

Stakeholder issues and technical challenges in telemedicine diffusion from a project management perspective: a systematic review

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Abstract: Telemedicine is deeply changing healthcare delivery paradigms, and its integration with the Internet of Things and 5G technologies allows the implementation of advanced smart health services. The COVID-19 pandemic highlighted the key role of telemedicine in ensuring patients’ access to healthcare in critical conditions. As a result, several nations have dedicated substantial resources to the development of telemedicine infrastructure through programs such as Next Generation EU. However, technical limitations and user acceptance remain obstacles to overcome to realize the full potential of telemedicine in improving patient care. This work aims to analyze the perceived technical and acceptance issues of the diffusion of telemedicine from a standpoint that considers the final users and the other impacted stakeholders, such as their families. The aforementioned standpoint needs to consider the challenges related to the interaction between technological know-how and a stakeholder environment that is highly affected by the technology but lacks the needed expertise to understand its benefits. To do so, this study draws from the realm of complex project management, where a proper communication and involvement strategy is paramount for stakeholders who are impacted by the outcome of the project but have limited influence over its management. This intersection between the world of telemedicine and complex project management is explored through a literature review composed of a systematic search performed following the PRISMA model, and a critical discussion of the results from the point of view of stakeholder theory and complex project management. The systematic search mainly explores the telemedicine adoption issues and challenges, while the discussion on the results refers to new stakeholder theories and approaches towards stakeholders in complex projects. This study contributes to both the academic and practitioner realms, by highlighting seldom explored synergies between areas of literature, and by addressing a pivotal challenge of the future healthcare paradigm.

Keywords: Telemedicine; Telehealth; Stakeholder management; Complex projects; Systematic Review

1. Introduction

The operations management of healthcare services is a critical field that impacts the efficiency and effectiveness of healthcare delivery. Furthermore, the increasing importance of digitalization in healthcare, as exemplified by the rapid evolution of telemedicine and the integration of digital technologies, is transforming the operational management of healthcare services (Piffari *et al.*, 2022; Jha *et al.*, 2016). Telemedicine can be defined as “the use of telecommunication systems to deliver healthcare from one site to another to improve a patient’s clinical health status” (American Telemedicine Association, 2020), while the World Health Organization defines telemedicine as: “the remote provision of healthcare services through the use of communication channels. Such channels could be used for communication between healthcare providers seeking clinical guidance and support from other healthcare providers (provider-to-provider telemedicine) or between remote healthcare users seeking health services and healthcare providers (client-to-provider telemedicine).”, adapted from the WHO Guideline, (2019): Recommendations on Digital Interventions for

Health System Strengthening. Telemedicine provides new opportunities for remote patient monitoring and improves access to specialist care. The integration of telemedicine with the Internet of Things (IoT) and 5G networks has paved the way for advanced smart health services. The COVID-19 pandemic has underscored the significance of telemedicine in preserving healthcare access during difficult situations. In response, several nations, including those participating in initiatives such as Next Generation EU, have made substantial investments in developing telemedicine infrastructure. As part of the PNRR (National Recovery and Resilience Plan) restructuring, the Italian Ministry of Health has allocated €750 million for the improvement of home care and telemedicine interventions (Camera dei deputati XIX legislatura, 2023). This endeavor includes creating a national platform for telemedicine services and funding projects that facilitate remote doctor-patient interactions and ad hoc research initiatives on digital technologies in health and care. Despite the enormous potential of telemedicine, its diffusion continues to face significant obstacles. Key among these are technical limitations and user acceptance. The implementation of telemedicine services often aligns

