehealth nursing services and supporting remote physical and psychiatric rehabilitation programs. The implementation of Telemedicine offers several advantages in the healthcare sector, including enhanced healthcare decision-making, improved quality, and efficiency of emergency services, expedited diagnostic processes, and cost savings for medical professionals and patients through the optimization of clinical procedures and reduction of hospital-related travel expenses [5-6].

## 2.3. Telemedicine services

The escalating expenses associated with healthcare and the imperative for enhanced medical care standards have prompted an increasing number of hospitals to explore the advantages of Telemedicine [18]. There is a desire for enhanced communication between physicians and geographically distant patients, as well as a need for greater utilization of healthcare facilities. Telemedicine also enhances connectedness, leading to a reduction in hospital readmissions and improved patient adherence to prescription treatment programs.

The enhanced connectivity offered by Telemedicine also extends to inter-physician communication. Telemedicine can be utilized by medical professionals to establish support networks for the purpose of exchanging their expertise and enhancing the delivery of healthcare services. Telemedicine refers to the provision of medical care via the internet, typically facilitated through video conferencing technology. This technology offers numerous benefits for both patients and healthcare practitioners. Despite the presence of technical challenges, Telemedicine has the potential to complement and improve the entire patient experience [19-20].

Within the realm of Digital Health, Telemedicine can be implemented across various applications and services. This paper examines the functionalities and attributes of Telemedicine within the framework of a healthcare management system.

The concept of Telemedicine and its associated services has been widely recognized and substantiated in the context of providing social support. Figure 1 depicts the extensive array of attributes and capabilities offered by the Telemedicine idea, namely in the realm of healthcare. This approach provides a range of services including chronic health management, prescription adherence, remote services, and treatment for critical and severe cases, among other notable features. These competencies ultimately contribute to the support of the healthcare and medical care sector. Moreover, the integration of a set of tele-wearables possesses the potential to enhance the recuperation procedure of individuals, simultaneously delivering timely updates pertaining to their health condition in a unique method [4-15].

Telemedicine, an innovative technology advancement, is often regarded as a disruptive phenomenon within the domain. Telemedicine employs various electronic communication systems, such as teleconferencing, image-sharing, and remote patient surveillance, to deliver healthcare treatments to patients who are geographically remote.

In addition, physicians may employ automation as a strategy to deliver therapy of exceptional quality to their patients. The organization should prioritize the improvement of its IT support systems and develop expertise in a new file management methodology. One example of this phenomenon is the implementation of virtual appointments, which enables primary care physicians to seek advice from specialists when they have questions regarding a certain condition or treatment. The expert is presented with a diverse range of data, including examination reports, history records, medical findings, X-rays, and other images, which are intended for scrutiny by the physician. The specialist has the capacity to engage in electronic communication and facilitate a virtual consultation with the doctor. Virtual consultations have the capacity to alleviate the need for unnecessary referrals to specialists that would otherwise be carried out face-to-face. This can lead to a decrease in waiting times for specialized input and eliminate the need for unnecessary travel. The utilization of Telemedicine strategies proves to be advantageous in situations where a healthcare professional can conduct a visual examination of the patient, provide a correct medical diagnosis, and record the interaction [10–21].

Healthcare systems can be categorized into various levels, including provider, Local Authority (such as Region), and National System. The concept of integration holds significant importance not only within the domain of Tele-expertise, but also within the broader context of Telemedicine. These systems are seamlessly connected and capable of exchanging data, functioning and operating in a manner similar to an ecosystem. Examples include the reservation platform and the Electronic Health Records system, which require access to the Telemedicine platform in order to unlock a multitude of options for healthcare providers.

An electronic personal health record system employs health records that possess the capacity to monitor and uphold. Web-enabled gadgets, such as desktop computers or smartphones, have the capability to be utilized at any given point in time. In the case of an emergency, a personal health report promptly provides emergency responders with essential information, including diagnoses, prescribed drugs, drug preferences, and relevant contact details of the attending physician. The purpose of the system is to enable consumers to efficiently manage their medical records in a safe and centralized manner. It is imperative for recovery programs to establish precise objectives in order to effectively augment patient behavior, a matter that is progressively gaining significance.

Bashshur conducted a comprehensive analysis of Telemedicine services and put out a schematic model for categorizing the various available services. The framework comprises three distinct dimensions, namely: technology, functionality, and applications [21].

The technology dimension assesses the degree of synchrony, network capabilities, and connectivity options available within a given system. synchrony refers to the ability to facilitate real-time and live interaction among users. Network capabilities encompass

several modalities, each of which may offer different levels of security and protection. Connectivity options can include both wireless and cable connections.

The applications domain encompasses fundamental medical disciplines as well as sub-specializations that are categorized based on three factors: disease entities, sites of care, and treatment methods.

Finally, the functionality dimension encompasses various aspects, including consultation, diagnosis, monitoring, and mentoring. Consultation refers to the exchange of information between healthcare providers or between providers and patients. Diagnosis involves the use of images and records obtained from a remote location to make a medical diagnosis. Monitoring involves providing home care for patients and closely overseeing their medical condition. Mentoring refers to the provision of medical guidance by specialists to other healthcare professionals [21].

The model has three dimensions, which can be shown as a three-dimensional matrix (see Figure 3). By intersecting the parameters, one can effectively discern and categorize various Telemedicine services.

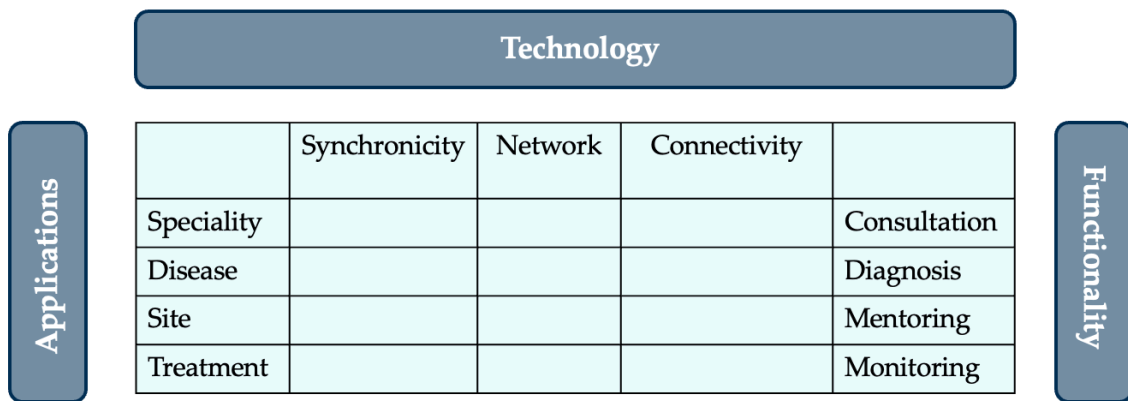


Figure 3: Three-dimensional matrix of Telemedicine Services

The Joint Action to Support the eHealth Network has produced a taxonomy of various Telemedicine services, which is similar but less complex. The initial categorization suggested is based on the distinction between synchronous, which refers to real-time communication, and asynchronous, which involves store-and-forward mechanisms. The application of these two methods of providing healthcare services can be extended to a diverse range of services, including teletriage, teleconsultation, telediagnosis, telesurgery, telescreening, and telemonitoring. Ultimately, the services possess the capacity to be implemented and utilized across many fields of expertise, resulting in a

very extensive array of potential applications for Telemedicine. The recognized fields of use that are most observed include radiology, pathology, dermatology, psychiatry, cardiology, ophthalmology, nursing, and pharmacies [22].

## 2.4. Telemedicine applications

Telemedicine applications are utilized for the purpose of diagnosing and monitoring patients to provide preventive and curative care. These applications necessitate the involvement of knowledgeable professionals who may offer guidance in making therapeutic decisions, prescribing treatments, recommending, or performing services, and monitoring the patient's status. Telemedicine has been developed within this situation. Organized networks can facilitate the sharing of information and skills, thereby enhancing patient management in various healthcare contexts, including emergency care and the treatment of chronic diseases such as cardiovascular diseases, diabetes mellitus, respiratory diseases, chronic renal failure, cancer, nervous system disorders, musculoskeletal disease, and multi-morbid patients [23]. Telemedical interventions encompass various sorts, such as the utilization of telemedical devices to measure vital signs, interactive systems, and direct personal engagement between healthcare providers and patients.

In addition to various medical practices, Telemedicine imposes comparable responsibilities on physicians, while patients are entitled to equivalent rights as those in traditional medical settings. Non-compliance has the potential to involve regulatory bodies responsible for professional monitoring.

The utilization of telemedicine is becoming increasingly essential in the medical field due to the growing emphasis on specialized areas of practice. Currently, patients who see a General Practitioner have the option to seek advice from a specialist through telecommunication resources. This approach offers the advantages of saving time and money while ensuring high-quality medical treatment. It eliminates the need for physically transferring patients to experts for in-person consultations [24].

Telemedicine emphasizes two equally important aspects, as stated by Adewale [25]:

The escalation of diagnostic intricacy frequently necessitates peer-to-peer consultation, which relies on data such as pictures, sometimes referred to as tele-consultation. Both the utilization of a tele-consultation with an expert and the utilization of a tele-consultation with a knowledge-based system are plausible options.

Telemedicine serves to promote healthcare equity for those residing in rural and distant regions who encounter challenges in accessing specialized medical treatments, in contrast to their metropolitan counterparts. Additionally, it addresses the provision of home care for specific populations, such as the elderly.



## 2.5. Italian Scenario

### 2.5.1. The utilization of Telemedicine in Italy within the COVID-19 pandemic

Telemedicine has played a significant role in combating the COVID-19 pandemic and providing assistance to the healthcare sector. The development of Telemedicine in Italy was significantly influenced by the COVID-19 pandemic, as emphasized by Negrini [26].

The COVID-19 pandemic has created a window of opportunity to rapidly advance the adoption of digital solutions which can improve activities that support integration at clinical, professional, organizational and system levels. Global examples demonstrate how the pandemic has also created opportunities to use technology to address core values of integrated care like person-centeredness and coordination. [27]

The utilization of Telemedicine as a means of diagnosing, monitoring, and providing rehabilitation treatment is demonstrating significant promise in the context of the ongoing epidemic, as emphasized by Bahsnur [28]. The current proliferation of Telemedicine, in contrast to prior instances of pandemics, can be attributed to the confluence of unparalleled technical accessibility and extraordinary medical conditions. The significant growth of Telemedicine during the Covid-19 pandemic of 2019 can be attributed to various factors. Notably, the widespread impact of the pandemic, which is considered the most severe of the previous century, played a crucial role. However, the primary driving force behind the Telemedicine boom was the utilization of mobile technology, specifically smartphones. These devices have the capability to support Telemedicine applications, including those reliant on wearable sensors. This represents a notable advancement compared to previous times when dedicated technological solutions were required for such purposes. Throughout the progression of the pandemic, Telemedicine has demonstrated significant and rapid growth [29].

Regarding the situation in Italy, the introduction of innovative solutions to the health area was hindered by cultural hurdles and organizational limitations, hence impeding a seamless implementation. The entrance was accompanied by contrasting elements of light and darkness [30]. Two distinct phases may be discerned in the evolution of Telemedicine utilization amongst the ongoing pandemic. During the initial phase, encompassing the first lockdown period from March to July 2020, two significant concerns were identified. The initial concern might be succinctly described as a missed chance to extensively disseminate Telemedicine for individuals requiring long-term care, as emphasized by Omboni [31]. According to him, Italy exhibited a lack of

preparedness in using Telemedicine during the initial stage of the catastrophe. The second concern is to a missed opportunity in delivering sufficient Telemedicine services to individuals who opt out of emergency care.

Vigano in 2021 [32] emphasized two key findings regarding the initial phase of the pandemic. Firstly, there was a notable decrease in the number of individuals seeking emergency room care and being admitted to hospitals. Secondly, this decline in in-person healthcare utilization may have resulted in a subsequent rise in healthcare demands that could potentially be addressed through remote techniques. However, it is important to note that during this period, the full functionality of remote healthcare methods was not yet fully realized. Following the initial lockdown, a phase of development can be observed, during which responses to significant challenges started to emerge. These responses were driven by the exceptional demands arising from the pandemic and were accompanied by various institutional guidelines pertaining to the utilization of Telemedicine and interventions in the field.

Several publications issued by the Istituto Superiore di Sanità, the Italian National Institute of Health, have specifically examined Telemedicine and its application in several areas. Additional players, such as the Regional Government and the Italian Ministry of Health, have also implemented measures aimed at fostering the adoption of Telemedicine. Political initiatives that can be reported include the development of national guidelines by the Ministry of Health for the implementation of Telemedicine services. These guidelines aim to address the inconsistent utilization of Telemedicine and establish its official recognition as a healthcare service of equal value to traditional healthcare services. The decision to utilize them or not is ultimately at the discretion of the physician.

## 2.5.2. Telemedicine National Guidelines

The COVID-19 pandemic in 2020 necessitated the National Government and Local Authorities to undertake a comprehensive reassessment and restructuring of the National Health Service, as well as the delivery of healthcare services to people. Indeed, the emergence of COVID-19 has played a significant role in facilitating the endorsement of the document titled "Indicazioni nazionali per l'erogazione di prestazioni di Telemedicina" (National Guidelines for the provision of Telemedicine services) in December 2020 [33]. The National Guidelines have furnished and revised the definitions of various Telemedicine services and their respective distinguishing features. Specifically, while considering the utilization of Telemedicine by healthcare practitioners, it is possible to identify:

- Medical teleconsultation, also known as teleconsulto medico, refers to a medical practice in which two or more physicians engage in remote interaction to deliberate on a patient's clinical condition. This process primarily relies on the exchange of comprehensive clinical data, reports, photos, and videos pertaining to the individual case. Teleconsultation can also be conducted in an asynchronous manner, without the need for real-time interaction, and without the physical presence of the patient being necessary. The objective of this service is to provide a "second specialist opinion" to facilitate the selection of the optimal care solution for the patient.
- Teleconsulenza medico-sanitaria, also known as teleconsulting, is a form of medical consultation that involves multiple individuals with distinct responsibilities pertaining to a specific case. This may include the involvement of a General Practitioner and a specialized physician, among others. This tool is utilized to solicit assistance during the execution of healthcare tasks. In the context of medical teleconsultation, Teleconsulting can be conducted either with the patient present or in their absence.
- Telerefertazione, also known as telereporting, refers to the digital adaptation of the conventional process of generating a report following a clinical test. In this context, the physician responsible for authorizing the document is situated in a distinct location from where the examination was conducted by the patient. The physician has the ability to engage in communication and seek assistance from an

operator situated in the vicinity of the examination site. Upon completion of remote diagnosis of the clinical condition, the specialized physician bestows legitimacy and authenticity to the document by means of a digital signature.

Subsequently, the document is kept in an interoperable and secure system.

In Italy, the first national guidelines on Telemedicine were approved by the General Assembly of the Superior Health Council in 2012 [34]. Since that year, several actions have been taken nationwide to promote the adoption of Telemedicine, mainly in light of the COVID-19 pandemic. One of them is part of the PNRR and will be elaborated by the Author in the subsequent paragraph.

### 2.5.3. National Recovery and Resilience Plan (PNRR)

In light of the crisis experienced by the Italian National Health Service during the pandemic, numerous issues have arisen pertaining to the imperative of bolstering the primary care network and enhancing the efficacy of home care services. The pandemic has served as an event that has brought to light the various faults inside a system that has been consistently overlooked by the government over a prolonged period of time. In the present context, during the spring of 2021, the Italian Parliament and the European Union Commission have granted approval to the "Piano Nazionale di Ripresa e Resilienza" (PNRR), which translates to the Recovery and Resiliency National Plan [35]. The statement pertains to the utilization of the NextGenerationEU funds in Italy, which is an application of the European financial plan aimed at supporting countries in achieving a recovery that is durable, equitable, inclusive, and uniform [36].

The Italian National Recovery and Resilience Plan (PNRR) possesses a monetary worth over €200 billion and encompasses six strategic objectives aimed at rejuvenating the entirety of the nation and its economic landscape. The sixth Mission pertains to the domain of healthcare and is allocated a budget of approximately €15 billion. The COVID-19 pandemic has underscored the significance of the healthcare system as an essential public good and has highlighted the intrinsic value of health. Due to this rationale, Mission Six of the National Recovery and Resilience Plan (PNRR) is bifurcated into two distinct lines of activity. The first aspect pertains to primary and intermediate care as well as Telemedicine, whilst the second aspect pertains to additional healthcare innovations, research, and the digitalization of the National Healthcare Service [37]. The PNRR presents a significant opportunity for the Italian National Health Service (NHS) to address the consequences of prolonged financial scrutiny and budget reductions. This initiative offers substantial resources that can potentially facilitate the restoration and potential enhancement of the whole healthcare system.

### 2.5.4. New models and standards for the development of territorial healthcare – DM77/2022

In May 2022, the "Decreto del Ministro della Salute" (Decree of the Ministry of Health) number 77, abbreviated as DM77, was approved and published in the Gazzetta Ufficiale (Official Journal). This decree pertains to the establishment of models and standards for the enhancement of territorial assistance within the National Health Service. The primary aim of this document is to redefine healthcare services within specific regions. This

redefinition involves enhancing residents' access to care, alleviating hospital overcrowding, and reducing waiting times. Telemedicine plays a crucial role in achieving these objectives, as it becomes an essential component of the broader framework of the healthcare process, encompassing both straightforward and intricate aspects [38a]. These instructions represent a crucial initial measure in the endeavor to maximize the utilization of the financial resources that Italy is set to receive from the European Union, in alignment with the NextGenerationEU initiative.

