Framework for Conducting Maturity Evaluation of Teleconsultation Platforms: A COVID-19 motivated project from India

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We conducted online evaluations of 58 teleconsultation platforms to identify the expectations and feature requirements of multiple stakeholders, including doctors, hospital administrators, hospital IT managers and health technology platform vendors. We then analyzed evaluation summaries and propose a maturity evaluation framework; a consensus development process was employed and experts from all participating organizations in the alliance were engaged. The resultant maturity framework is descriptive in nature, with three levels presented in a clear and concise manner. We recommend to view maturity as a dynamic and ongoing process. Patient-centric features were found to be desirable during evaluations, but ultimately took a backseat to medical and institutional logistics in terms of relevance for maturity evaluation. Compatibility of teleconsultation platforms with existing infrastructure and clinical practices was deemed important by all experts due to concerns about adoption and seamless transition to the new platform. This framework can serve as a roadmap for teleconsultation platform developers and could also be used to assess the teleconsultation platform maturity within a country, or organization.

CCS Concepts: • **Human-centered computing → Web-based interaction**.

Additional Key Words and Phrases: Teleconsultation, maturity framework, platform design, tele health, Teleconsultation evaluation framework, Teleconsultation in India

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1 INTRODUCTION

Over the past three decades, there has been a notable proliferation of research articles examining the implications, antecedents, and consequences associated with the utilization of telehealth platforms. These investigations have spanned both developed and developing countries. However, there has been a noticeable absence of guidance on selecting or developing an appropriate telehealth platform. Hospital administrators, physicians, and various stakeholders of telehealth ecosystem face a multitude of platform choices, yet they encounter challenges in evaluating these options effectively, often lacking the requisite tools to determine whether the chosen platforms align adequately with their requirements. Thus, uncertainty to assess their offerings has been felt by both providers and users of these platforms, underlining the need for comprehensive evaluation framework for telehealth platforms [11, 29]. In the field of telehealth, teleconsultations play a crucial role as they serve as the fundamental framework for linking patients with remote healthcare services and maintaining the continuity of care. Moreover, during the initial stages of the COVID-19 pandemic, efforts to reduce in-person healthcare visits, especially in hospital outpatient departments worldwide, resulted in the widespread adoption of teleconsultations as the preferred approach for rapid clinical assessment and delivering healthcare remotely. This shift was embraced not only by patients and healthcare professionals but also by hospitals [12, 36, 45]. Simultaneously, legislative changes in favor of telehealth delivery stimulated health technology entrepreneurs to introduce their products for telehealth delivery, most common being teleconsultation platform, in both developed and emerging nations [41, 64, 68]. Our examination of existing research shows that many studies have looked into the effects and use of teleconsultation services, both before and during the initial years of the COVID-19 pandemic. But, no comprehensive framework exists that could be applied to evaluate the maturity of current teleconsultation platforms and to advance their development. This gap can be in part attributed to the simplistic perception of teleconsultation platform as remote healthcare delivery tool with features such as video or image transfer, without considering the social or organizational aspects that influence the utilization of such platforms. While it is noteworthy that in resource-constrained and diverse regions, like many countries in the Global South, social or organizational aspects are further complicated by disparities in healthcare provider-patient ratios, nascent digital health policies, and social and cultural contexts that mediate healthcare utilization [13]. This paper is situated at the convergence of these two distinct healthcare research contexts. On one hand, there is a need to develop framework for evaluating the teleconsultation platforms. On the other hand, it is imperative to account for the complexities within healthcare ecosystems at the social, organizational, and national levels. To this end, an exploratory study on teleconsultation was conducted in India through a research alliance involving five organizations committed to enhancing healthcare delivery through information and technology. These organizations include the National Resource Centre for EHR Standards, the College of Healthcare Information Management, the Consortium of Accredited Healthcare Organizations, the Healthcare Information and Management Systems Society (India), and Digital Health India. Representatives from these organizations were nominated to form an expert working group comprising 12 members. Based on the work this research alliance this paper attempts to answer, *how should a tele-consultation platform be evaluated for its maturity that account for complexities of remote healthcare delivery in India?* Maturity here is not conceptualized as the success of one specific technological system; instead, it represents progress in aligning features with the requirements of the teleconsultation ecosystem, which includes healthcare providers, product developers, hospital administrators, and patients. Furthermore, we aim to approach this assessment in a manner that departs from the conventional standards tied to clinical users' specific services typically used to evaluate telehealth systems.