with the characteristics of megaprojects, defined as endeavors with investments of around one billion euros and significant impacts on communities and environments. The complexities inherent in megaprojects, particularly in managing diverse stakeholder interests and ensuring user acceptance, necessitate a robust project management approach. Stakeholder management, a cornerstone of project management theory, offers a structured framework for identifying, analyzing, and engaging with stakeholders to navigate these complexities effectively. Accordingly, this systematic review adopts a project management perspective, specifically focusing on complex projects, to analyze the perceived technical and user acceptance challenges associated with telemedicine diffusion. To do so, the results are screened and reviewed through the lens of stakeholder theory and new stakeholder theory, according to which organizations have broader obligations towards their stakeholder environment and society at large, generating a “sense of ownership” (Freeman, 1984; Freeman *et al.*, 2010; McGahan, 2023). Stakeholder theory asserts that organizations bear responsibilities not only to their shareholders but also to a broader spectrum of stakeholders who are impacted by or hold the ability to influence their decisions and behavior. This approach underscores the importance of considering all stakeholders, including patients, their families, and healthcare providers, in the telemedicine implementation process. By understanding stakeholder needs, engineers can design user-centric systems, address technical challenges proactively, facilitate smooth implementation, and optimize system performance through ongoing feedback and adjustments. This is necessary to fully realize the benefits of telemedicine for patient care, consider the needs and claims of the secondary stakeholders, who are affected by the outcome of the organization but have limited power to influence it. The primary challenge in implementing technological advancements is to effectively bridge the gap between the stakeholders impacted by the technology and those who may lack the necessary expertise to comprehend its benefits. This study delves into the exploration of stakeholder theory and complex project management principles to examine how effective communication and stakeholder engagement strategies can be leveraged to address these challenges. A significant emphasis is placed on understanding the unique needs and perspectives of stakeholders to ensure that they have the necessary information to make informed decisions. Indeed, building on the insights provided by stakeholder theory, the theme of stakeholder engagement and value co-creation in projects is gaining momentum in literature. By proactively informing or conceding a portion of decision-making to secondary stakeholders, organizations can optimize their projects, tailoring them to the surrounding context (Di Maddaloni and Sabini, 2022; Gil, 2021). Of course, generating social value going beyond the original boundaries of projects increases the complexity of the endeavors and the pressure on the project organization, especially on the shareholder side. Thus, managers are required to reconcile business expectations with the social and legal pressure related to the generation and distribution of value (Gil, 2023). A comprehensive

literature review has been carried out utilizing the PRISMA model to examine the current research surrounding the challenges associated with telemedicine adoption. The stakeholder theory and complex project management approaches have been applied to analyze the findings. The purpose of this analysis is to bridge the gap between these two distinct yet interconnected fields, offering valuable insights for both academic researchers and healthcare practitioners working to advance telemedicine implementation. By uncovering these previously unexplored synergies, the study contributes to the ongoing discussion about overcoming critical obstacles within the ever-evolving healthcare landscape, with a focus on the operations management challenges of telemedicine implementation and the role of digitalization in healthcare.

2.Methodology

The present study was conducted following the PRISMA guidelines, to identify and analyze the main issues and barriers associated with stakeholder engagement in telemedicine diffusion. To that end, a systematic literature review has been conducted, covering research and review articles published in English between 2020 and 2024. The search has been carried out using three main sources: PubMed, Scopus, and Google Scholar. The search terms used included “telemedicine” or “telehealth,” combined with “stakeholder”. Moreover, to exclude papers that referred to stakeholder engagement but did not analyze the resulting limitations, the keyword also terms “issues” or “barriers” have been considered. A total number of around 300 articles have been initially screened. The article selection process flowchart is shown in Fig. 1.

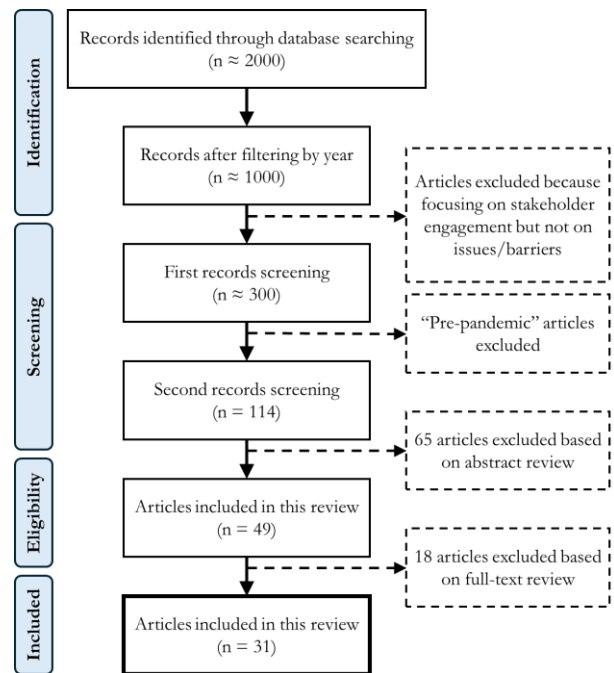


Figure 1: Articles selection process flowchart

As the COVID-19 pandemic has had a significant impact on the development and adoption of telemedicine, the keyword “COVID-19” has been used to exclude pre-