## 2.6. Ways in which Telemedicine enhances Relational Coordination

The Relational Coordination Theory (RCT) [39] constitutes a valuable interpretative lens for understanding the role of Tele-expertise as a coordination mechanism. In the Relational Coordination (RC), the main construct within this theory, is defined as “a mutually reinforcing process of communicating and relating for the purpose of task integration” [40]. RC includes two dimensions through which organizational agents perform coordination: shared goals and shared knowledge. RCT is therefore focused on the quality of the relationships in organizations [15], with respect to other interpretations of coordination [41]. The model postulates two propositions:

- RC is supported by the presence of cross-cutting structures (e.g., protocols, information systems, regular meetings, etc.) [41];
- RC drives the achievement of positive outcomes, such as quality and efficiency [42].

This study is positioned with particular reference to the use of Telemedicine to improve RC, keeping into consideration possible moderating factors such as the possess of digital competences. In practice, understanding the relationship between the use of Tele-expertise and RC is of paramount importance at the present time. As healthcare systems are investing much effort in developing large scale Telemedicine services, it is relevant to understand how communicating and sharing knowledge through digital platforms may affect the quality of relationships among health professionals. At present time, coordination between Specialist Doctors and General Practitioners is often lacking, fragmented or informal often due to lack of proximity and establishment of ad hoc moments of interaction. Moreover, as RC has been shown to positively influence outcomes of interest within organizations, RCT could contribute to understand whether the use of Telemedicine for medical coordination could potentially contribute to better outcomes, such as quality of care and efficiency.

## 2.7. Research Topic

Based on the comprehensive array of material, studies, research, and documentation presented in this chapter, the Author has successfully derived several essential messages, which are succinctly summarized above.

- i. Telemedicine is playing a significant role in combating the COVID-19 pandemic and providing assistance to the healthcare sector. The narrative review examined two perspectives: (a) the first perspective critically assessed the institutional initiatives implemented by the Italian government to encourage the adoption of Telemedicine; (b) the second perspective analyzed the progression of scientific literature in the field, specifically focusing on the Italian context.
- ii. The rising healthcare costs and the need for improved medical care standards have led to a growing interest in Telemedicine. This technology enhances communication between physicians, leading to reduced hospital readmissions and improved patient adherence to treatment programs. It also allows medical professionals to establish support networks for exchanging expertise and enhancing healthcare services. Telemedicine can be implemented across various applications and services, including healthcare management systems.
- iii. Tele-expertise is a coordination mechanism in chronic care management that uses digital artifacts to facilitate information flow and knowledge flow. However, it requires organizational frameworks like routines and procedures to facilitate efficient coordination. The Relational Coordination Theory (RCT) provides a valuable interpretative lens for understanding tele-expertise's role in coordination. RC is defined as a mutually reinforcing process of communicating and relating for task integration, with shared goals and knowledge being key dimensions. Telemedicine has positive effects on service quality, efficiency, and relationships within organizations. It is essential to analyze its fundamental attributes, which include geographical disconnection, telecommunication technology use, team selection, and organizational structure development. The effectiveness of Telemedicine can be enhanced by implementing regulations and protocols for accurate patient triage. Telemedicine offers numerous advantages in the healthcare sector, including enhanced healthcare decision-making, improved emergency services quality, expedited diagnostic processes, and cost savings.

Based on the factors mentioned above, the Author has posited the potential for

conducting a study examining whether the integration of Telemedicine improves the RC mediated by the use of tele-expertise. Consequently, this is the main research purpose that will guide the study and the reasonings behind the following Chapters of this Dissertation.



## 3. Literature Review

In the subsequent sections, the Author will present a comprehensive and methodical examination of the current state of literature pertaining to the different aspects of healthcare professional coordination facilitated by the utilization of Telemedicine. To begin, this section will provide a comprehensive outline of the technique utilized, emphasizing the methodical approach employed by the reviewer in developing the Literature Review. Following this, an analysis will be conducted on the theoretical framework that underlies the conceptual review before an in-depth exploration of the specific study findings. Therefore, this study will examine the limits and provide possible paths for further research. The study will thereafter identify and clarify gaps in the current collection of literature, so facilitating the development of research inquiries for later portions of the study.

### 3.1. Methodology of the Review

In these paragraphs, the Author explicitly outline the procedures undertaken to identify and utilize the sources required for conducting the literature review.

The Literature Review presented in this study has been based on the Eight-Step Guide to Conducting a Systematic Literature Review authored by Okoli [43].

Specifically, the procedures undertaken are as follows:

1. The purpose of the Review has been identified by reviewers, along with the anticipated objectives of the review.
2. A literature search was conducted wherein Review formulated a research query to get papers and studies from the scientific database Scopus.
3. The Review has adhered to the PRISMA 2020 principles in conducting the screening procedure for this review. The Author has provided a comprehensive explanation of each exclusion criterion to assure the quality of the review.
4. Data extraction was conducted on each of the papers included in the review, wherein a thorough reading was undertaken to extract factual information, specific details, and relevant assertions.
5. The Author has conducted a narrative and bibliometric review by synthesizing research. She has carefully selected the most significant and pertinent aspects from each study and then aggregated, discussed, compared, and organized the acquire information. This process allows her to make sense of the numerous papers and

gain a comprehensive understanding of the topic.

6. In the last stage, Reviewer have documented her observations and composed the review.

Despite the systematic approach employed in constructing the Literature Review, additional academic sources were required to complement the documents obtained through the first Scopus database search. This step was taken to further explore specific theories highlighted in the literature and to strengthen the Author's hypotheses.

In particular, the further analysis was carried out with the aim of deepening J. H. Gittel's theory of Relation Coordination. 9 academic papers in total have been included in the Literature Review.

Additionally, 2 papers specifically addressing the research topic were incorporated into the review. A more in-depth analysis was conducted to address concerns related to the collaboration between physicians and the integration of IT systems utilized in Telemedicine applications, which are fundamental for communication within a network of healthcare organizations.

In the following paragraphs, a detailed explanation of each of the previously outlined phases has been provided to guarantee maximum transparency and replicability of the Review presented here.

### 3.1.1. Identification of the Purpose

Based on Okoli's study, it is crucial for each Systematic Literature Review to begin with a clearly articulated statement of the underlying purpose that serves as the driving force for the Reviewer. The literature review fulfills the objective of presenting the rationale behind undertaking a comprehensive examination of existing scholarly works. According to the source referred to. [43]

The objective of this Review is to provide a thorough examination of the existing scientific literature regarding the topic of Telemedicine and its impact on Relational Coordination, as indicated by researchers. The preceding chapter has illustrated the growing importance of Telemedicine, seen in its escalating relevance inside healthcare sector. Furthermore, the COVID-19 pandemic has amplified the importance of Telemedicine.

In the current context, it is essential to perform a Systematic Literature Review to thoroughly analyze the existing body of research related to this topic, with the objective of assessing specific areas of study that require further exploration.

## 3.2. Conduct a Literature Review

The starting point of the second phase involves the establishment of a scientific database to facilitate the exploration of pertinent material. Scopus was chosen due to its high-quality papers and its ability to handle intricate and sophisticated queries. Google Scholar, despite its extensive coverage relative to Scopus [44], undergoes frequent modifications to its contents, algorithms, and database structure. Consequently, Scopus emerges as a more preferable option for conducting systematic reviews [45]. In addition, the literature review section of this study has 27 sources. Scopus provides a more extensive range of operators and filter options in comparison to Google Scholar.

Once the database has been established, the subsequent task involves formulating the research query.

### 3.2.1. Definition of the research query

The main research query string was formulated by the Author, incorporating parameters determined through preliminary research and prior studies.

The use of the search terms "health AND care" and "healthcare" in the Scopus query is

consistent with the comprehensive focus of the thesis on Telemedicine and the coordination of healthcare professionals within the healthcare system. The objective in utilizing terminology such as 'care' and 'healthcare' was to broaden the scope of literature beyond the purely technical aspects of Telemedicine. The purpose was to investigate broader concepts pertaining to the provision of healthcare services, the collaborative efforts among healthcare professionals, and the overall healthcare environment. The adoption of this inclusive approach guarantees that our examination encompasses not only the technological aspects of Telemedicine, but also the interdisciplinary and systemic dimensions. This contributes to a comprehensive comprehension of the challenges and opportunities involved in coordinating medical professionals through Telemedicine interventions.

The parameter "coordination" has been added to the research with the operator AND to produce outcomes that encompass all aspects related to healthcare, including its intersection with coordination. A filter has been implemented for the source type, restricting the documents to come exclusively from Journal sources. In consideration of the Review's scope, the predominant subject areas are "Business, Management, and Accounting" as well as "Social Sciences". The rationale for the first topic is evident. However, the second subject area has been selected to encompass literature pertaining to healthcare sector and theory, classified under the domain of Social Sciences according to Scopus categorization.

Following this, a filter has been applied to limit the type of documents retrieved, focusing solely on Articles and Reviews. The Year of Publication has been restricted to include only publications from this millennium. The final filters applied pertain to language preferences, ensuring results are in English only.

A visual presentation illustrating all the selected parameters is available in Table 1:

| Dimensions                                       | Parameters   |
|--|--|
| <b>Health system parameters</b>                  | Health AND care, healthcare  |
| <b>Relational Coordination design parameters</b> | coordination   |
| <b>Filters</b>                                   | LIMIT-TO ( SRCTYPE , "j" ) ) AND ( LIMIT-TO ( DOCTYPE , "ar" ) OR LIMIT-TO ( DOCTYPE , "re" ) ) AND ( LIMIT-TO ( SUBJAREA , "soci" ) OR LIMIT-TO ( SUBJAREA , "busi" ) |
| <b>Yers</b>                                      | 2000-2023  |
| <b>Language</b>                                  | English  |

Table 1: Research Query

Furthermore, an additional search query was employed in the Scopus database, forming the basis for drafting paragraph 3.3.

In the search the term “relational coordination” was queried within the Article Title, Abstract, and Keywords. In the “Authors” field, the Author chose to include the name of Jody Hoffer Gittel, the theorist behind this concept. These fields were linked using the AND operator, ensuring that a document would appear in the results if J.H. Gittel was the author or co-author of the work. As above, it was decided to filter only the results in English.

| Dimensions  | Parameters              |
|-------------|-------------------------|
| Focus topic | Relational Coordination |
| Authors     | Jody Hoffer Gittel      |
| Language    | English                 |

*Table 2: Research query on Relational Coordination*

### 3.2.2. Screening Process

In summary, the first research question outlined earlier was applied to the chosen database, Scopus, on August 25th 2023, resulting in 2174 records. Subsequently, the Reviewer carried out the screening process.

In light of these results, the Author utilized the SCImago Journal Rank to measure the level of scientific influence of the journals from which the papers originated. Based on this indicator, only the papers belonging to the Q1 ranking were selected. In total, only 1116 articles proceeded to the subsequent screening phase.

At this stage, the screening process complied to the PRISMA 2020 guidelines. [46]

The first step was analyzing the titles of the papers, leading to the exclusion of 873 papers that did not align with the primary research topics: Telemedicine and its impact on coordination.

A further in-depth analysis was carried out on the remaining 243 papers, involving the examination of the abstract of each. Consequently, 77 papers were excluded as their topics were unrelated to the areas of Telemedicine and coordination in the healthcare sector. In addition, 6 papers from the selected ones were excluded because they had 0 citations, even though they were written before 2023.

Subsequently 160 papers were selected for reading. Following a discussion among the Authors, 131 papers were excluded from the next stage of the Review. These exclusions were based on the identification of their primary topics:

- **Organizational design** (24): papers in this category are considered less appropriate for the objectives because it primarily concentrates on organizational issues, overlooking a comprehensive examination of the behaviors, competences, and relationships among healthcare professionals, which are crucial elements in our research setting.
- **Physician-patient relationship** (19): the studies exhibit an apparent disparity in its emphasis, primarily centering on the physician-patient relationship while neglecting to thoroughly explore the dynamics and interactions among healthcare professionals. Typical topics in this category included home teleassistance and may present a limitation, as it narrows the focus to a specific context.
- **Covid-19 scenario** (33): the primary emphasis of these papers on COVID-19-related aspects may pose a limitation as it appears to predominantly discuss elements that may no longer accurately reflect the post-pandemic reality.
- **Specific medical diseases** (45): this category focus on highly specific diseases, such as HIV and AIDS, or studies conducted in geographically non-representative areas, may pose limitations to its applicability in the Italian context.
- **Technology applications in Telemedicine** (10): these papers exhibit a disproportionate emphasis on the information and communication technology features of implementation, neglecting to thoroughly investigate the interdependence of healthcare actors.

From the second research regarding relational coordination, 30 papers were found.

In this case the Author decided to order them from least to most recent. The Author read all the Abstracts and decided to keep the 9 most relevant papers which explained the theory exhaustively, and which allowed the Author to understand how the model works also from a statistical point of view.

In addition, the Author discovered 2 scholarly articles that were deemed appropriate for the chosen research subject.

Overall, as a result of this PRISMA 2020 screening process, 40 academic papers have been incorporated into the Review discussed in the following section. A visual representation of the methodology employed can be found in Figure 4.

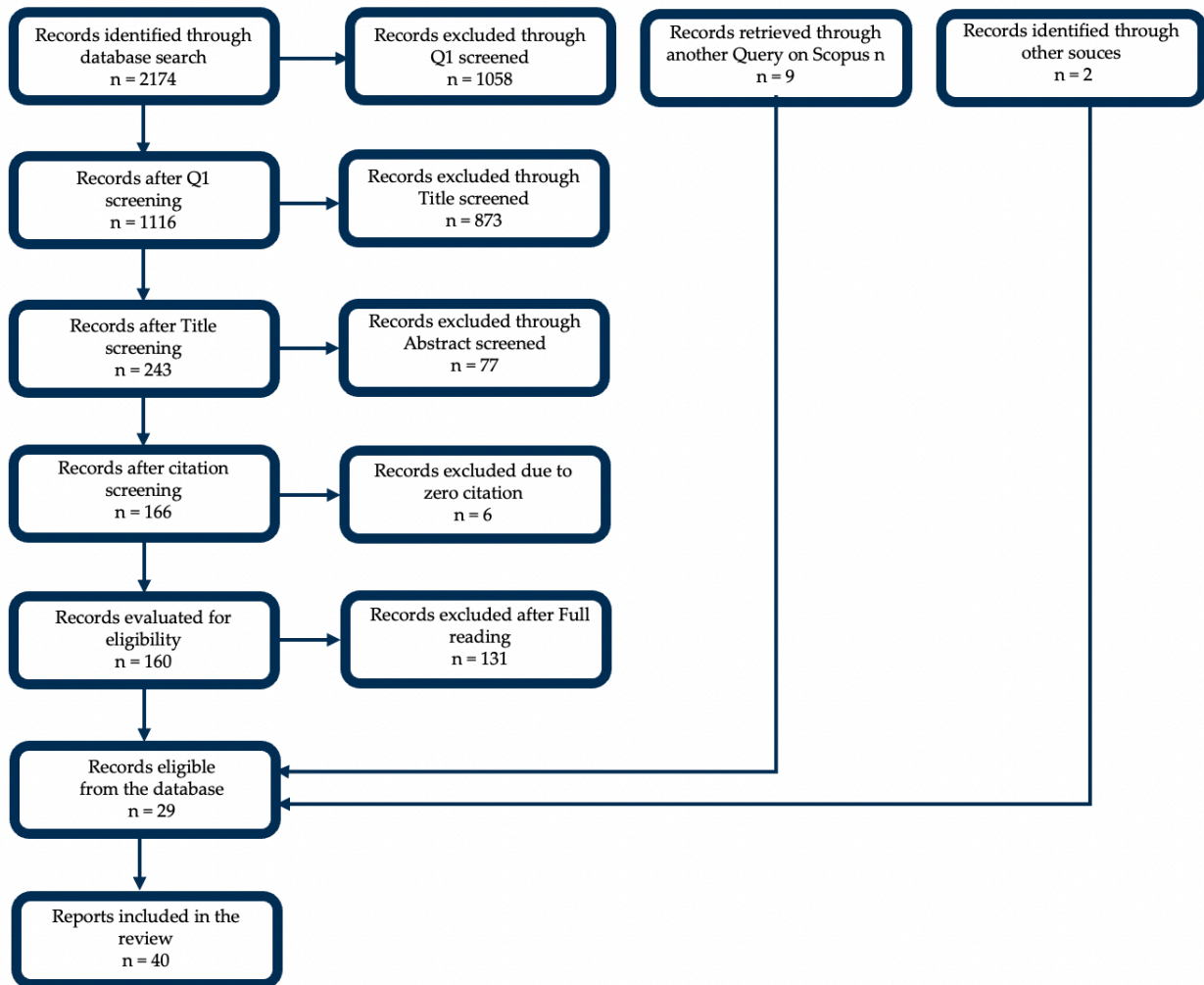


Figure 4: PRISMA Flow Diagram

### 3.2.3. Narrative Review

The primary objective of a narrative review is to systematically identify and briefly summarize the existing body of literature that has been previously published.

Functional specialization in healthcare involves individuals cultivating profound knowledge within specific fields, but it also poses challenges in efficiently synchronizing their endeavors. Integration is facilitated by five critical factors: sharing product knowledge, aligning organizational tasks, coordinating work processes, creating a supportive environment for teamwork, and consolidating reference data. The presence of relational coordination influences the effects of individuals who bridge boundaries and the occurrence of team meetings on performance. The ever-evolving nature of the working environment in the healthcare sector requires the adoption of adaptable processes and techniques for labor management. Academic literature plays a pivotal role in the advancement of research on interprofessional collaborative care by highlighting the importance of collaboration within integrative healthcare settings.