2 BACKGROUND

There are three phases to the current study's execution. The first phase involved survey of previous literature. We reviewed the studies obtained from three databases, namely Scopus, Web of Science, and Google Scholar. The selection of included studies for this paper followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, focusing on the timeline between 2010 and 2020. To enhance the relevancy of search results, the key search terms used were "teleconsultation evaluation," "teleconsultation maturity," "teleconsultation framework," "Telehealth framework," "Telehealth maturity," "Telemedicine framework," and "Telemedicine maturity." These key search terms were combined using Boolean operators (OR/AND). The initial screening was done on the basis of titles and keywords and it involved selecting studies that evaluated telemedicine in general, with a specific focus on teleconsultation. In addition to peer-reviewed published studies with high indexing, a literature search was conducted to incorporate popular frameworks and studies among practitioners. Relevant academic articles and materials related to these frameworks were included in the initial database. The next screening of abstracts was performed by the third and fourth authors, who identified papers that provided a systematic evaluation of one or more aspects of teleconsultation. This process resulted in the identification of 132 studies for in-depth reading. In order to synthesize the literature, a total of 132 selected studies were read and categorized based on their key focus, which included both single element and synthesis of diverse elements, following Maeder and Poultney's [48] approach. Only studies that specifically evaluated teleconsultation were included. We also documented the stakeholders involved as focal participants and classified the theoretical approaches used in each study according to Currie's 2005[22] classification, as presented in Table 1. Moreover, we analyzed the types of outcomes investigated as a result of utilizing teleconsultation platforms, as well as the research methodologies employed by the researchers in selected articles. Our analysis referred to the works of Coiera [20] in 2003 and Andargoli et al. [4] in 2017 to understand the approaches used in studying these outcomes. After an extensive screening process, we have included 21 papers that met our inclusion criteria and provide a comprehensive overview of the teleconsultation platform evaluation. These papers are listed in Table 1, offering valuable insights into the evaluation of teleconsultation.

The findings from included studies highlight that in the prior research frequently cited evaluation frameworks include the Model for Assessment of Telemedicine (MAST) [42], RE-AIM model [33], Technology Acceptance Model (TAM) [39], and Donabedian's Quality of Care Model (QOCM) [10]. Outcome evaluation studies on teleconsultation platforms are often conducted at a behavioral level, with the Technology Acceptance Model (TAM). The RE-AIM and Modified Delphi Method recommend consulting experts in the development of evaluation tools, and have been utilized to assess the usability, utility, and integration of teleconsultation platforms with other healthcare IT systems [3]. In addition, frameworks such as the Capability Maturity Model and the Telemedicine Maturity Model (TMM) in studies on the feasibility evaluation at the organizational level [65]. Table 2 summarize the frameworks mentioned. Prior research (Table 1) has largely focused on the evaluation of teleconsultation platforms from the perspective of a single user, rather than adopting a more diverse multi user approach. Key outcomes of interest to researchers include the low cost and advanced clinical information technology integration, as well as the technical suitability and usability of teleconsultation platforms for clinical and administrative purposes [24, 65]. Ease of use, clinical utility, and economic accessibility are commonly considered parameters in the evaluation [19, 24]. Overall, we find that studies conducted on teleconsultations tended to neglect the situational factors influenced by the complex dynamics within healthcare systems, spanning social, organizational, and national levels. While scholars that investigated health systems in global south have shown that intricate dynamics of health technology adoption were further compounded by disparities in the ratios of healthcare providers to patients, the evolving landscape of digital health policies, and the social and cultural factors that shape healthcare utilization [14, 16]. Therefore, it is imperative to undertake research utilizing suitable methodologies that engage a variety of domain experts [34, 51, 60] to identify the necessary features for successful teleconsultations. This is the gap that our study partially addressees.

3 METHOD

3.1 Data collection and analysis

The phase two of study was carried out between May 2020 and October 2021. We conducted activity walkthrough evaluation by experts for teleconsultation platforms that expressed interest in being part of the study [28, 32, 44, 49].