pandemic papers that did not address the purpose of the present study, obtaining 114 eligible articles. The resulting articles have been analyzed using a thematic approach, with a focus on identifying the main issues barriers, and technical challenges associated with stakeholder engagement in telemedicine diffusion. Following the abstract review, 49 articles have been selected based on their relevance to stakeholder engagement and telemedicine diffusion. Other articles have been excluded, e.g., review articles that did not present original research or articles with unavailable full-text. Subsequently, a full-text review has been conducted on the selected articles, with 31 articles chosen based on their in-depth analysis. Articles that did not contribute to the review’s purpose, such as those that did not present a link between telemedicine diffusion and stakeholder issues have been excluded.

3. Telemedicine stakeholders

In the past, considerable academic attention was directed toward the role and claims of shareholders and primary stakeholders, so those stakeholders “without whose the organization would cease to exist” (Freeman, 1984; Freeman *et al.*, 2010). Because of their direct contractual, financial, and regulatory interest in the project, their involvement was thoroughly discussed. This distinction is mainly operated according to the power attribute, neglecting other meaningful dimensions and the impact that projects have on their stakeholders. Thus, a more nuanced understanding of the surrounding stakeholder environment has become paramount, enabling a multi-level strategy based on the different interests at stake. In literature, a plethora of terms to better describe the role of the different stakeholder groups emerged, resulting in an entangled and not unified taxonomy. In such context, definitions that are not proper synonyms are used interchangeably within different epistemic communities. Though, the first and foremost is the distinction between internal and external stakeholders, or primary and secondary stakeholders, with the latter that can be further subdivided according to some attributes. Among those, the most relevant ones are the distinctions between users and non-users, so the secondary stakeholders who will use to some extent the outcome of the project; and between market and non-market stakeholders, so among stakeholders who are involved to some extent financially in the project and those who are not. Often, non-market stakeholders are also involuntary stakeholders, and they control essential resources that are needed to complete the project (Cellerino and Mancini, 2023; Gil, 2021).

Internal stakeholders: individuals who are directly involved in the delivery, diffusion, and administration of telemedicine services within a healthcare organization. Typical examples include:

- Healthcare Providers (Physicians, Nurses, Clinicians, Therapists, etc.): these are the healthcare professionals directly involved in delivering telehealth services to patients.
- Administrators & Funders: this group includes hospital administrators, clinic directors, and those

responsible for allocating funding for telehealth initiatives.

- Staff (Clinical and Non-Clinical): this encompasses all staff involved in telehealth implementation, including nurses, technicians, and administrative personnel.
- Healthcare Organizations: these are hospitals, clinics, and other healthcare delivery settings that offer telemedicine services.

External stakeholders: those outside the healthcare organization who nevertheless have an interest in telemedicine and play a role in influencing the development, implementation, and adoption of telehealth. Typical examples are:

- Patients: the individuals who receive healthcare services through telehealth.
- Caregivers (Parents/Family members): individuals who provide care for patients using telemedicine.
- Payers: the entities responsible for financing healthcare services, including insurance companies.
- Policymakers: government officials who develop and implement regulations related to telemedicine.
- Public Health Agencies: government agencies responsible for public health initiatives.
- Technology Companies: companies that develop and provide telemedicine platforms and technologies. They play a role in ensuring user-friendly and interoperable platforms.

Classifying stakeholders in telemedicine projects helps address problems like resistance to change, financial constraints, technical challenges, access disparities, and regulatory hurdles. Understanding these issues allows project managers to develop targeted strategies, by mitigating risks and ensuring successful implementation and adoption of telemedicine services.