Customization of performance management strategies to align with the social environment is crucial, as it has the potential to enhance outcomes for both employees and patients. In interdependent work contexts like healthcare, the implementation of a developmentally oriented performance management system that encompasses cross-functional goals holds considerable importance. Perceptions of relational coordination influence the relationship between formative cross-functional performance monitoring and employee outcomes, and vice versa.

The Relational Coordination Theory is a highly comprehensive approach that serve as a foundation for the development of care coordination solutions aimed at addressing the complexities associated with chronic diseases. The intricate nature of healthcare supply chain management offers prospects for scholarly investigation in domains such as coordination, mass customization, and incentives. Hospital care administrators face several challenges related to technology, including inadequate information access, subpar information quality, limited efficacy of technologies, complications with different health information systems, and technological difficulties.

The concept of coordinated care is delineated into seven distinct elements, including access, data, information, service, infrastructure, professional care, interpersonal care, tailored care, continuity, and coordination. The integration of interdisciplinary perspectives is crucial for successful resolution of complex modern issues.

Effective care coordination is essential for managing patients with chronic illnesses, involving activities such as service coordination, information exchange, documentation of errors, and patient assistance. Health information technology plays a crucial role in supporting these activities. Effective communication and active patient involvement are essential components of this process. Health system regulation does not effectively



facilitate collaboration, and clear role delineation is necessary for efficient patient treatment.

The rapid integration of digital health technology has been accelerated by the COVID-19 pandemic, facilitating the convergence of health and social care. However, rapid change can lead to disparities in health and fragmentation. Relational Coordination Theory suggests that effective communication and problem-solving among different roles, disciplines, organizations, and sectors are significantly improved by shared goals, expertise, and mutual respect. However, the efficacy of substituting monitoring with accountability procedures and performance evaluation remains uncertain.

Effective coordination among front-line personnel is crucial for optimal performance in dynamic settings. Improving supervisors' capabilities and implementing measures to reduce their responsibilities and enhance performance evaluation procedures can optimize coordination processes. In the airline sector, workgroups with interconnected workgroups often face intricate dynamics, including infrequent communication, opposing objectives, fragmented knowledge, and lack of mutual respect.

Organizations are facing pressures to enhance resource allocation and achieve greater outcomes while lowering costs. Jody Hoffer Gittel's approach emphasizes the importance of high levels of performance based on relationships and human and social capital within an organization.

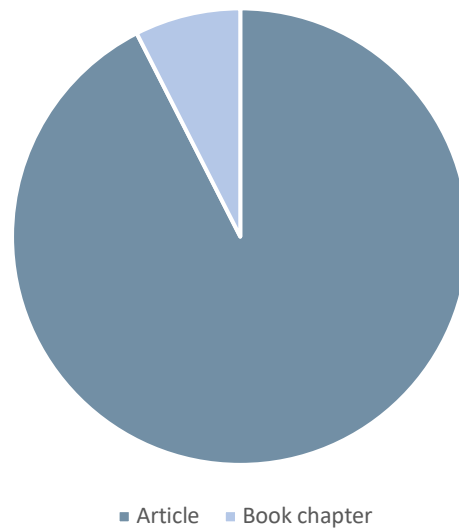
The present literature investigates the influence of relational coordination, which pertains to the coordination of social and work interactions, on task performance and the generation of social value.

### 3.2.4. Bibliometric Review

Bibliometric analysis is a widely utilized and rigorous approach for the examination and evaluation of enormous quantities of scientific information [47].

The Author observed an adequate balance between the fields of Social Sciences (42.5%) and Business, Management, and Accounting (45%) in the chosen publications.

Moreover, 92.5% of the sources analyzed in this search are classified as articles, while the remaining 7.5% are categorized as book chapters. As shown in Figure 5.



*Figure 5: Percentage of Document Types*

In relation to the overall papers included in the Review, it is evident that a significant portion of the selected papers are of recent origin, with half of them (50%) having been published within the past 7 years. (Figure 6)

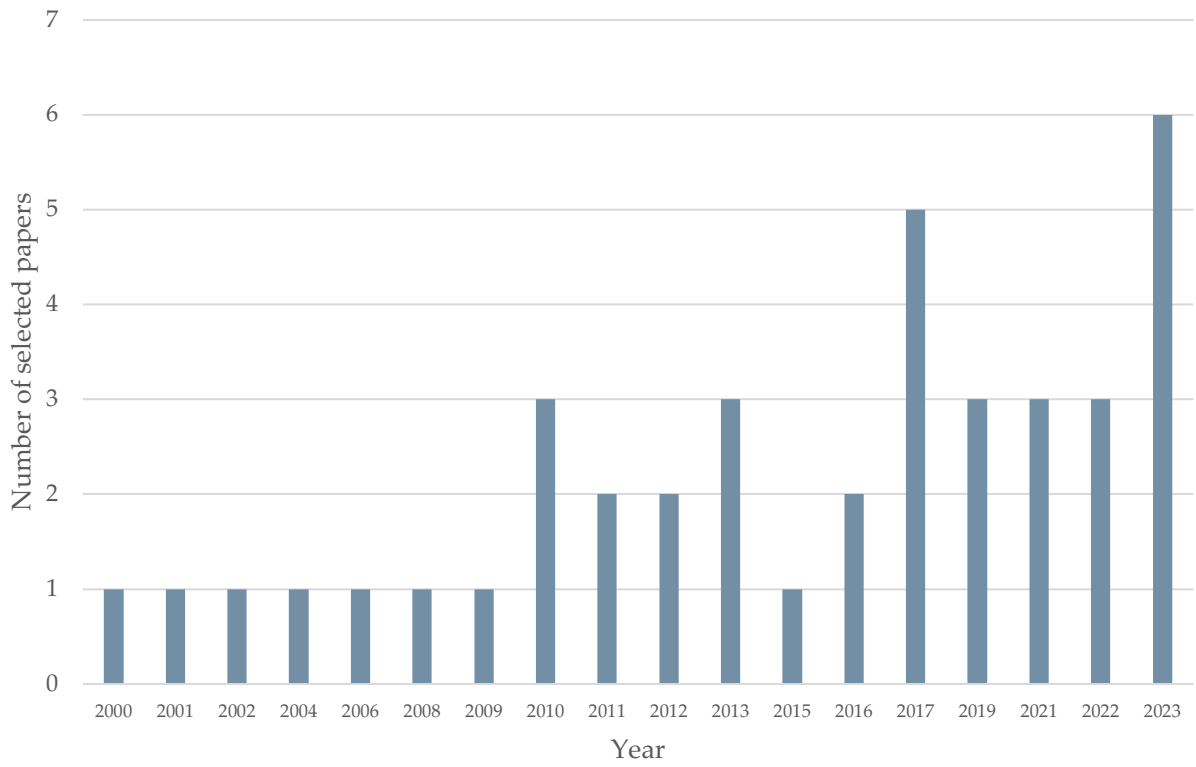


Figure 6: Distribution of pertinent papers by publishing year

## 3.3. Theoretical Background

### 3.3.1. Relational Coordination Theory

After having defined the methodology followed by the Author in the Literature Review it is necessary to point the attention also to the Relational Coordination Theory (RCT) supporting the Dissertation.

The Relational Coordination Theory (RCT) emphasizes the social aspects involved in coordination, asserting that coordination involves not only the management of task interdependences, but also the people who perform those tasks [48].

RCT proposes that among the agents that coordinate their work, “relationships characterized by shared goals, shared knowledge, and mutual respect tend to support frequent, timely, accurate, problem-solving communication and vice versa” [49].

In other terms, Relational Coordination (RC) is characterized by common goals going beyond individual objectives, shared knowledge allowing individuals to understand how their tasks are connected to the overall process, and mutual respect supporting communication [50].

RC is strengthened by communication that is frequent, timely, precise, and problem-solving, as well vice versa, in a virtuous circle [51].

A graphical representation of the model is given in the Figure 7.

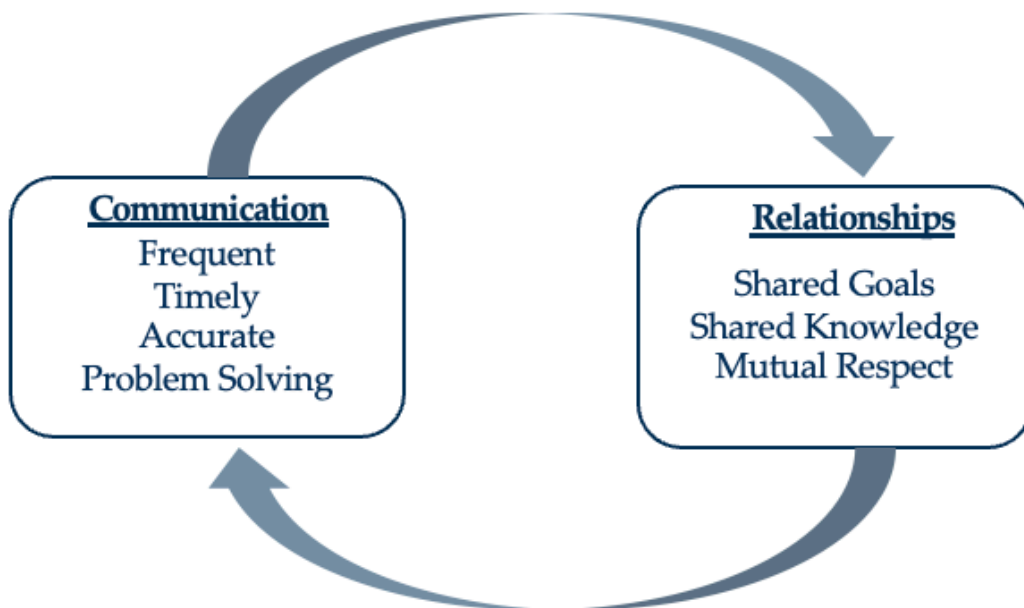


Figure 7: Relational Coordination framework

The relational coordination framework encompasses three factors pertaining to the relationship aspect: shared goals, shared knowledge, and mutual respect. The concept of shared goals pertains to the situation where individuals or entities have a collective understanding of the job at hand. This understanding encompasses a comprehensive grasp of the ultimate objectives of the group, as well as an awareness of how the various sub-processes undertaken contribute to the achievement of these objectives. [52] The absence of a collective holistic understanding is evident in groups where individuals prioritize their own task completion without comprehending how their tasks contribute to the achievement of the collective objective.[53] Similarly, in such groups, individuals may display a lack of concern for the overall success of the process and frequently resort to blaming activities when confronted with unsuccessful outcomes [52].

The concept of shared knowledge can be more precisely characterized as the collective understanding of the various roles that individuals undertake within the comprehensive workflow. Actors possessing unique functional responsibilities are prone to developing disparate mental models of the workflow and context due to their varying training and experience. Consequently, they may encounter challenges when it comes to effective communication and coordination [54]. The challenges mentioned can be mitigated by a substantial amount of collective awareness of roles. This phenomenon has been referred to as "a comprehension of the connections between an individual's own responsibilities and the responsibilities carried out by their counterparts in different functions"[52]. Therefore, the relationship dimension pertains to the level of comprehension that actors possess regarding the roles and responsibilities of other functional groups, as well as the manner in which these tasks intersect with their own.

Mutual regard constitutes the ultimate dimension inside the realm of relational coordination's relationship component. Actors who are part of groups characterized by high levels of mutual respect have an understanding and appreciation for the significance of their fellow actors' roles, knowledge, abilities, and distinct contributions within the overall workflow. Mutual regard also pushes actors to contemplate the repercussions of their own activities on the efficacy of others in accomplishing their tasks. The absence of proper regard for the contributions made by others within the workflow serves as an impediment to effective coordination.

These three aspects of relationships work are strengthened by communication that is frequent, timely, precise, and problem-solving. In this direction, relational coordination is defined as an interconnected process where communication and relationships mutually support each other with the aim of integrating tasks effectively, as shown in figure 7 [50].

In 1949, Mary Parker Follett is the first theorist to propose a relational theory of coordination [50]. While she acknowledged the prevailing belief that organizations exist to coordinate work, she presented a unique perspective. She argued that effective coordination is not a mechanical process but rather a continuous interplay between the various components and the organization. According to Follett, reaching optimal coordination requires first establishing a philosophical standpoint regarding the relationship between individual parts and the entirety. In fact, the most profound philosophical truth lies in recognizing the relationship of parts not only to each other but also to a dynamic and evolving whole.

In accordance with Follett's relational perspective on coordination, the relational dimensions of relational coordination do not refer to personal relationships based on preferences or personal liking/disliking. Instead, they are based on task-related relationship connections.

Relational Coordination Theory goes beyond Follett's ideas and suggests that coordinating through relationships is particularly valuable when there is mutual interdependence between tasks [55] uncertainty in task and input [56-57], and time constraints [58]. When tasks depend on each other, relational coordination becomes crucial for participants to adjust their actions based on each other's task outcomes. Additionally, when there is uncertainty in tasks or inputs, relational coordination becomes more important as participants need to adapt their activities on the go as new information arises. Lastly, in fast-paced environments with time constraints, relational coordination becomes vital for participants to quickly adjust their actions and respond to each other and new information without wasting time by escalating issues for resolution.

Relational coordination theory, developed in the early 1990s following a comprehensive field study of flight departures within the airline industry, posits that relationships characterized by the presence of shared goals, shared knowledge, and mutual respect tend to facilitate frequent, timely, accurate, and problem-solving communication. Conversely, such communication enables stakeholders to effectively coordinate their work, thereby establishing a reciprocal relationship. Building upon the influential research conducted by Follett in 1949, the theoretical framework posits that the presence of cross-cutting structures has the potential to enhance relational coordination. This is achieved by mitigating the tendency towards compartmentalized thinking and fostering a greater level of stakeholder focus on the overall objectives. The idea posits that robust networks of relational coordination play a crucial role in facilitating the attainment of desired objectives, particularly in situations when work is characterized by high levels of interdependence, uncertainty, or time sensitivity.

Over the years, relational coordination has gained recognition as a valuable framework for understanding and improving organizational performance. It has been applied in

various industries and sectors to enhance collaboration, teamwork, and communication among individuals and teams [59].

In a study conducted across nine hospitals in the USA [60], it explores the role that relationships play in enabling resilient responses to external pressures and the organizational practices that allow workers to respond resiliently when organizational change is required. Relational coordination is a resilient response to external threats that demand a coordinated collective response across multiple functions or roles [60]. The findings suggest that workers engage in higher levels of relational coordination when they perceive this type of threat, but the presence of a particular type of high-performance work system - a relational work system - significantly strengthens this resilient response. When individuals perceive a collective threat, it can break down status boundaries among people with different areas of expertise. This breakdown fosters a greater sense of mutual respect and strengthens relationships. The experience of collective threat can also diminish barriers such as differences in goals between individuals with diverse areas of expertise. Moreover, it reduces the tendency to solely focus on one's own field, allowing for a better understanding of how one's job is interconnected with that of colleagues. Consequently, when participants perceive an external threat, it leads to an increased alignment of shared goals, shared knowledge, and mutual respect. This, in turn, enhances the frequency and quality of communication among those individuals.

## 3.4. State of the Art

The field of Telemedicine, which is experiencing rapid development, has demonstrated considerable potential in revolutionizing the provision of healthcare. Specifically, it has proven effective in improving communication, collaboration, and coordination among healthcare providers. The ongoing evolution and innovation within the healthcare sector have sparked significant interest in understanding the effects of Telemedicine on relational coordination among healthcare practitioners.

This chapter delves into the scholarly research and practical implementations that illustrate the significant impacts of Telemedicine on communication, relationships, time management, and information systems within the healthcare industry. This chapter seeks to provide a comprehensive analysis of the many effects of Telemedicine on the interpersonal dynamics within the healthcare profession, drawing upon existing scholarly literature and empirical research.

The utilization of Telemedicine has emerged as a prominent approach in enhancing communication within the healthcare sector. Advanced technologies with quality network services enable individuals to improve healthcare delivery and make it available to more and more people [61].

Telemedicine is an advantageous technological innovation that facilitates improved accessibility to preventive healthcare services, hence contributing to the enhancement of individuals' long-term well-being. This holds especially true for individuals who encounter financial or geographical barriers in accessing high-quality healthcare services. Telehealth has the capacity to enhance the efficacy, organization, and accessibility of medical care.

Furthermore, the nature of work is becoming progressively intricate, specialized, and interconnected, necessitating the need for coordination among many roles, disciplines, organizations, and sectors in order to accomplish desired results. The proposition put out by Relational Coordination Theory posits that the establishment of relationships characterized by shared goals, shared knowledge, and mutual respect plays a crucial role in facilitating regular, timely, and accurate communication aimed at problem-solving. In turn, this reciprocal relationship enables stakeholders to effectively coordinate their activities across various boundaries.

The transformation of work processes through digitization is having a profound impact on the manner in which individuals participate in coordination [62-63-64]. In contemporary healthcare settings, the exchange of patient information is facilitated through the utilization of electronic health record solutions, as demonstrated by the collaborative efforts of physicians and nurses [65]. Similarly, the coordination of inventory and purchasing decisions is effectively managed through the implementation



of enterprise resource planning systems [66]. Furthermore, the storage and retrieval of customer information and histories are efficiently maintained through the utilization of customer relationship management software [67]. The growing prevalence of digitization in coordination activities has led to the implementation of predetermined scripts that provide structure to the coordination process [68]. These scripts dictate the manner in which coordination is conducted, including the content of information transmitted, the recipients of the information, and the timing of its delivery, among other factors. Furthermore, these scripts are typically integrated into the technological systems used for coordination. This transition also results in coordination being largely facilitated through digital means, hence decreasing the necessity for in-person communication among individuals.

Previous research on coordination has provided evidence on the significance of interpersonal ties in the process of coordinating labor [69-70]. The concept of relational coordination has emerged as a significant framework for comprehending the factors that contribute to enhanced coordination performance. This framework acknowledges the interdependent nature of relationship quality and communication between actors, positing that these two elements mutually reinforce each other. As the quality of the relationship between actors improves, so does the quantity and quality of communication, and conversely, as communication improves, so does the relationship quality [52]. This study aims to analyze the correlation between coordination mechanisms, which refer to the specific methods employed by individuals or groups to exchange information and effectively handle interdependencies. Examples of such mechanisms include meetings, procedures, and boundary spanners.

### 3.4.1. The influence on Relational Coordination

The development of Telemedicine has significantly changed the medical collaborative decision making [71]. In healthcare settings, the interdependence and the need for task coordination, cross-functional information and data flow are very high [72].

Medical decisions are influenced by various factors, including logistical, ethical, legal, and security limitations. These factors might operate at both conscious and subconscious levels, contributing to the decision-making process. In order to enhance the medical decision-making process, clinicians may seek input from other medical professionals. When a specific set of principles is established and effectively communicated to medical personnel, this viewpoint can be transformed into a clinical protocol of care, practice guidelines, or consensus conferences. These decision aids are derived from expert opinion and a systematic analysis of the literature, following a structured approach.

Telemedicine is an emerging decision support tool that has undergone continuous advancement and demonstrated its ability to effectively integrate technological growth with superior quality.

Collaboration is needed among physicians or between physicians and other healthcare professionals involved in Telemedicine protocols in accordance with the areas of different and complementary skills so that everyone is responsible for his/her actions and decisions [71]. There are various tele-consultation models that can be implemented, which are contingent upon factors such as the type of teleconsultation, geographical location, whether the medical service is provided by a public or private entity, and where the services are delivered and received. When responsibilities are involved we distinguish: tele-consultation among public health care (PHC) institutions, where the patient is a user and medical officers in the public service; tele-consultation performed among health facilities (HF) where the patient has a private contractual relationship with the requesting physician and the physician required; and tele-consultation between PHC institutions, where the patient is hospitalized and a physician who is practicing in a private facility [71].

Primary healthcare (PHC) facilities have the responsibility of implementing and utilizing Telemedicine technologies developed by medical professionals within the context of healthcare delivery.

Cooperation among primary healthcare (PHC) entities is a public policy function that encompasses the fulfillment of public service obligations and serves as a social function. This cooperation entails the utilization of innovative, cost-effective, and diverse organizational models. To the extent that the public service mission encompasses novel services, there exists a fundamental need for flexibility in embracing cutting-edge technologies and providing optimal care. If Telemedicine is able to deliver superior healthcare, the establishment of a cooperation agreement among public hospital units and networks may not be necessary for its development. Hence, it is incumbent upon the public practitioner to disseminate their expertise among their colleagues. Telemedicine is a practical tool that allows practitioners to pool their resources, share expertise, exchange ideas, and undertake joint action [71].

The formalization of information communicated between a requesting physician and medical expert is of great significance in the field of Telemedicine, as it enables a transparent and traceable comprehension of the telemedical process. The establishment of an appropriate data interchange format that is tailored to the requirements of performance assessment and safe information management is necessary. Hence, it is imperative to uphold confidentiality [73] and ensure protection through legal provisions, ethical principles, and formal regulations pertaining to the disclosure of information, the protocols for its dissemination, and the safeguarding of confidential data.

The choice of collaboration models in Telemedicine applications depends on the type of information to be shared, with options including synchronous and asynchronous approaches. The implementation of Telemedicine necessitates adherence to several principles in order to ensure its appropriate utilization, its contribution to remote healthcare services and coordinated care pathways, and to guarantee a thoughtful and regulated application of advanced information and telecommunications technologies.

The implementation of Telemedicine necessitates a systematic and well-organized approach, overseen by medical practitioners and computer scientists. This approach should be guided by clearly defined regulations and protocols established by health authorities, in collaboration with legal professionals, healthcare institutions (both public and private), and manufacturers of biomedical devices [74-75-76-77-78-79].

Telemedical expertises, which are conducted without the presence of patients, involve the examination of diagnoses and/or treatments. These expertises are facilitated by knowledge models and reasoning mechanisms that enable dispersed collaborative decision-making environments. These areas of expertise will make use of feedback and use the lessons learned from this effort in order to strengthen and broaden competence in the operational sector.

The subsequent paragraph underscores the significance of comprehending and advancing the incorporation of Telemedicine into healthcare systems in order to enhance relational coordination among healthcare experts, consequently facilitating the delivery of superior and more cohesive patient care.

### 3.4.2. Relational Coordination in a Digital Age

The transformation of work processes through digitalization has brought about significant changes in the manner in which individuals participate in coordination [62-63-80].

Digital services provide healthcare customers with easy access to healthcare information and facilitate peer-to-peer connections so they can exchange experiences and social support [81]. Shared information may serve as input for the patient-professional encounter, such that it might encourage active patient involvement during service delivery and foster shared decision making [82-83-84]. Previous research also concludes that patient involvement leads to favorable outcomes, such as more trust in the health professional, higher patient satisfaction, better adherence to treatment, and overall increased health status [85].

There is a growing trend among organizations to convert traditional procedures into digital formats, as seen by the works of Brynjolfsson and Kahin [86], Colbert, Yee, and George [87], and Foster and Flynn [88]. In various contexts, including health care [89], it is evident that coordination processes are undergoing a predictable shift towards digitized solutions.

The process of digitizing coordination entails the automation, either partially or completely, of the workflow associated with coordination [90]. The process of digitization frequently results in advantageous improvements, including time and effort reduction, enhanced accuracy, and increased transparency of data.

The growing prevalence of digitization in coordination practices has been observed to promote the utilization of predetermined scripts that provide a framework for the coordination process [91]. This implies that the manner in which coordination is executed, such as the content of information transmitted, the recipients of the information, and the timing of its delivery, is frequently pre-established and integrated into the technological systems. This transition additionally results in the digitized mediation of coordination, to some extent, hence decreasing the necessity for in-person interaction among participants.

The concept of relational coordination has emerged as a valuable framework for comprehending the factors that contribute to enhanced coordination performance. This theory acknowledges the interdependent nature of the relationship and communication between actors, highlighting their mutually reinforcing dynamics. Specifically, it posits that as the quality of the relationship improves, so does the quality and quantity of communication, and vice versa [52].

### 3.4.3. A systematic review of Relational Coordination

We know from the literature that relational coordination refers to a collaborative and interconnected way of communicating and building relationships that aims to enhance the coordination of tasks and improve overall performance [40].

The second assumption that we have is that the theory focuses on the structures that span across different areas and is believed to facilitate the development of relational coordination [40]. The effectiveness of relational coordination relies on how the organizational structures are designed [39-41]. For instance, these structures include practices like hiring and training individuals to work well in teams, implementing shared accountability and reward systems, utilizing standardized work protocols that are shared among team members, establishing shared information systems, and conducting regular team meetings and huddles. These elements collectively contribute to enhancing relational coordination [40].

Relational coordination, as a conceptual framework, encompasses distinct elements that facilitate the coordination of tasks across stakeholders. According to March and Simon [92], stakeholders are driven by shared goals, which encourages them to go beyond optimizing subgoals and instead act with a greater consideration for the entire system.

The acquisition and dissemination of shared information plays a crucial role in facilitating systems thinking, as it provides stakeholders with a comprehensive

understanding of how their own duties, as well as the tasks of others, contribute to the overall functioning of the system [93]. The cultivation of respect for the labor of others serves to foster a sense of appreciation among stakeholders, prompting them to recognize and acknowledge the valuable contributions made by others. Additionally, it helps stakeholders to reflect upon the potential consequences of their actions on others, so strengthening their propensity to act in a manner that takes into account the collective well-being [94]. The intricate network of interdependent interactions is strengthened and reciprocated by regular, prompt, precise, and solution-oriented communication, facilitating stakeholders in enhancing their collaborative efforts. It is anticipated that relationships of low quality will have a contrasting impact, since they will diminish the quality of communication and impede stakeholders' capacity to efficiently coordinate their activities.

Relational coordination theory as originally conceptualized (Figure 8, upper panel) includes three main components: relational coordination as a mutually reinforcing process for coordinating work, the cross-cutting structures theorized to strengthen it, and the outcomes theorized to result from it [40].

The process of communication and interaction, as illustrated in Figure 8, is understood as a reciprocal mechanism that involves connections between various roles.

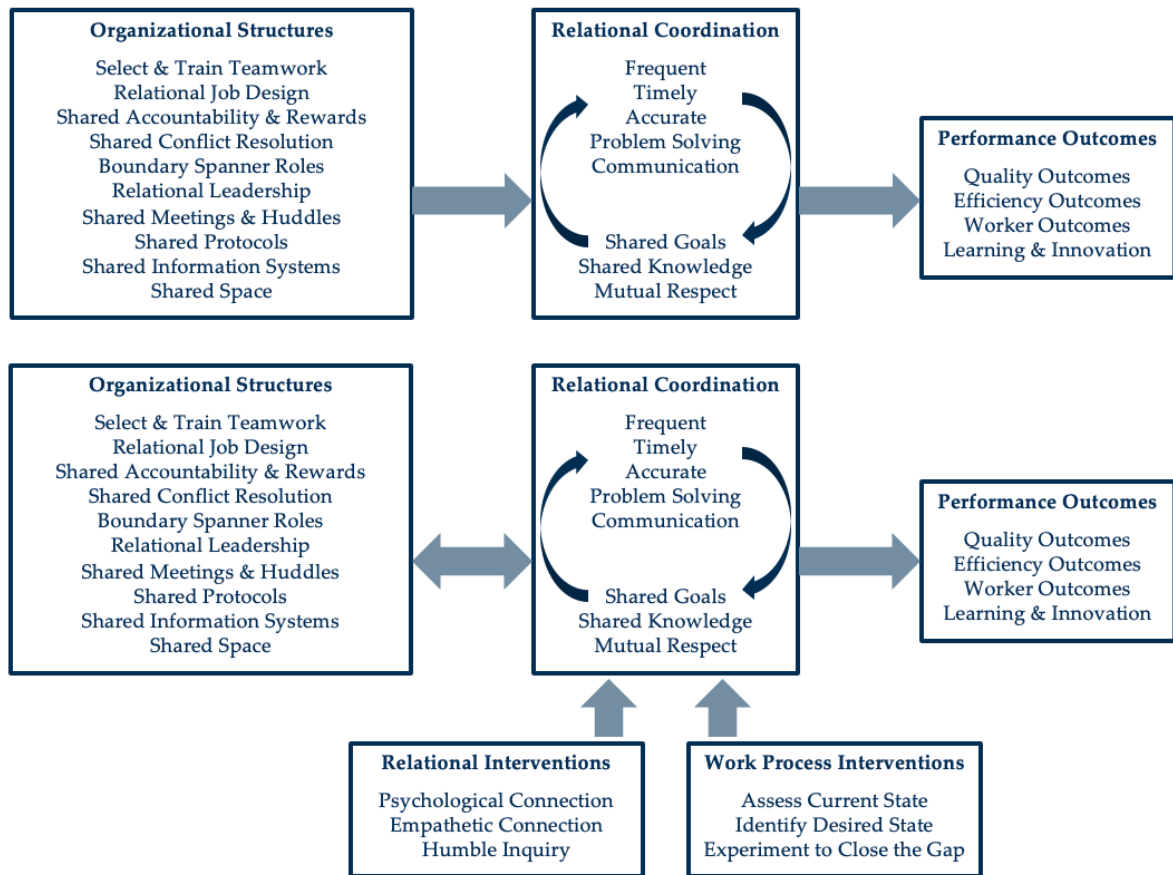


Figure 8: From a linear to dynamic theory of relational coordination

### 3.4.4. Structures that support Relational Coordination

A key element of Relational Coordination Theory pertains to the cross-cutting structures that are postulated to facilitate relational coordination, as seen in Figure 8. The idea posits that the degree of relational coordination is contingent upon the configuration of organizational structures [39-41]. In accordance with the findings of Follett (1949), it is expected that the effectiveness of coordination between departments is heavily influenced by personal connections. However, to enhance the reliability of relational coordination, it is crucial to incorporate opportunities for coordination within organizational structures, such as human resource practices and coordinating mechanisms. According to Evans and Davis [95], conventional human resource practices are characterized by a division of stakeholders based on their respective functions, which ultimately hinders the cultivation of relational coordination.

According to Gittell [96], it is possible to design human resource procedures, such as selection, training, accountability, and rewards, in a manner that fosters connectivity across various positions. This approach can enhance the focus on the entire organization and enable stakeholders to effectively manage their interdependencies. Coordinating mechanisms, which can be categorized as either programmed or nonprogrammed, have been proposed to enhance relational coordination. Programmed mechanisms include shared information systems and shared protocols, while nonprogrammed mechanisms encompass boundary spanner roles and shared interdisciplinary meetings. These mechanisms are believed to facilitate coordination by establishing connections among all roles that require coordination, enabling stakeholders from different organizations to gain a comprehensive understanding of the whole and effectively manage their interdependence. This notion has been supported by various scholars, such as Argote [56], Faraj and Xiao [97] and Gittell and Weiss [98].

### 3.4.5. Implications of Relational Coordination

Another element of relational coordination theory encompasses the postulated specific consequences that arise from the presence of robust relational coordination (as depicted in Figure 1). The comprehension of any production process can be framed within the context of a production possibilities frontier, which serves as a graphical representation of the most favorable results that can be attained by varying levels of quality and efficiency. According to Lapré and Scudder [99] and Schmenner and Swink [100], there exists an inherent trade-off between quality and efficiency on a specific production possibilities frontier. Enhancing one aspect necessitates sacrificing the other. Relational



### 3| Literature Review

coordination is an illustrative instance of a primary process enhancement that empowers stakeholders within a particular role, department, or organization to transition beyond their production possibilities frontier towards a more advantageous position. This transition facilitates the attainment of multiple outcomes that may be conflicting in nature [101-102].

By enhancing the relational coordination among individuals engaged in diverse activities within a given process, the management of task interdependencies is facilitated in a more efficient manner, resulting in a reduction of redundancies, lapses, errors, and delays. Consequently, this leads to an improvement in the overall quality of the process [103]. The engagement of clients as coproducers, rather than passive recipients of outcomes, is anticipated to enhance quality through the implementation of relational coordinating [41-104]. The enhancement of client trust and confidence, along with the improvement of client satisfaction and other outcomes, is anticipated through the augmentation of relational coordination among providers, leading to increased accuracy and consistency of the information received by clients [105].

Simultaneously, the implementation of relational coordination within companies facilitates the enhancement of operational efficiency by assisting stakeholders in effectively managing interdependencies among their respective responsibilities. Consequently, this leads to a reduction in wastage and an amplification in the quantity of outputs generated from a specific allocation of inputs. Furthermore, the presence of relational coordination among colleagues has been found to yield favorable outcomes for workers. According to Adler and Kwon, individuals who have strong interpersonal connections in the workplace are more likely to have access to the necessary resources to effectively carry out their tasks [106]. Additionally, these individuals have enhanced well-being because of the inherent advantages associated with high-quality relationships at work [107]. Relational coordination is posited as a facilitator of learning and innovation [108]. According to Dougherty, numerous innovations have the ability to transcend organizational borders [54]. This implies that when stakeholders gain knowledge about the activities of different sections within the company and comprehend the interconnectedness between these sections, they are better equipped to identify potential avenues for innovation.

When stakeholders actively participate in timely and effective communication aimed at problem-solving, including across organizational boundaries, they can enhance their ability to successfully execute the opportunities they have identified. In addition, it is anticipated that the presence of high-quality relationships in relational coordination will enhance psychological safety [109], thereby mitigating identity threat and loss of face during the acquisition of new skills or establishment of new role relationships.

Consequently, this will further augment the capacity for learning and fostering innovation [110].

### 3.4.6. Cross - Cutting Structures that support Relational Coordination

According to Relational Coordination Theory, organizations support relational coordination by implementing cross-cutting structures such as selection and training for teamwork, relational job design, relational leadership roles, boundary spanner roles, shared accountability and rewards, conflict resolution, shared meetings, shared space, shared protocols, and shared information systems [40a]. This cross cutting structures are respectively:

- Selection and Training for Teamwork
- Relational Job Design
- Relational Leadership Roles
- Boundary Spanner Roles
- Shared Accountability and Rewards
- Conflict Resolution
- Shared Meetings
- Shared Space
- Shared Protocols and Routines
- Shared Information Systems
- Relational and Work Process Interventions

#### *Selection and Training for Teamwork*

The process of selecting and training individuals for cooperation is anticipated to establish the foundation for relational coordination. This is achieved by facilitating the development of common understanding and knowledge of the issue among stakeholders who fulfill distinct roles. The topic of selection for teamwork has been examined in a limited number of studies, namely in the contexts of the airline business [39] and the health care sector [98]. In both of these studies, a positive relationship was found between

selection for teamwork and relational coordination. The topic of training for teamwork has been extensively researched in various contexts, including interprofessional team training in the field of healthcare [111-112-113-114-115] and in the domain of medical education [116].

### *Relational Job Design*

Relational job design refers to the establishment of well-defined roles that include flexible boundaries. This approach is anticipated to enhance relational coordination by fostering role clarity and promoting the expectation of cross-role coordination. Although distinct roles and fluidity across role boundaries may appear to be contradictory aspects of work design, they are both features of relational job design and are anticipated to have a favorable correlation with relational coordination.

There exists a positive association between relational coordination and the presence of flexible boundaries within well-defined job roles in the aviation sector [39]. The hypothesis was corroborated by two qualitative investigations conducted by Manski-Nankervis and Solberg, which revealed that the implementation of flexible responsibility contributed to the enhancement of relational coordination among healthcare practitioners [117-118]. Similarly, Crompton discovered a positive association between explicit standardized job roles and relational coordination in the field of primary care [119].