4. Results and Discussion

A detailed review of the literature indicates a complex landscape of concerns and challenges surrounding telemedicine adoption for numerous stakeholders. In particular, financial constraints (Kedia *et al.*, 2021; VanderWerf *et al.*, 2022) and disparities in access to technology (Badawy and Radovic, 2020; Braune *et al.*, 2021; Hughes *et al.*, 2024) appear to be critical barriers to the widespread acceptance of telemedicine by all stakeholder groups (Ko and Busis, 2020; Maleka and Matli, 2022). Patients often have difficulty to afford technology and reliable internet connection (Dikaios *et al.*, 2020; Ftouni *et al.*, 2022), underlining the dual difficulties of availability (presence of technology and Internet) (Casillas *et al.*, 2022) and capability (financial resources and digital knowledge) (Kong, Hu and Walsman, 2021). This disparity can be aggravated by ethnic and racial disparities in access to technology, potentially increasing already existing health disparities (Cunha, Pedro, and Cordeiro, 2023). While technological difficulties with platforms (Amaral *et al.*, 2022), software development and use, Internet access (Wardlow *et al.*, 2023), and audiovisual issues (Yang *et al.*, 2020) might limit telemedicine delivery by healthcare providers, a lack of training additionally

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represents a significant challenge (Hammerton, Benson and Sibley, 2022; George *et al.*, 2024). Engaging patients digitally necessitates a distinct skill set from in-person sessions. This suggests that healthcare personnel require particular expertise to feel at ease navigating technology (Cho *et al.*, 2023; Johnson *et al.*, 2023) while preserving patient rapport and adherence to treatment plans in a virtual environment. Furthermore, this landscape is set in a situation in which politicians (Schofield, 2021), who recognize the potential benefits of telemedicine, have the challenging responsibility of developing clear regulations that safeguard patients’ privacy and data security (Park, Park, and Lee, 2022), as well as fair treatment (Ko and Busis, 2020). Finding a balance between preserving

privacy and encouraging innovation in telehealth services remains an important objective. Finally, administrators, financiers, and technology companies must integrate telehealth workflows into current healthcare systems (Casillas *et al.*, 2022), which frequently encounter internal resistance to change. Justifying the costs of implementing and maintaining telehealth infrastructure complicates the process, but conducting cost-benefit analyses that consider potential long-term savings and improved patient outcomes can help alleviate these financial concerns. Table 1 summarizes the main issues and challenges encountered by different stakeholder groups in the implementation of telemedicine.