Additional research indicates that the successful implementation of relational work designs may require a minimum level of relational coordination. As an illustration, a certain research investigation discovered that the establishment of relational coordination between employees and supervisors facilitated a collective restructuring of job responsibilities [120]. Conversely, a separate study revealed that inadequate levels of relational coordination were linked to the incapacity to modify role boundaries [121]. The collective results of these studies align with a theoretical framework of relational coordination that emphasizes its dynamic and iterative nature. Specifically, the evidence suggests that job redesign facilitates relational coordination, and conversely, relational coordination facilitates job redesign [122].

### *Relational Leadership Roles*

Relational leadership refers to a leadership approach that emphasizes the cultivation of strong and meaningful relationships among colleagues and with those under one's supervision. An indication of relational leadership can be observed through the concept

of supervisory spans, where it is postulated that smaller supervisory spans facilitate a more relational style of leadership. The element of the theory in airlines, early intervention agencies, and health care has been proven by several studies [123-124-125]. In a broader context, studies have found a favorable correlation between relational approaches to leadership and relational coordination in various domains, including childcare [41], elder care and education [126-127]. Furthermore, the study conducted by Mark found a favorable correlation between the presence of nurses in high-level leadership positions and the level of relational coordination across other healthcare professions [128]. According to Huber, in a dynamic environment, the act of facilitating change through the utilization of rewards for innovation, actively seeking information, and establishing a supportive setting has been found to have a positive correlation with relational coordination [129].

### *Boundary Spanner Roles*

Boundary spanners are those who are responsible for facilitating the coordination of tasks among different individuals or groups [130]. Boundary spanners are individuals who can be observed across several industries and are postulated to facilitate relational coordination in diverse contexts. Boundary spanners in the airline sector, namely operations agents, have been found to be linked to increased levels of relational coordination among different jobs [16]. This finding has been reproduced in the domains of health care [131] and education [132-133]. In a qualitative study conducted by Parsons, an examination of elementary schools revealed a favorable correlation between the presence of a clearly defined boundary spanner function and the level of relational coordination observed between school staff and external mental health specialists [132]. According to Gebo and Bond, the implementation of a community collaboration aimed at mitigating youth violence shown that enhancing the role of cross-organizational boundary spanners resulted in a lasting improvement in relational coordination across participating groups [134].

There have been several further studies that have failed to provide support for the notion concerning the influence of border spanners on relationship coordination. In the study conducted by Derrington, it was found that the existence of a boundary spanner role did not exhibit any significant correlation with relational coordination between hospital employees and early intervention agencies in the context of caring for drug-addicted newborns [125]. Similarly, Flieger observed a negative association between the presence of a care coordinator role and relational coordination among staff in primary care clinics [135]. Di Capua conducted a study which revealed that the introduction of a recently established boundary spanner role did not demonstrate a significant association with enhanced overall relational coordination [136]. However, it did exhibit a positive

correlation with increased relational coordination specifically among physicians. According to McEvoy, the effectiveness of boundary spanners was enhanced when accompanied by organizational practices such as well-defined relational workspaces and opportunities for interaction with coparticipants [137].

Similarly, Lee discovered that the implementation of boundary spanner roles yielded more favorable outcomes in settings that already exhibited high levels of relational coordination [138]. The presence of conflicting findings in the research conducted by Gittell may indicate the need for a more intricate model that takes into account the impact of low levels of relational coordination on the preparedness to deploy cross-cutting structures [122]. To elaborate, it is vital to enhance relational coordination as a means to effectively implement cross-cutting structures and fortify their efficacy.

#### *Shared Accountability and Rewards*

Theoretical literature suggests that the presence of shared accountability among various positions within an organization might facilitate relational coordination by directing attention towards their common objectives [92]. Most of the empirical evidence examining this idea has consistently supported this assertion. The concept of shared accountability has been linked to the presence of relational coordination in various industries, including aviation [39a], healthcare [42a-50-139], and banking [140].

According to a study conducted by Lee and Kim, there is a positive correlation between the implementation of multisource feedback as a means of shared accountability and the development of relational coordination inside manufacturing organizations [141]. The studies conducted by Gittell [50] and Siddique [140] found a positive correlation between shared rewards and relational coordination in the fields of health care and banking.

In a study conducted by McDermott, it was discovered that the implementation of formative performance monitoring, along with proactive feedback, had a favorable correlation with relational coordination within the health care industry [142]. The use of systems of shared accountability across organizations has been found to enhance relational coordination among key stakeholders in community-based schools [126] as well as in public/private partnerships [143]. Collectively, these results provide evidence in favor of the hypothesis that the implementation of shared accountability and rewards contributes to the enhancement of relational coordination.

### *Conflict Resolution*

The use of proactive horizontal conflict resolution is anticipated to facilitate relational coordination by utilizing disagreements as an opportunity to foster relationships, rather than allowing conflicts to persist and potentially result in enduring divisions. Conflict resolution can be integrated into formal procedures or performed as a routine

responsibility of frontline managers [39]. Although limited in number, the existing research have yielded consistent results. Proactive horizontal conflict resolution has been seen to have a positive correlation with relational coordination across roles in the context of airlines [39a]. Similarly, Gittel identified a similar association in the domain of surgical care [51]. Furthermore, Jakobsen also discovered a positive relationship between proactive horizontal conflict resolution and relational coordination in the field of elder care [144]. In a study conducted by Ekwueme, an investigation into the inverse causal pathway revealed that there exists a correlation between relational coordination and a decrease in both employee-manager conflicts and strikes within the context of medical care [145].

### *Shared Meetings*

Regular meetings between interdependent roles can facilitate the sharing of information and ideas, so promoting teamwork and enhancing relationship coordination. The examination of the influence of meetings on relational coordination in the field of healthcare was initially conducted within the framework of interdisciplinary patient rounds. It was observed that the level of inclusion in these rounds exhibited a positive correlation with relational coordination [131]. The finding mentioned in the text was corroborated by Schölmerich in their study on the collaboration between midwives in hospital and community settings [146]. Additionally, Solberg recognized the lack of inclusive meetings as a hindrance to enhancing relational coordination [118]. According to Crompton, the implementation of huddles with structured agendas has been found to enhance relational coordination in primary care settings [119]. Similarly, Jakobsen observed a positive association between shared meetings and relational coordination among elder care workers [126]. Furthermore, Abu-Rish Blakeney discovered that the implementation of structured interprofessional bedside rounds resulted in sustained positive changes in relational coordination [111]. In a study conducted by Derrington, it was discovered that the planning of open houses and community events by hospitals, specifically targeting early intervention agencies, exhibited a positive correlation with increased levels of relational coordination across these distinct entities [125].

Recent research has expanded the scope of shared meetings beyond the domain of healthcare, revealing their positive impact on relational coordination within the human services and social services sectors [125-143]. Although the majority of research findings on shared meetings have yielded positive results, there have been a few instances where the outcomes were not favorable. Perloff found that the implementation of regular cross-disciplinary meetings within a university research setting did not result in a significant improvement in relationship coordination [147]. According to Stjern, the enhancement of relational coordination in supply chain dyads was observed just in instances where meeting facilitators successfully established a conducive relational environment [148].

### *Shared Space*

According to McEvoy, the establishment of shared space is anticipated to enhance relational coordination by facilitating closer proximity and more opportunities for face-to-face contact [137]. Our systematic review yielded a limited number of data pertaining to shared space, all of which were in alignment with the hypothesis. Relational workspaces in community-based care facilitated the establishment of relational coordination among case managers and their colleagues [137], as well as other interdisciplinary personnel [149-150]. Shared spaces in primary care settings have been found to promote the development of relational coordination among healthcare practitioners [119-122-151]. Nevertheless, the studies failed to demonstrate consistent validity within the venture capital sector [152]. They posited a theoretical explanation for this phenomenon, suggesting that the reason behind it could be attributed to the nature of relational coordination, which is a type of proximity that is not contingent upon physical proximity. The results of this study indicate that the significance of physical closeness in facilitating relational coordination may vary based on the characteristics of the task at hand.

### *Shared Protocols and Routines*

The implementation of shared protocols is anticipated to enhance relational coordination by facilitating a clear understanding of the work process and highlighting the interconnections among activities assigned to various stakeholders. The initial formulation and empirical examination of this hypothesis occurred within the realm of surgical care.

Gittell discovered that the presence of more comprehensive interdisciplinary clinical pathways was associated with a higher likelihood of observing tighter relational

coordination among care providers [131]. This effect was particularly pronounced when the level of uncertainty was elevated. Higher levels of relational coordination among members of health care provider teams, between teachers and parents in the education sector, between educators and mental health providers, and among staff in accounting firms have been found to be associated with the implementation of shared protocols [126-132-153-154-155-156]. Nevertheless, a number of investigations have yielded inconclusive results [119-157-158].

The reciprocal relationship was also investigated. The likelihood of patients receiving care that adheres to clinical guidelines, protocols, and process recommendations is better

in practices with elevated levels of relational coordination [159-160-161]. Collectively, the aforementioned evidence implies a reciprocal relationship in which the utilization of shared protocols facilitates enhanced relational coordination, while relational coordination, in turn, fosters the inclination to employ shared protocols [159-162]. This further indicates the possibility of developing a more dynamic framework for understanding relational coordination.

### *Shared Information Systems*

According to Claggett and Karahanna, the utilization of information systems has the potential to enhance relational coordination [163]. This is achieved by ensuring that these systems are accessible to all relevant stakeholders involved in coordination efforts. Additionally, it is crucial to implement these systems in a manner that complements existing forms of communication, rather than replacing them. Furthermore, the implementation should aim to provide visibility into the overall work process, rather than obscuring it. The existing literature presents varying results about the correlation between shared information systems and relational coordination.

In a preliminary investigation on airplane departures, it was shown that shared information systems appeared to substitute direct contact rather than enhance it, resulting in a negative correlation with relational coordination [39]. In the field of healthcare, there is evidence to suggest that the implementation of shared information systems has a favorable correlation with the development of relational coordination among care providers [164-165-166]. The absence of standardized data reporting platforms has been found to be linked to diminished relational coordination between public managers and nonprofit managers during the contracting process [167], hence offering additional evidence in favor of the theory.



Additional discoveries were in alignment with a paradigm of relational coordination that emphasizes dynamism. In a study conducted by Sebastien [168], it was discovered that the correlation between shared information systems and relational coordination is contingent upon the relational context in which the information systems are employed. This implies that the successful implementation of shared information systems necessitates a certain level of foundational relational coordination. Tang provided additional support for this conclusion, demonstrating once again that the degree of baseline relational coordination and the existence of supplementary supportive structures might modulate the connection [169].

Additional studies in the field of healthcare offer further evidence, indicating that

relational coordination has the potential to alleviate difficulties arising from the absence of physical proximity within a patient portal network [170]. Moreover, these studies suggest that the successful implementation of new technology and information systems is more likely to occur when there are moderate to high levels of relational coordination [150].

### 3.4.7. Relational and Work Process Interventions

In instances where cross-cutting structures are insufficient in establishing relational coordination due to a low baseline level, what strategies might change agents employ to intervene? There is a growing body of literature that presents a more dynamic and iterative explanation of relational coordination. This theory proposes the existence of two more routes, as seen in Figure 8 (bottom panel), as suggested by Gittell [122]. Relational interventions encompass coaching and feedback strategies that aim to initiate novel dialogues, foster fresh cognitive frameworks, and establish innovative patterns of interaction. These interventions are intended to facilitate a cultural transformation towards enhanced relational coordination, ultimately enabling the implementation of additional structures that reinforce and fortify this coordination [171].

Work process interventions, such as the implementation of lean methodologies and the utilization of plan-do-study-act cycles, are anticipated to enhance relational coordination inside organizations. These interventions facilitate the involvement of employees in the identification of the present state, the envisioning of a desired future state, and the collaborative efforts to bridge the gap between the two states [172].

Although research on relationship interventions is relatively new compared to studies on

structural interventions, most reported findings have demonstrated favorable outcomes. The implementation of relational interventions has been linked to a rise in relational coordination within the health care sector [111-113-114-161-173]. Furthermore, these interventions have been found to enhance efficiency [174] and elevate the overall quality of care [175]. Frequently, the implementation of relational treatments has been observed to occur concurrently with structural interventions, such as cross-functional training programs [114] and cross-functional meeting structures [111].

As an illustration, the combined implementation of relational and structural interventions in trauma care was found to enhance relational coordination [113]. Nevertheless, in a different context, a relational intervention that relied on coaching and feedback did not demonstrate any quantifiable effect on relational coordination, even though it was implemented concurrently with a novel cross-functional meeting framework [147]. Several studies have observed that certain relational interventions were effective for certain teams, while proving ineffective for others, without providing a clear explanation for this discrepancy. For instance, in the context of a supply chain intervention aimed at establishing a relational space during meetings among supply chain partners, Stjerne reported varying outcomes [148].

### 3.4.8. Summing Up

Based on the comprehensive array of material, studies, research, and documentation presented in this chapter, the Author have successfully derived several essential messages, which are succinctly summarized above.

- i. Digitalization has significantly transformed work processes, leading to a shift towards digital solutions in various contexts, including healthcare. This process involves automating workflows associated with coordination, resulting in improvements such as time and effort reduction, enhanced accuracy, and increased data transparency. The increasing prevalence of digitization in coordination practices promotes the use of predetermined scripts, integrating the execution of coordination into technological systems. The concept of relational coordination has emerged as a valuable framework for understanding factors contributing to enhanced coordination performance.
- ii. The Relational Coordination Theory (RCT) emphasizes social aspects of

coordination, focusing on effective management of task interdependencies and individuals involved. It suggests that communication is facilitated within relationships with shared goals, knowledge, and mutual respect, creating a virtuous cycle. This theory acknowledges the interdependent nature of relationships and communication between actors, highlighting their mutually reinforcing dynamics. As the quality of the relationship improves, so does the quality and quantity of communication, and vice versa. Relational coordination is a crucial aspect of organizational operations, often lacking in cross-cutting structures.

- iii. Cross-cutting mechanisms like teamwork selection, training, job design, and joint meetings are crucial for relational coordination. Emphasis on teamwork correlates with higher coordination levels. Relational leadership, boundary spanners, shared accountability, and proactive conflict resolution strategies enhance information exchange and relationship coordination.

## 3.5. Gap in the Literature & Research Question

The current amount of literature indicates that Relational Coordination pertains to a collaborative and integrated mode of communication and relationship-building, with the objective of optimizing task coordination and enhancing overall performance [40].

The Author finds a positive correlation between Relational Coordination and several organizational outcomes, including quality, efficiency, learning, and innovation. Furthermore, the study repeatedly demonstrates that there is a strong association between Relational Coordination and various worker outcomes. Specifically, it has been seen that higher levels of Relational Coordination are linked to enhanced job satisfaction and work engagement, as well as decreased burnout, emotional tiredness, and turnover.

The second element of Relational Coordination theory pertains to the cross-cutting structures that are postulated to facilitate relational coordination. According to the theory, the strength of relational coordination depends on the design of organizational structures [30-41].

In line with the findings of Follett (1949), it is expected that the effectiveness of

coordination between departments is contingent upon personal relationships. However, to enhance the reliability of relational coordination, it is imperative to incorporate opportunities for coordination within organizational structures. Examples of organizational elements that can be considered include procedures related to human resources and coordinating systems.

The theoretical framework of relational coordination posits that the establishment of relationships characterized by shared goals, shared knowledge, and mutual respect plays a crucial role in facilitating regular, timely, and accurate communication aimed at problem-solving. This reciprocal relationship between relational coordination and successful coordination of work across organizational boundaries enables stakeholders to collaborate efficiently.

The main gap we encounter is that there is not a substantial amount of literature available regarding the cross-cutting structures that contribute to its implementation, or among those present, none refer to the topic of remote communication and coordination among health care professionals. There is more research on the effect of relational coordination on performance [170], as mentioned above. However, the available evidence pertaining to digital technologies is limited, and there is a complete absence of evidence regarding Telemedicine. This matter is of great specificity and has not yet been previously examined.

The present study aims to address the gap in the literature by synthesizing the existing empirical evidence on the relationship between cross-cutting structures, relational coordination, and intended outcomes for various stakeholders. (Figure 9)



Figure 9: Research Question

This research question concerns how Telemedicine, being a system that enables synchronous/asynchronous communication in addition to information exchange, may be an interesting predictor of relational coordination.

A comprehensive examination of the empirical evidence pertaining to relational coordination theory will offer valuable insights to companies aiming to enhance relational coordination and maximize the associated results. This research aims to offer a comprehensive analysis of the progression that stakeholders can make in terms of coordinating their work.

The Author explores the transition from struggling to coordinate work due to fragmented and dysfunctional connections, to achieving more efficient coordination through the establishment of strong cohesive relationships, facilitated by cross-cutting structures.





# 4. Research Methodology

Starting from the Survey submitted to healthcare professionals as described in the previous paragraph 1, this Chapter is aimed at defining the methodology followed in utilizing the survey answers in order to develop a good theoretical model and then some hypotheses to be tested with STATA. In particular, within the different possible methodologies to build theoretical model and then some hypotheses to be tested, the one that best fits the situation under examination is the SEM. A detailed explanation of all the performed steps in conducting the process will be provided along with the reasons that have led to the choice of the present methodology.

## 4.1. Survey Research

In formulating the technique for conducting the research, which is intended to address the research questions that have been identified in Paragraph 3.5, the Author have thoroughly assessed many methodologies in order to determine the best appropriate one. Ultimately, the Author made the decision to use the Survey model due to its versatility in participant recruitment, data collection, and utilization of diverse instrumentation methods. Survey research has the capacity to employ several research tactics, including quantitative approaches that involve the use of questionnaires with numerically rated items, qualitative approaches that involve the use of open-ended questions, or a combination of both strategies known as mixed methods.

Survey research is defined as “the collection of information from a sample of individuals through their responses to questions” [176].

The Author has chosen to employ a cross-sectional survey research methodology. The researcher engages in a cross-sectional survey in order to get insights from a specific target population within a defined time period.

The survey research approach is widely utilized throughout multiple industries, including healthcare. The process is efficient and facilitates the rapid acquisition of data by researcher. The cross-sectional survey research method is commonly employed by researchers when there is a need for descriptive study of a particular subject, in this scenario, the focus lies on examining the perspectives of healthcare professionals regarding Telemedicine and its impact on the coordination among themselves.



## 4.2. Data collection

The data were provided by the Digital Healthcare Observatory of Politecnico di Milano, via the survey “Medici Specialisti 2023”. The survey was conducted through diverse types of healthcare structures involving 1.909 Specialist Doctors who took part in the survey.

The survey is structured according to 7 sections facing different aspects of technology applications in healthcare practices:

- Telemedicine and digital tools for communication
- Digital application for the patient
- Digital therapies
- Electronic medical records
- Artificial Intelligence
- Innovation trends
- Care and Assistance Processes and Coordination Mechanisms

The focus of the Author was defined according to only the first and last sections, respectively Telemedicine and digital tools for communication and Care and Assistance Processes and Coordination Mechanisms, which provided the Author with all the relevant information for building the model and formulating the hypotheses about the role of Telemedicine in healthcare organizations to boost and reinforce relational coordination and communication between Specialist Doctors and General Practitioners. The survey encompasses both types of relationships, the ones between Specialist Doctors and General Practitioners, and those involving only Specialists with different specializations.

### 4.2.1. Age of Survey Participants

The mean age of medical professionals in Italy is 52.5 years, with half of the doctors being aged 55 years or older (56.2%) [177]. As shown in Figure 10 participants in the survey have a representative age of the average age of doctors in Italy.

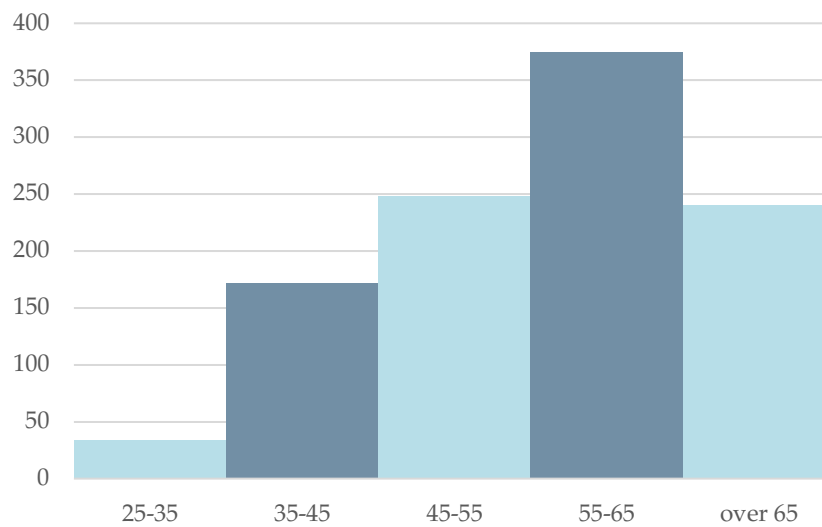


Figure 10: Age of Survey Participants

## 4.2.2. Survey Provider

The Digital Healthcare Observatory sets the following objectives:

- Develop analyses and research to aid decision-makers in the healthcare sector in fostering innovation, also based on digital technologies.
- Cultivate a culture, communicate, and disseminate knowledge on Innovation in Healthcare among institutions, healthcare facilities, healthcare professionals, patients, etc.
- Create opportunities for interaction and discussion among various stakeholders in the healthcare sector within a pre-competitive context, promoting improved collaboration among different actors.

Within its seventeenth edition, the Digital Healthcare Observatory sets the following Research objectives concerning Healthcare Innovation:

- Provide an estimate of spending on Digital Health, highlighting the main ongoing trends.
- Understand the priorities for digital innovation in Healthcare by Italian

healthcare facilities, considering the investments aimed at achieving the objectives of the National Recovery and Resilience Plan (PNRR).

- Analyze the level of usage and interest in various Digital Health solutions (Health Apps, Electronic Health Records, Artificial Intelligence, etc.).
- Identify opportunities related to leveraging healthcare data and analyze the associated challenges, such as system interoperability.
- Monitor the evolution of regulatory frameworks and the spread of Telemedicine in Italy, pinpointing the necessary actions for greater adoption by various healthcare system stakeholders.
- Delve into the digital skills required for the utilization of Digital Health tools, particularly among patients and caregivers.
- Analyze the role of digital technology in integrated care pathways (e.g., PDTA) and the current presence of digital tools (e.g., Telemedicine) within these pathways.
- Assess the impact of Digital Health on the environmental, social, and economic sustainability of the healthcare system, identifying suitable models and tools for its measurement (e.g., HTA, MAST).

The Observatory's Research is based on empirical analysis involving approximately 200 stakeholders yearly, including CIOs, General Directors, Administrative Directors, Health and Social Care Directors, along with regional representatives, 300 General Practitioners, 2,000 Specialists, 3,000 Nurses, 500 Patients, and a statistically representative sample of 1,000 Italian citizens through surveys and case studies [178].

### 4.2.3. Survey Structure

The survey was structured according to 7 sections as stated at the beginning of this chapter (4.2.) and completed with an introductory set of questions useful to control the socio-demo characteristics of the respondents to better interpret the results of the analyses.

In this matter, Call stated that the examination of demography and the acquisition of demographic data are fundamental components of scholarly inquiry into human populations [179]. Demography encompasses the various attributes that define communities of individuals, including but not limited to gender, ethnicity, marital status, and socioeconomic standing [180-181]. In contrast, demographic data refers to the quantitative evaluation of these features [182]. Demographic data are commonly employed in research to characterize the sample under investigation, hence furnishing

crucial information for the purpose of comparing findings across other studies. Data are frequently utilized to assess whether demographic groups exhibit a disproportionate association with, or are impacted by, occurrences [183].

The outcomes derived from such study are utilized to inform evidence-based economic, political, and social determinations. As an illustration, the United States (U.S.) utilizes demographic data obtained from the U.S. Census to directly influence policymaking and allocate federal resources in accordance with the demographic makeup of various regions within the nation [184]. Considering the subsequent societal consequences, the acquisition and utilization of demographic information necessitates judicious deliberation.

In the field of psychological science, demographic data are utilized for various purposes, such as comprehending disparities in psychological phenomena or outcomes across different social groups, discerning patterns in population changes over a period, or assessing the applicability and transferability of statistical findings from a research sample to specific populations.

While psychology typically emphasizes the examination of individuals, it is worth noting that numerous psychological phenomena can be attributed to underlying structural factors. Hence, the examination of demographic factors can serve to contextualize the experiences of people within larger social and structural frameworks, particularly when addressing disparities [185-186-187].

The socio-demographic information of Respondents is represented below in Figure 11.

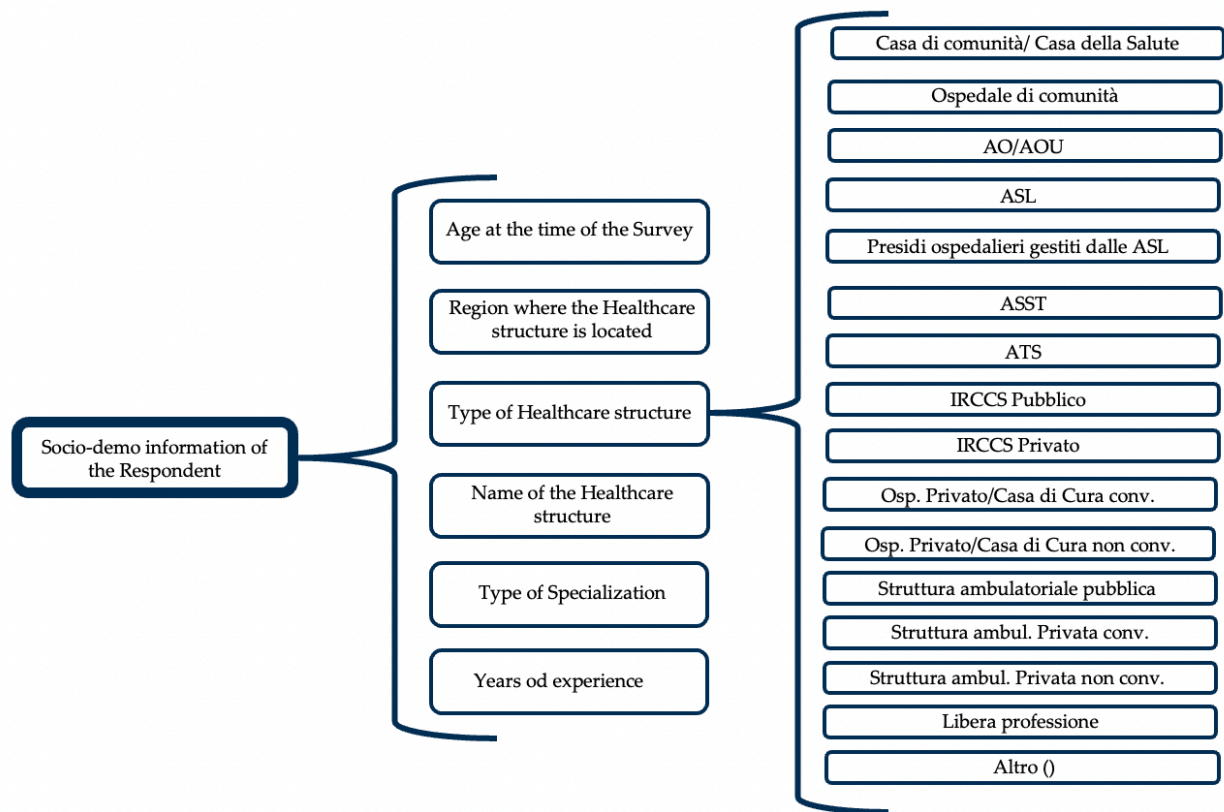


Figure 11: Socio-demo information of Respondents

The survey continued with the 7 sections reported at the beginning of this chapter 4.2 where a series of questions were submitted to the respondents to collect all potentially relevant information to make hypotheses about the level of relational coordination and communication between care providers.

The survey questions covered various aspects of relational coordination, including how often they communicated with each other, how promptly they responded to each other's messages, the accuracy of their communication, and their ability to work together to solve problems. Additionally, the survey explored the extent to which care providers shared common goals, possessed shared knowledge, and treated each other with respect in their relationships.

The Survey "Medici Specialisti 2023" can be accessed upon request.

### 4.3. Data cleaning

Respondents were 1.909, out of which 1.903 had at least answered one question. The Author then made a choice on which respondents could be considered useful according to the percentage of the survey they responded to and decided to keep for the sake of the analyses only those who responded minimum to one third of the questions of sections 1 and 7 of the survey. At the end of this process to detect the blanks in the survey submissions according to the relevant part of the survey, 1.069 records were kept in the further steps of the study.

### 4.4. Model Design

The Author constructed a conceptual framework to get insight into the ways in which Telemedicine services enhance the rapport and communication between healthcare practitioners. The objective of the study is to investigate the impact of Telemedicine services on enhancing relationships and communication among healthcare professionals. The purpose of the survey was to examine the utilization of Telemedicine services by

specialists, as well as their level of interest in future adoption. Additionally, the survey aimed to assess the impact of Telemedicine on the quality of services provided to patients, as well as its potential for enhancing time management and reducing the need for unnecessary travel.

This study also examines the efficacy of utilizing these services for enhanced patient communication, expedited document exchange, pre-visit document consultation, and the mindset surrounding innovative approaches. This includes assessing whether healthcare professionals predominantly adhere to conventional methods or exhibit a willingness to experiment with novel working approaches.

The primary objective of the Author was to examine the impact of specialists utilizing Telemedicine services on communication and the quality of their relationships with system operators. The study aimed to explore the factors that contribute to effective collaboration, including clear objectives, well-defined roles, transparency, and mutual respect for responsibilities. The question at hand is to the potential improvement of relational elements among system operators through the utilization of Telemedicine services. The model was developed by establishing four distinct factors derived from the responses:

- the ability to allocate additional time for domestic activities and enhance their flexibility and the capability of effectively incorporating time management activities into overall task management.

Telemedicine offers a notable benefit in terms of its capacity to optimize time management and improve information systems within the healthcare industry. Telemedicine enables experts to engage in real-time consultations and information sharing, thereby mitigating the necessity for physical travel and decreasing delays in decision-making procedures. In addition, the utilization of digital health records and telemonitoring systems facilitates the smooth transmission of patient data between healthcare providers, hence enhancing the standard and effectiveness of healthcare provision [188]

The inclusion of research studies, highlights the significance of Telemedicine interventions in terms of time-saving benefits for healthcare professionals and patients. Additionally, these interventions facilitate improved information sharing and management, ultimately enhancing the overall effectiveness of healthcare delivery.

- the openness to innovative work approaches in contrast to conventional methods.

The presence and adherence to well-defined guidelines for operational processes play a pivotal role in fostering innovative work behavior. This is achieved by seamlessly integrating the various stages of the innovation process, encompassing knowledge acquisition, idea generation, and solution implementation. A key factor influencing the effectiveness of this relationship is the level of flexibility individuals exhibit in taking ownership of their roles within the organizational framework. The capacity for adaptability and autonomy in role ownership emerges as a mediating force, shaping the dynamics between operational guidelines and the cultivation of innovative work behaviors [189]. Innovation and creativity are becoming even more significant nowadays in light of the public sector's need to address several grand societal challenges that lie ahead [190]. As such, the need for constant evolution in developing new technologies, products, and services has become a key guiding principle for public organizations [191].

- the ability to assess the eligibility of a patient for a certain Telemedicine service.

When initiating a Telemedicine program, much of the focus should be on the clinical application of the medical practice. It is important to decide what services to offer and how to offer them to set up a system for billing and financial sustainability of the new practice and to determine how it will fit into the already present system [192].

Technologically mediated relational coordination improves employee trust, improving individual performance and functional effectiveness outcomes. The quality of technologically mediated relational coordination affects the speed and richness of shared data among employees. This phenomenon enables employees to take optimal decisions and learn to improve innovative solutions iteratively [193].

- the successfulness in interacts with patients via Telemedicine services. The objectives of care coordination are to promote sharing of patients' clinical information, keep patients and families informed, and manage effective referrals and care transitions [194].

High-quality chronic care delivery and productive interaction between patients and healthcare professionals are expected to lead to better patient outcomes [20]. The foundational elements of care delivery coproduction rest upon the intricate relationships and positive exchanges established between patients and healthcare providers. These dynamic interactions form the bedrock of the collaborative efforts, contributing significantly to patient outcomes, thereby enhancing overall well-being. The reciprocal and constructive nature of these exchanges plays a pivotal role in shaping the



coproduction dynamics within the healthcare delivery process. Encouraging conversation and interactions between patients and healthcare professionals may require investing in time spent with patients.

Associations among individual characteristics, quality of chronic care, and productive interactions between patients and (teams of) healthcare professionals increase costs in the short term, it may produce a long-term return on investment exceeding the resources needed to make the change [195]

The variables mentioned are independent variables in the model. The Author has conducted a study to examine the influence and subsequent implications of this factors on relationship dynamics, collaboration, and communication. The observed effect is influenced by two additional variables: the utility of the services in question for facilitating work processes, and the presence of a governance structure among these services. Furthermore, the effect is also contingent upon the level of expertise and proficiency in digital skills within the relevant specialty. These factors collectively impact the extent to which the independent variables contribute to improved communication and coordination. The study focused on two moderators: frequency, which refers to the frequency of usage of these services, and the level of genuine interest perceived by the specialist in relation to these services. The control factors in this study are the age of the specialist and the geographical location where their operating structure is situated.

#### 4.4.1. Structural Equation Modeling

The Author opted to utilize Structural Equation Modeling (SEM) to conduct the investigation. Structural Equation Modeling (SEM) is a statistical technique employed to construct and evaluate intricate associations between observed and latent variables. The technique in question is a versatile approach that integrates components of multivariate statistics, factor analysis, and regression analysis.

With Structural Equation Modeling (SEM) it is possible to define and examine intricate theoretical frameworks that encompass several variables and their interrelationships. These models have the capacity to incorporate both observable factors, which are explicitly measured, and latent variables, which are calculated from a collection of observed data. Structural Equation Modeling (SEM) enables the Author to investigate the direct and indirect associations between variables, facilitating a full comprehension of the underlying data structure.

Structural Equation Modeling (SEM) comprises two primary components:

- the measurement model within the framework pertains to the examination of the associations between latent variables and their respective observable indicators, which are variables that directly assess the underlying construct. Assessing the degree to which the observable variables accurately reflect the underlying latent constructs is beneficial.
- the structural model examines the associations between latent variables and/or observable variables. This tool enables to empirically examine hypotheses pertaining to the associations between variables, encompassing both direct and indirect effects. The structural model delineates the causal pathways and interactions among variables within the model.