Table 1: Summary of stakeholder issues and technical challenges

| Stakeholder Group | Main issues | Key technical challenges | References | |
|-------------------|--------------------------|--|--|---|
| Internal | Healthcare Providers | <ul style="list-style-type: none"> ▪ Lack of training and support ▪ Technical difficulties ▪ Maintaining patient engagement ▪ Resistance to change | <ul style="list-style-type: none"> ▪ Perceived benefits vs. ease of use ▪ Workforce shortages ▪ Cybersecurity risks | (Hammerton <i>et al.</i> , 2022; Wardlow <i>et al.</i> , 2023; George <i>et al.</i> , 2024) |
| | Administrators & Funders | <ul style="list-style-type: none"> ▪ Financial limitations ▪ Integration with workflows | <ul style="list-style-type: none"> ▪ Perceived benefits vs. ease of use ▪ Staff burnout | (Ko and Busis, 2020; Lanfranchi <i>et al.</i> , 2022; VanderWerf <i>et al.</i> , 2022; Lew <i>et al.</i> , 2023) |
| | Healthcare Organizations | <ul style="list-style-type: none"> ▪ Financial limitations ▪ Integration challenges with existing workflows ▪ Ensuring staff competency in telehealth delivery ▪ Cost of implementing and maintaining technology | <ul style="list-style-type: none"> ▪ Inadequate IT infrastructure ▪ Developing clear telehealth protocols and workflows ▪ Investing in staff training and support ▪ Conducting cost-benefit analyses to justify investments | (Kong <i>et al.</i> , 2021; Maleka and Matli, 2022; Miley <i>et al.</i> , 2022) |
| External | Patients | <ul style="list-style-type: none"> ▪ Lack of access to technology/internet ▪ Resistance to change ▪ Privacy and confidentiality concerns ▪ Reimbursement uncertainties | <ul style="list-style-type: none"> ▪ Perceived benefits vs. ease of use ▪ Financial limitations ▪ Unequal access to technology | (Adebayo <i>et al.</i> , 2020; Dikaos <i>et al.</i> , 2020; Schofield, 2021; Ftouni <i>et al.</i> , 2022; Mirbaha <i>et al.</i> , 2023) |
| | Caregivers | <ul style="list-style-type: none"> ▪ Technical difficulties ▪ Limited training and support ▪ Balancing caregiving responsibilities with technology use ▪ Concerns about patient privacy and safety | <ul style="list-style-type: none"> ▪ Developing targeted training programs for caregivers ▪ Addressing the digital divide and ensuring equitable access ▪ Establishing clear communication protocols for telehealth consultations | (Andrejek <i>et al.</i> , 2021; Braune <i>et al.</i> , 2021; Nguyen <i>et al.</i> , 2022; Park <i>et al.</i> , 2022) |
| | Payers | <ul style="list-style-type: none"> ▪ Reimbursement uncertainties ▪ Cost-effectiveness | <ul style="list-style-type: none"> ▪ Aligning payment models with telehealth services ▪ Standardizing coding and billing practices | (Badawy and Radovic, 2020; Corona <i>et al.</i> , 2021; Těšínová <i>et al.</i> , 2023) |
| | Polymakers | <ul style="list-style-type: none"> ▪ Lack of awareness about benefits ▪ Regulatory hurdles ▪ Disparities in access | <ul style="list-style-type: none"> ▪ Developing clear policies ▪ Ensuring data privacy/security ▪ Ensuring payment parity | (Kedia <i>et al.</i> , 2021; Schofield, 2021; Johnson <i>et al.</i> , 2023; Jones <i>et al.</i> , 2023) |
| | Public Health Agencies | <ul style="list-style-type: none"> ▪ Integration with public health initiatives ▪ Privacy concerns | <ul style="list-style-type: none"> ▪ Developing clear guidelines for public health applications ▪ Ensuring equitable access to telehealth services ▪ Keeping treatment protocols up-to-date | (Yang <i>et al.</i> , 2020; Amaral <i>et al.</i> , 2022; Hughes <i>et al.</i> , 2024) |
| | Technology Companies | <ul style="list-style-type: none"> ▪ Financial limitations ▪ Security vulnerabilities in platforms ▪ Interoperability challenges with existing healthcare systems ▪ Limited user-friendliness of interfaces | <ul style="list-style-type: none"> ▪ Prioritizing robust data security measures ▪ Integration difficulties with existing healthcare systems ▪ Developing open standards for data exchange ▪ Focusing on user-centered design for ease of use | (Casillas <i>et al.</i> , 2022; Cho <i>et al.</i> , 2023; Cunha, Pedro and Cordeiro, 2023) |

In conclusion, this analysis highlights the multifaceted nature of the challenges in telehealth adoption. It is not just about the technology itself. Successful implementation requires a multifaceted approach that addresses the specific needs of each stakeholder group. This includes ensuring equitable access to the technology and an affordable price for patients, providing adequate training and support for caregivers, establishing clear and secure data privacy regulations, and conducting cost-benefit analyses to demonstrate the value proposition to administrators and funders. By addressing these challenges, we can unlock the full potential of telemedicine to improve healthcare access, quality, and affordability for all.

To better understand such an entangled context and respond to the claims of stakeholders, we advocate that some meaningful lessons learned can be obtained from the realm of complex projects. Indeed, some common traits can be recognized on multiple levels. First, on the policymakers' side, there is a massive challenge related to the safeguarding of the hospitals and their operators in case of false negatives, properly identifying the responsibilities. Furthermore, another pivotal element is the protection of the patients' privacy. Both hospitals and patients require warranties about the anonymization of the data, so the providers of telemedicine services must guarantee the security of such sensitive data. On the other hand, there is another barrier that needs to be addressed, related to the wide variety of competitors in the market. As telemedicine is rapidly evolving, there is not a unified standard yet for compatibility among digital systems and in the understanding of the needs of patients. This inhibits the reaching of the full potential of telemedicine, as it does not allow to effectively reduce the overcrowding of hospitals. Indeed, even if there are systems such as Holter that can transmit data for months, there is no standard normative on the characteristics of software, so hospitals and patients are still relying on face-to-face visits. Furthermore, each competitor targets different market segments, which prevents the provision of a comprehensive offer to meet the diverse needs of the patients.