The Author has classified the survey questions into five distinct groups of variables, which have been employed in the construction of the Structural Equation Modeling (SEM):

- Control variable: *Age* of the respondent and *Region*, in particular Italian region in which the respondent operates as a healthcare specialist. Control variables are factors that can influence the dependent variable but are not the main subject of the study.
- Moderators: *Frequency* and *Interest*. The direction and the intensity of the association between the independent and dependent variables is influenced by moderators. "For whom" or "under what conditions" the association is stronger or weaker is indicated by these variables. In this case Frequency is the rate of respondent's Telemedicine services usage, while Interest is the extent to which the respondent would like to use Telemedicine services in the future.
- Mediators: the process by which an independent variable affects a dependent variable is explained by mediating factors, which are intermediary variables. Stated differently, these factors aid in explaining "why" or "how" there is a relationship between independent and dependent variables. The concept of *integration* serves as an extrinsic motivator for engaging in the study, acting as a mediator between the independent variables and the dependent variables. Specifically, the study focuses on the unique nature of Telemedicine services within the healthcare sector, the integration of Telemedicine with other systems utilized by the respondent, the establishment of defined rules, procedures and governance pertaining to the use of this services. Another factor that serves as a

motivation are *competences* which are an internal motivator that acts as a mediator between independent variables and dependent variables, such as the respondent's digital literacy.

- **Dependent Variables:** *Communication* and *Relationship* are the dependent variable that are being investigated. The individuals under consideration are subject to the effect of independent variables, and the objective is to comprehend the nature and degree of the relationship between these variables and the independent variable. *Communication* refers to the frequency, speed, and accuracy with which a healthcare practitioner engages in communication with other individuals in the healthcare field. *Relationship* pertains to the level of collaboration, clarity, transparency, and respect within the healthcare system in which the responder is situated. Together these two terms contribute to the theory of Relational Coordination.
  
- **Independent variables:** they refer to the factors that are being in the context of Telemedicine in the healthcare sector. The following variables are hypothesized to exert an influence on the dependent variable. The variables are intentionally altered and manipulated in a controlled manner during this study. These variables are:
  - *Confidence:* refers to the extent to which the respondent feels confident in evaluating whether a patient is eligible for a specific Telemedicine service
  - *Effectiveness:* refers to the degree to which the respondent communicates more effectively with patients through Telemedicine services
  - *Personal scheduling* refers to the degree to which the respondent can spend more time at home and increase flexibility
  - *Planning:* the extent to which the respondent can integrate TM activities with all other tasks
  - *Embracing Innovation:* the extent to which the respondent is adaptive and agile towards innovation in the workplace.

The identified pattern can be summed up in the following framework. (Figure 12)

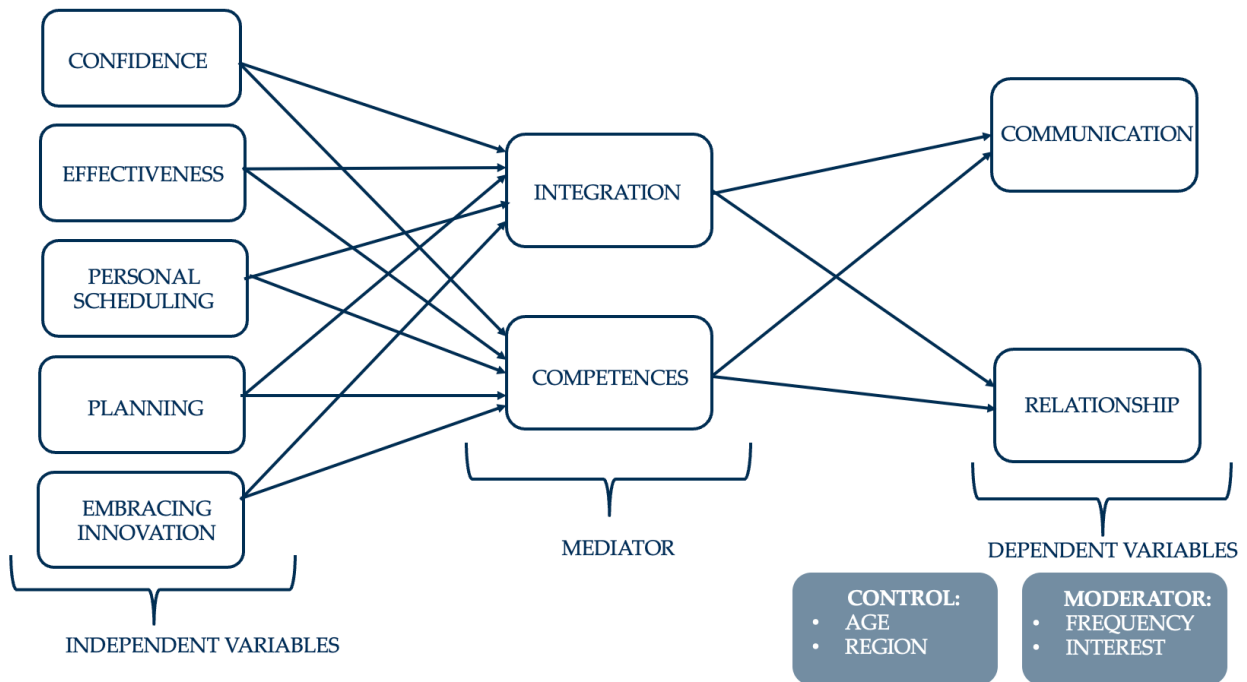


Figure 12: Framework of the Thesis

While controlling for age and region and moderating for frequency and interest, all according to the designed framework that gives lots of good logical support, the Author has formulated 5 hypotheses which are all supported by strong logic and literature. The Author in this paragraph starts with a formal statement of the hypotheses:

**Hypothesis 1:** *The Integration of Telemedicine and the digital Competences mediate positive effect of confidence in evaluation on frequency and quality of Communication and quality of Relationships with General Practitioners. These effects are positively moderated by the Frequency of usage and the Interest in future adoption of Telemedicine.*

**Hypothesis 2:** *The Integration of Telemedicine and the digital Competences mediate positive effect of ability to communicate with patients on frequency and quality of Communication and quality of Relationships with General Practitioners. These effects are positively moderated by the Frequency of usage and the Interest in future adoption of Telemedicine.*

**Hypothesis 3:** *The Integration of Telemedicine and the digital Competences mediate positive effect of flexibility in personal scheduling on frequency and quality of Communication and quality of Relationships with General Practitioners. These effects are positively moderated by the Frequency of usage and the Interest in future adoption of Telemedicine.*

**Hypothesis 4:** *The Integration of Telemedicine and the digital Competences mediate positive effect of planning skills on frequency and quality of Communication and quality of Relationships with General Practitioners. These effects are positively moderated by the Frequency of usage and the Interest in future adoption of Telemedicine.*

**Hypothesis 5:** *The Integration of Telemedicine and the digital Competences mediate positive effect of adaptiveness and agility towards innovation in the workplace on frequency and quality of Communication and quality of Relationships with General Practitioners. These effects are positively moderated by the Frequency of usage and the Interest in future adoption of Telemedicine.*

The assumptions were incorporated into the model in the subsequent manner.

(Figure 13)

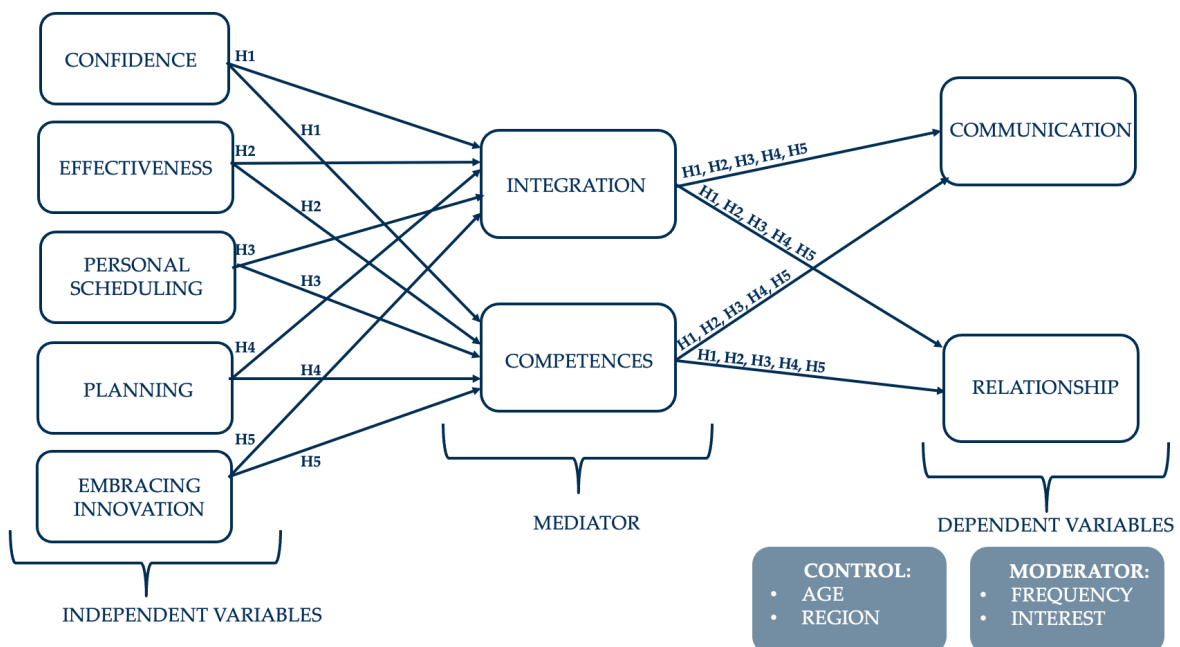


Figure 13: Framework of the Thesis with Hypothesis

In addition to testing the above hypothesis, the Author explores the features of various statistical tools to assess the distinctive benefits of STATA that has been chosen among

other possible options and that has been successfully utilized to perform the analyses.

## 4.5. Data Analysing using STATA

The Author has assessed various statistical analysis software options to determine the best appropriate one for conducting the research and addressing the research questions outlined in paragraph 3.5.

A graphical representation covering strengths and limitations among software packages has been presented in Table 3.

|  | R   | SAS | SPSS | STATA |
|--|-----|-----|------|-------|
| <b>Advanced statistical analyses</b>                   | +   | +   | +/-  | +     |
| <b>Data weights and complex survey design</b>          | +   | +   | +/-  | +     |
| <b>Optional complimentary analyses</b>                 | +   | +   | +    | +     |
| <b>User-written programs for analyses</b>              | +   | -   | -    | +     |
| <b>User-written programs for graphics</b>              | +   | -   | -    | +     |
| <b>Numerous online resources available</b>             | +/- | +   | -    | +     |
| <b>Data sets in various formats/extensions allowed</b> | +   | +   | -    | +     |

*Table 3: Strengths and Limitations Among Software Packages*

As defined by Brian W. Ward, STATA can perform a wider range of advanced statistical analyses than R, SAS, and SPSS [196].

As shown in the table, the software STATA sets itself apart by providing a wide range of features, encompassing advanced statistical analyses, strong support for data weights and intricate survey designs, optional supplementary analyses, support for user-generated programs for both analyses and graphics, and an abundance of online resources. Moreover, the software exhibits its versatility through its capacity to process data sets in many formats and file extensions.

Considering these factors, the Author made the decision to utilize STATA as the primary software for doing the requisite statistical analyses in their thesis. The decision to use STATA as the preferred platform is driven by its established reputation for reliability and

versatility, which makes it well-suited to fulfill the specific analytical requirements of the research. Analyses were undertaken using STATA SE, version 17.





## 5. Findings

At a statistical level, research has demonstrated the significance of Telemedicine in terms of its favorable impact on performance and the improvement of relationships among system operators, as well as enhancing communication between them. According to the model, the utilization of Telemedicine services has the potential to enhance the quality of work in terms of service provision, time efficiency, and work-life balance. In this scenario, there is an enhancement in the professional interactions with other individuals. This assertion holds particularly valid in instances where Telemedicine services are included inside the working setting. These services exhibit seamless interoperability with other systems, practical usability, and are supported by a well-structured organizational framework for effective management.

Additionally, individuals enhance their work productivity and achieve more efficient time management, thereby reclaiming time that would otherwise be spent on tasks that are both time-consuming and yield minimal value. The utilization of Telemedicine services has been found to have a beneficial impact on relational coordination and communication. This can be attributed to the enhanced time management capabilities and improved output quality facilitated by such services.

The previously mentioned impact is facilitated by the inherent usefulness and use of Telemedicine services, their seamless integration with other computer and information systems, and the presence of an organization overseeing these services. Specialists benefit themselves of Telemedicine services, which enables them to effectively allocate their time and enhance their work-life equilibrium, while concurrently elevating the standard of their professional output. The utilization of these services has a positive impact on communication and relationships among system operators. This impact is influenced by the integration and practical application of the services, as well as the operators' level of digital competence and familiarity with the technology. The Stata output is presented in the next paragraph.

## 5.1. Analysing using STATA - Structural Equation Modeling

| Integration                 | coefficient | std. error | z     | P >  z |
|-----------------------------|-------------|------------|-------|--------|
| <b>Confidence</b>           | .0695709    | 0.01365    | 5.09  | 0.000  |
| <b>Effectiveness</b>        | .0988181    | 0.38584    | 2.56  | 0.010  |
| <b>Personal Scheduling</b>  | -.17187     | .0420616   | -4.09 | 0.000  |
| <b>Planning</b>             | .136115     | 0.42719    | 3.19  | 0.001  |
| <b>Embracing Innovation</b> | .1020808    | 0.323553   | 3.15  | 0.002  |

Table 4: Output 1 of STATA

| Relationship       | coefficient | std. error | z    | P >  z |
|--------------------|-------------|------------|------|--------|
| <b>Integration</b> | .1302773    | .0411951   | 3.16 | 0.002  |
| <b>Competences</b> | .3470527    | .0415746   | 8.35 | 0.000  |

Table 5: Output 2 of STATA

| Communication      | coefficient | std. error | z    | P >  z |
|--------------------|-------------|------------|------|--------|
| <b>Integration</b> | .1428778    | .044824    | 3.19 | 0.001  |
| <b>Competences</b> | .3525388    | .0453672   | 7.77 | 0.000  |

Table 6: Output 3 of STATA

In the present model, higher absolute z-values are indicative of increased statistical significance. It is observed that all p-values exhibit a considerable level of significance, being less than 0.05. This indicates that all coefficients inside the model, associated with each variable, can be considered statistically significant. The possession of digital skills by specialist doctors does not have a statistically significant reinforcing effect on the mechanisms of Telemedicine influencing relational coordination.

## 5.2. Analysing using STATA – PCA Analysis

In this instance, the Author has opted to employ Principal Component Analysis (PCA) as a modeling technique, specifically selecting two components for analysis. From this analysis becomes evident that the foremost two components account for a significant proportion of the overall variance in the dataset, specifically amounting to 81.70%.

According to the Author, the determination of the number of components to be extracted can be identified also by observing the screeplot. Specifically, this determination is made by identifying the point on the curve where the change in slope occurs, sometimes referred to as the "elbow" of the curve. Beyond this point, the curve tends to flatten. It is evident from the graph that the shift in slope happens subsequent to the second component.

Furthermore, while analyzing the eigenvalues, it is observed that only the initial two components possess a value that is larger than or equal to 1.

Through the examination of the eigenvectors, the researcher identified that the variables *confidence*, *planning*, *embracing innovation* and *effectiveness* exhibit significant coefficients, indicating their substantial contribution to the primary principal component. Consequently, these variables play a crucial role in elucidating the variance within the principal model.

The second primary component is mostly influenced by *relationship* and *communication* characteristics.

An in-depth examination, it becomes evident that the *integration* variable has a favorable impact on the third component.

Following completing this series of analyses, the Author made the decision to compute the Kaiser-Meyer-Olkin (KMO) value, an index utilized to assess the sufficiency of the sample for doing a principal component analysis (PCA). In this instance, the KMO index demonstrates a robust compatibility of the sample for conducting the principal component analysis, as seen by its value of 0.9507. Therefore, based on the parameters mentioned above, the data appears to be highly appropriate for doing a principal component analysis.

## 5.3. Analysing using STATA – Further Analysis

In this section, the Author conduct a more in-depth examination and evaluation of the model.

To substantiate the proposed model, the Author sought to investigate additional statistical indicators, which are included below for reference:

| Population error    | value | description                              |
|---------------------|-------|--|
| RMSEA               | 0.064 | Root mean squared error of approximation |
| 90% CI, lower bound | 0.058 |  |
| upper bound         | 0.071 |  |

Table 7: RMSEA Value

With an RMSEA (Standardized root mean square residual) of 0.064 and a CI very close, it seems that the model has a good adaptability according to the criterion [197].

| Baseline comparison | value | description                             |
|---------------------|-------|---|
| CFI                 | 0.974 | Comparative fit index                   |
| TLI                 | 0.965 | Tucker-Lewis index                      |
| SRMR                | 0.028 | Standardized root mean squared residual |

Table 8: Reliability Indexes

The Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI) are statistical measures that assess the degree to which a model fits better than a null model. A higher level of conformity to the basic model is indicated by a CFI and TLI value that approaches 1.

In the present scenario, the Comparative Fit Index (CFI) is reported as 0.974, while the Tucker-Lewis Index (TLI) is reported as 0.965. Both values exceed 0.90, suggesting a

favorable level of model adaptation in comparison to the base model. Similarly, the Standardized Root Mean Squared Residual (SRMR) of 0.028 suggests a good fitting model.

The Cronbach's alpha coefficient was calculated to be 0.821, indicating a significant level of internal consistency and dependability among the components inside the model.



## 6. Discussion

In this chapter, the Author will analyze the findings to address the research questions. The main outcome of this Dissertation Thesis will be the presentation of a Framework, which aims to highlight the interrelationships between the dimensions addressed earlier in a visual and thorough manner.

### 6.1 Dimensions for Relational Coordination implementation

In this Chapter, all the relevant dimensions derived from the Survey have been analyzed with the goal of defining how they impact communication and relationship within healthcare sectors.

The Survey encompasses both levels of relationship of Specialist Doctors with clinicians, namely the one with General Practitioners and that with other specialists. The Author has decided to stick with only one relationship level at a time when building the model and performing relative analyses.