The challenges presented above emerged from the literature and the interaction with practitioners, and they share the trait of being multi-level issues, where the claims and needs of different actors are at stake. Analyzing this evolving context from a complex project management perspective, the recent developments in terms of stakeholder engagement offer a promising avenue for reducing the impact of these issues and providing a more tailored solution. Lehtinen *et al.* (2019) advocate that such endeavors can act as organizational platforms, where actors can jointly create value, that can be redistributed to each of them. Kier *et al.* (2023) present a promising example of shared service design in a hospital, where different professionals engage in dialogue about the future transformation. Bringing together different stakeholders through meetings and workshops and balancing and prioritizing their needs reduces their resistance and incentivizes a fruitful exchange, enhancing their “sense of ownership” (Lehtinen and Aaltonen, 2020). Instead of

separately considering the claims of the different groups, a common future-oriented vision focused on opportunities should be adopted, encouraging all parties to provide input and negotiate (Toukola *et al.*, 2023), to reach a more shared solution.

The results obtained from this systematic review can represent a first step in developing precise specifications, requirements, and guidelines for telemedicine service implementation projects. These may encompass a stakeholder engagement plan, a technical requirements checklist, training and support programs, a change management strategy, and a monitoring and evaluation framework. Integration of these components into project management methodologies augments the prospect of successful telemedicine implementation, ultimately enhancing patient care and addressing healthcare needs.

5. Managerial implications

While the concept of co-creation is already established in the medical world, bridging the complex project management literature provides a better approach to such multi-faceted issues, enriching the body of knowledge in both fields. Indeed, Ika and Pinto (2022) advocate that sometimes problems should be “complexified” rather than simplified. Embracing complexity enables the consideration of the standpoints of all the related actors, either internal or external, users or non-users. A more inclusive approach would thus allow the inclusion in the discussion of many different key factors that prevent or facilitate the adoption of telemedicine among the stakeholders of interest. Even if simplifying the problem could be tempting and much less time-consuming, flattening the stakeholder concerns, roles and responsibilities would lead to a sub-optimal solution, which would be plagued by low acceptance rate as not responding to the actual needs of the different actors. Thus, investing time in the engagement of stakeholders and offering a portion of decision-making in exchange for their insights and cooperation, while still keeping a lead role (Gil, 2021), would be an optimal choice for the managers involved in the process. The process will be iterative and will need time and negotiations to reach a shared vision among the plethora of actors, but it will guarantee a more optimized and tailored outcome, satisfying the involved stakeholders.

6. Conclusions

This article presented a systematic review that highlighted the multifaceted nature of the challenges that hinder the widespread adoption of telemedicine. In order to achieve successful implementation, a many-sided approach is required that addresses the specific needs and concerns of each stakeholder group. This includes ensuring fair access to technology and affordable prices for patients, providing adequate training and support to healthcare operators and caregivers, establishing clear and secure rules on data privacy, and conducting cost-effective analyses to demonstrate the value of the proposal to administrators and funders. By addressing these challenges, the full potential of telemedicine can be unleashed to improve access to healthcare, quality, and convenience for all.

Moreover, the complex project management perspective offers valuable insights to overcome the multi-level problems associated with the needs and demands of stakeholders. Adopting principles such as the design of shared services and collaborative dialogue promotes a sense of belonging among stakeholders, reduces resistance, and encourages a more fruitful exchange of ideas. This collaborative approach, focused on a shared future vision and commitment to co-creation, promises to maximize the positive impact of telemedicine in the evolving healthcare landscape, with particular relevance to operation management and digitalization in healthcare services.

In conclusion, telemedicine has enormous potential to revolutionize healthcare, but it faces significant challenges in terms of implementation. A multi-pronged approach that addresses each stakeholder group’s specific needs and concerns, combined with a collaborative approach based on a shared future vision and a commitment to co-creation, can overcome these challenges and maximize telemedicine’s positive impact in the healthcare sector.

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