Therefore, the hypotheses formulated by the Author were tested in the context of Specialist Doctors using Telemedicine to consult and coordinate with General Practitioners with the intention of assessing the influence of TM services on the perceived quality of communication and relationships of Specialist Doctors with General Practitioners.

#### *H1: Confidence*

Confidence of Specialist Doctors in evaluating the eligibility of patients for Telemedicine services increases with Integration in line with the Author's expectations. Technology integration and automation initiatives would prevent the loss of important patient data [70], thus providing the specialist with a more informed view on patients' needs and enhancing the assessment capabilities of specialists.



### *H2: Effectiveness*

Ability of Specialist Doctors to communicate effectively with patients increases with Integration in line with the Author's expectations. In this way, Integration enhances implicit coordination and harmonizes team behaviors, thus improving Specialist Doctors' ability to cope with patients and to communicate with them more efficiently [198]. This in turn indirectly improves the quality and safety of communication and information exchange procedures. The positive effects of Integration on communicating with patients have been highlighted in several contexts, irrespectively of the routine nature of the activities involved [199]. Nevertheless, the positive effect of Integration appears to be greater in contexts that need a high level of implicit coordination among clinicians [200].

Afterwards, same hypotheses were tested in the context of application of Telemedicine between Specialist Doctors and other specialists with same intention stated by the Author in the previous examined context. This model led to the same considerations as the above model.

### *H3: Personal Scheduling*

Contrary to Author's expectations, Personal Scheduling does not seem to increase with Integration, but decreases.

Figure 14 provides an overview of the strategic approach to healthcare planning and scheduling, including program objectives, characteristics of a successful program, risk categories, and a few stages for making scheduling and planning decisions. Examining all or some of the elements in this diagram will probably go on as our intricate healthcare systems deal with new, cutting-edge technologies, changing patient demands, and unforeseen circumstances in the future. The COVID-19 pandemic, for instance, has highlighted the healthcare sector's sensitivity to change and the necessity of structural and technical change [201].

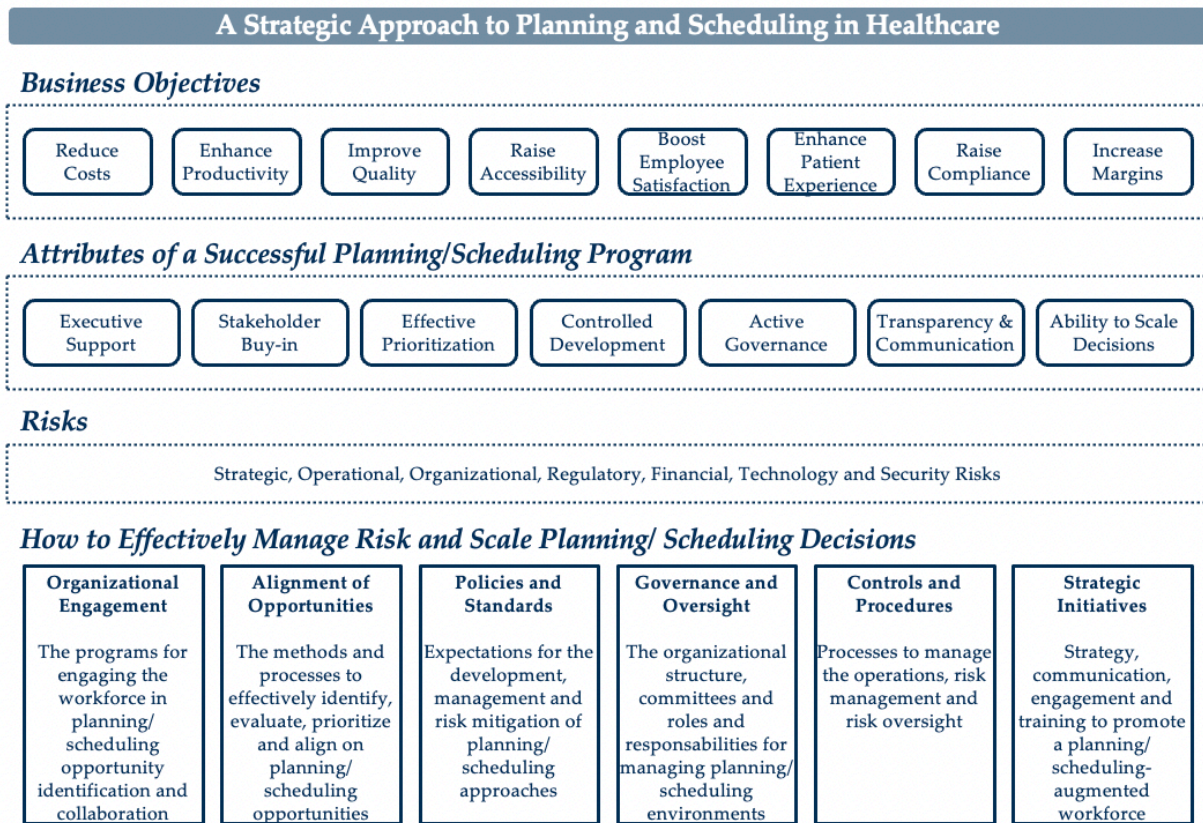


Figure 14: A strategic approach to planning and scheduling in healthcare

Within the realm of business objectives related to scheduling and planning, a noticeable absence exists in terms of integration. The strategic alignment and harmonization of these essential functions are not currently observed, highlighting a distinct separation among the identified business goals within the context of scheduling and planning processes.

To have a comprehensive understanding of the impact of time management, it is necessary to explore the many levels of service and assess the efficacy of integration, as the successful implementation of these factors is crucial for the effectiveness of therapy. Conversely, if these aspects are poorly integrated, they can result in a significant waste of time.

*H4: Planning*

Planning skills of Specialist Doctors for coordinating TM activities with all other tasks increases with Integration in line with the Author’s expectations. This is especially true

when Integration is interpreted in the sense of integrated governance [202]. Under conditions of complementarity, as it is the case of Telemedicine, integration of the complementary activity is the preferred mode of governance [203]. This is because an integrated governance mode has an advantage over nonintegrated mode with respect to coordination of activities through well-defined routines, superior communication channels and allocation of decision rights [204].

#### *H5: Embracing Innovation*

Adaptiveness and agility of Specialist Doctors towards innovation in the workplace increases with Integration in line with the Author's expectations. The relevant dimension of integration to be taken into consideration in this context is team cohesion and the effectiveness of coordination in work teams [200]. The degree of shared ties and member integration that drive team members to work together, to commit to other members, and to accomplish the purposes of the team [205] depends on the existence of sound shared mental models and on the development of a collaborative and constructive working environment [200]. In such integrated environments, everyone's contribution is appreciated, and individual team members can freely share their ideas without being criticized, thus forming innovation-oriented mindset and agile approach to workflow standards and new ways of working [206].



# 7. Conclusions

This Thesis has made two distinct contributions to the research topic, namely theoretical and managerial in design. In relation to theoretical advancements, by a meticulous examination of the current body of literature, it has been feasible to validate previously established findings by other scholars while also introducing additional novel aspects.

In relation to managerial contributions this paper aims to provide a set of recommendations for managers to effectively coordinate personnel within their healthcare organization, with a specific focus on the adoption and incorporation of Telemedicine into their daily tasks. These suggestions have been drawn from the analysis and discussion presented in Chapter 6. In conclusion, this study will now address the research limitations and propose possible routes for further growth.

## 7.1. Theoretical Contribution

This Research fits into a broader line of inquiry about Telemedicine by examining how these services can enhance Relational Coordination while accounting for potential mediators of those effects such the possession of digital competences and the level of integration of Telemedicine that includes more computer and information systems, as well as the existence of a body in charge of these services within healthcare organizations as well as in cross-organizational healthcare systems where a higher level of cooperation is required.

Here, several theoretical contributions that came from the Research are examined with the body of the analyzed literature. There are three categories of theoretical contribution which can be recognized:

- The research has validated a few ideas and theories that have previously been put up and examined in the literature, thanks to the evidence that was gathered:
  - RC and the employment of tele-expertise relate to one another in practice. Given the significant effort that healthcare systems are putting into creating extensive Telemedicine services, Gittel has highlighted the importance to comprehend how the quality of relationships among medical professionals

may be impacted by communication and knowledge sharing via digital platforms. Since RC has been demonstrated to favorably influence outcomes of interest inside organizations, RCT may help determine whether using Telemedicine for medical coordination may result in improved outcomes, such as efficiency and quality of care.

- Telemedicine services need integration as an approach to strengthen people-centered health systems, delivered by a coordinated multidisciplinary team of providers working across settings and levels of care, to guarantee the successful and appropriateness of relationships and communication among clinicians. Some types of integration (structural, functional, clinical) have been extensively studied. Technological, digital, and organizational skills have been highlighted both by the analyzed Literature and by respondents. The Research has confirmed that clear formalization of roles, of tasks and responsibilities is a key aspect in the integration of Telemedicine services within healthcare providers.
- The Research has expanded the knowledge on a series of concepts already stated and discussed in the literature:
  - Thanks to the analyzed survey, it has been possible to extend the importance and influence of Telemedicine in offering a notable benefit in terms of its capacity to optimize time management and improve information systems within the healthcare industry, and everything happens there, highlighting the importance of some specific elements as facilitators: the integration of telemonitoring systems with digital health records enhances the efficiency and quality of healthcare delivery by facilitating the seamless exchange of patient data amongst healthcare professionals.
  - In addition to all the findings about technology presented in the Literature Review, more than one interviewee has stressed few new elements regarding its features. Starting from the development phases, the technological system must be designed adapting it to both healthcare professionals' and patients' needs and the need for constant evolution in developing new technologies, products, and services has become a key guiding principle for public organizations.

- The Research has found out new concepts, absent in the literature:
  - The research has made it possible to emphasize the idea of coherence and cohesiveness among all the components influencing the implementation of Telemedicine: they cannot be viewed as separate entities. Each of them contributes to the overall picture, and the organization as a whole—the "house" of the Framework—must be viewed as a collection of interconnected and mutually reliant pieces. Furthermore, some of the external elements immediately interact with these elements, and they are also influenced by them.
  - This Dissertation Thesis has contributed to the literature by offering a new perspective considering a series of factors affecting the implementation of Telemedicine in healthcare organization not as singular elements but as pieces of a puzzle that must be considered all together in the Framework proposed and discussed with a series of deep relations and implications within all of them. All the collected elements have been clustered in the Framework according to both intrinsic and extrinsic factors which directly or indirectly influence the relational coordination among clinicians to better serve the patient through the application of Telemedicine. By doing so, it has been demonstrated by the explanatory study how the interconnections between those elements cross the borders of the individual or the organization itself.

## 7.2. Managerial Implications

The study of Telemedicine as an antecedent to the relational coordination between General Practitioners and specialist doctors has been the focus of this dissertation thesis. The essential elements that managers in healthcare organizations must consider have been provided by the research.

The influence of job design on work coordination is particularly apparent when seen through the lens of relational coordination. The influence of job design on coordination within a workplace can be observed through alterations in the nature, frequency, and effectiveness of interpersonal interactions.

This phenomenon is particularly pronounced in the healthcare sector, where intricate care procedures necessitate collaboration among professionals with diverse areas of expertise. The Author's primary focus was on the managerial factors that impact relational coordination within a healthcare system. This includes the establishment of strong logical connections through job design, which in turn contributes to the personal well-being and satisfaction of all individuals involved. The Author also explored the interconnections

between coordination, communication, and the various stages of the healthcare system.

Furthermore, scholarly findings have indicated that the existence of leaders who demonstrate respect and appreciation for the knowledge and expertise of their subordinates is correlated with a favorable perception of collaboration. The inclusion of integration, the presence of leaders, cooperation, and other notions connected to persons and their interactions all contribute to prioritizing relationship-building and communication as fundamental aspects of work coordination within both individual and organizational contexts.

The field of healthcare supply chain management is characterized by its intricate nature, which in turn presents various research prospects in key domains of supply chain management. These domains include mass customization, such as precision medicine, coordination and integration pertaining to new care models, and incentives associated with emerging reimbursement schemes.

The impact of reciprocal team cohesion on teamwork and cooperation is significantly influenced by the establishment of robust shared mental models and the cultivation of a constructive and cooperative work environment. In integrated environments, the cultivation of an innovative attitude and the adoption of an agile approach to workflow norms and novel work methodologies are fostered. These environments prioritize the appreciation of each individual's contribution and create a safe space for team members to openly exchange ideas without apprehension of negative feedback.

The establishment of coordination in the workplace, centered on trust, participation, and a proactive attitude towards innovation and change, can yield significant advantages for employees and professionals. This is particularly relevant in job design and the implementation of technological advancements, such as Telemedicine, within healthcare work settings. Collaboration refers to the constructive exchange of information and ideas among healthcare professionals with the aim of effectively addressing the needs of clients. The scope of Telemedicine extends beyond the normal provision of remote guidance, serving as a coordination mechanism that facilitates the management of urgent cases, reduces delays, enhances patient care, and ultimately builds novel care networks for uncommon and intricate illnesses.

The utilization of technology to facilitate relationship coordination has been found to enhance employee trust, hence resulting in enhanced individual performance and ultimately contributing to organizational success. The impact of technological



## 7 | Conclusions

advancements on relational coordination have a direct influence on the efficiency and quantity of information exchange among personnel. Due to this phenomenon, employees have the opportunity to enhance their inventive problem-solving skills through iterative learning processes, enabling them to make optimal decisions.

One of the primary obstacles in the pursuit of social value is in the coordination of endeavors, not only between the public and private sectors, but also among individuals who possess specialized expertise that extends beyond conventional professional domains, necessitating the cultivation of mutual comprehension. Mutual knowledge refers to the shared understanding of information between all participants involved in a conversation. The significance of mutual knowledge within interorganizational connections lies in its contribution to the broader notion of Integration. This element plays a significant role by enhancing the probability of effective communication comprehension and enabling individuals and organizations to anticipate the actions of others. When there is a lack of efficient communication, the ability to manage task interdependencies within the framework of relationships, also known as relational coordination, will become difficult. The study highlights the correlation between successful cooperation and effective communication, emphasizing the importance of integration as a mediator that favorably influences the impact of work model enhancements on coordination.

The primary factors contributing to the challenge of achieving efficient and effective attainment in healthcare services are the clinicians' confidence in assessing patient eligibility for specific Telemedicine services, their effectiveness in communicating with patients through Telemedicine, their ability to spend more time at home and increase flexibility, their capacity to integrate Telemedicine activities with other job tasks, and their adaptability and agility towards workplace innovation.

Healthcare companies have employed several strategies to achieve efficiency and effectiveness. These strategies encompass standardization, training, knowledge transfer, systems and design thinking, process management, utilization of electronic medical records, variance minimization, and other related measures.

It is recommended that managers offer their staff customized training programs that align with their current competencies and desired skill sets. In the realm of delivering healthcare services through Telemedicine, it is crucial to offer guidance and coaching to clinicians, especially during the early stages, to improve their performance capabilities, confidence, patient-centered communication skills, and long-term adaptability. This is particularly important as the utilization of digital solutions, such as Telemedicine services, is anticipated to become indispensable in the healthcare system. In conclusion, it is recommended that managers thoroughly examine the effects of time management,

given the projected rise in productivity requirements and the anticipated broad adoption of new work practices, including remote work, inside healthcare companies. This will also encompass the involvement of highly trained medical professionals.

Within this context, it is imperative to evaluate the effectiveness of integration across several levels of service. Inadequately linked components can lead to substantial time inefficiencies and a decrease in the quality of services and treatments provided to patients.

### 7.3. Limitations & Future developments

The present Dissertation Thesis is grounded in a comprehensive research endeavor that seeks to thoroughly investigate the many scenarios prevalent within the Italian healthcare industry. As the entirety of the Survey Research is based in Italy, it is worth noting that future developments of relevance pertain to the validation of the model beyond the confines of Italy, which may yield further insights.

The Survey did not consider several additional relevant variables that could potentially impact the associations described earlier. The unexplained aspects encompass a range of considerations, such as the potency and velocity of the connections, the degree of user-friendliness inherent in the interfaces, and the comprehensiveness of the security and privacy safeguards that have been put in place.

Regrettably, the model fails to consider crucial technology limitations and limits that may have a substantial influence on the results. It is imperative to recognize that challenges pertaining to connectivity and interface functionality may emerge, particularly in areas of Italy that have not been extensively investigated or documented. The model's emphasis lies exclusively on occasions in which the technology functions optimally, while disregarding situations where services are inadequately delivered, resulting in potential inefficiency and time loss. However, these occurrences were regrettably excluded from the analysis.

Furthermore, it would have been interesting to explore the perspectives of patients directly, as the provision of Telemedicine services requiring patient interaction necessitates their active involvement. Subsequent investigations ought to be directed towards a focused analysis of the effects of Telemedicine services as seen by patients, as well as the coordination dynamics between healthcare providers and patients.





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# Appendix

- The STATA code used for analysis is accessible through the following OneDrive folder link:

[https://www.dropbox.com/scl/fi/ljkmby9w9lovkdt7pby14/2023\\_12\\_Pili\\_DOFILE.do?rlkey=5d2ml4fnjpnhm40lsd3b1x0n1&dl=0](https://www.dropbox.com/scl/fi/ljkmby9w9lovkdt7pby14/2023_12_Pili_DOFILE.do?rlkey=5d2ml4fnjpnhm40lsd3b1x0n1&dl=0)

- The database containing respondents' answers to the interviews conducted for this research is not available due to privacy constraints. The preservation of participant anonymity and privacy is of paramount significance.
- The Survey “Medici Specialisti 2023” is available upon request.



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