Table 1. Categorization of teleconsultation evaluation studies

Article Reference	Single or Diverse [48]	For whom	Currie's classification [22]	What (content)	How
Yan et al. [67]	Diverse	Doctors	Behavioral	Use as outcome	Qualitative enquiry, case study
Alkmim et al. [1]	Single	Doctors	Generic	Clinical usability	Quantitative summative
Alkmim et al. [2]	Single	Healthcare workers	Generic	Ease of use	Quantitative survey
Petcu et al. [55]	Single	Patients	Behavioral	Clinical usability	Quantitative survey
Esterle and Mathieu-Fritz [27]	Single	Patients and care givers	Social relationship	Clinical outcome	Qualitative observation and interview
Maarop and Win [47]	Single	Healthcare providers	Behavioral	Clinical usability	Quantitative survey and qualitative interviews
Grenier et al. [35]	Single	Patients	Behavioral	Clinical outcome	Quantitative Survey
Lu et al. [46]	Diverse	Doctors	System development	Usability and organizational fit	Review and quantitative survey
Gallerini et al. [31]	Single	Patients	Generic	Usability and organizational fit	Qualitative observation-based enquiry
De la Torre Díez et al. [63]	Diverse	Patients	System development	Usability and organizational fit	Quantitative Survey
Czekierda et al. [23]	Diverse	Doctors	System development	Clinical usability	Qualitative case study
Park et al. [53]	Single	Patients	System development	Clinical usability	Quantitative Survey
Paul and McDaniel [54]	Single	Clinicians, administrators and IT professionals	Behavioral	Adoption Outcome	Qualitative case study
Barrett [7]	Single	Nurses	Social relationship	Clinical usability	Qualitative case study
Rimner et al. [57]	Single	Patient	Generic	Ease of use	Quantitative survey
Gackowski et al. [30]	Single	Doctors	System development	Clinical usability	Quantitative experiment
Toledo et al. [62]	Single	Patient	Behavioral	Clinical Outcome	Quantitative survey
Mahnke et al. [50]	Single	Doctors	System Development	Usability and organizational fit	Qualitative observation
Li et al. [43]	Diverse	Doctors and Patients	System Development	Clinical usability	Quantitative and Qualitative
Viers et al. [66]	Single	Patients and Doctors	Behavioral	Clinical Usability	Quantitative experiment
Tchero et al. [61]	Single	Patients	Generic	Clinical Outcome	Quantitative experiment
This Study	Diverse	Patient, doctors, CIOs, health administrators	System Development	Features-level maturity of technology platform	Qualitative

Table 2. Summary of popular evaluation frameworks used in teleconsultation studies

Framework	Focus area
Model for Assessment of Telemedicine (MAST)	Evaluating telemedicine outcomes across various domains, including access to care, cost, experience, and effectiveness
RE-AIM model	Utilized to assess the usability, utility, and integration of teleconsultation platforms with other healthcare IT systems
Technology Acceptance Model (TAM)	Commonly used at a behavioral level for intention to use and adoption. Derivatives of TAM are also used in these studies
Capability Maturity Model, Telemedicine Maturity Model (TMM) and Telehealth Maturity Model (THMM)	Feasibility evaluation at the organizational level. Used to examine factors such as technology infrastructure, regulatory environment, and funding sources for the implementation of teleconsultation platforms within an organization
This study	Proposes a framework to assess the maturity of teleconsultation platforms in terms of their ability to offer the progression of features aligned with the demands of the teleconsultation ecosystem.

Table 3. Profile of nominated experts that were part of evaluation and framework development working group

Domain	Professional Role	Experience (years)
Medical policies and healthcare administration	Strategic healthcare consultant	20+
Health informatics and user engagement	Academic research	4
Standards and interpretability in digital health	Director product	20+
Healthcare services administration	Lead product	10+
Standards and interpretability in digital health	Joint director product	15+
Digital products development	Lead platforms of digital products	20+
Digital transformation healthcare	Lead Product	10+
Medical care	Senior physician	15+
Digital transformation healthcare	Strategic healthcare consultant	20+
Information security	Director	10+
Digital transformation healthcare	Director	20+
Medical care	MBBS	5+

The experts comprised of professionals with experience in healthcare delivery, organizational and administrative policy, telemedicine research, senior managers, and health-care consultants (Table 3). Teleconsultation platform vendors were recruited to participate in the study via survey-based recruitment using various social media platforms such as Facebook, LinkedIn. The walkthrough method for conducting a usability test comprises two main stages: preparation and execution. For first stage, to ensure the accuracy and comprehensiveness of identified use cases and scenarios (see table 4 for comprehensive list) nominated experts from various alliance organizations were involved in the process. Moving on to the execution stage, it involved a sequential walkthrough of actions and the recording of feedback by the experts. 58 vendors participated and each vendor was given a 45-minute online slot to demonstrate the workflow of their teleconsultation platform, starting from basic activity and then experts asked specific activity demonstrations. Following each demonstration, the expert evaluators discussed and provided subjective notes on how well it addressed scenarios enquired. These notes were combined by the first, third and fourth authors to create a comprehensive

Table 4. Comprehensive list of features and scenarios enquired by the experts during evaluations

Basic activities (8 vendors demonstrated only these activities)	Advance activities (39 platforms demonstrated some features for listed activities)	Automation activities (11 platforms had features to support automated teleconsultation workflow)
Onboarding of patients	Doctor and Patient profile management	Pre-appointment triage support
Onboarding of doctors	Dashboard layout for doctors	Risk assessment of patient
Modes of interaction between doctor and patients	Templates and customizations available for doctor	Digital assistance for medical record keeping
Clinical documentation features for doctors	Facility for referral and multi-doctor team consultation	Standardizations (security, databases, data storage, data exchange)
Prescription format	Consent modalities	Patient portal and facilities for patient health record
Features for patient to share documents	Provision for record keeping	Health education and counselling support
Alternative to smart phone ownership for patients	Feature for caregivers of elderly and adolescent	Assistance to patient in following the care plan
Consent types for teleconsultation session	Interoperability and integration with hospital information system	IoT integration
	Drug data base integration	Features for secondary remote care
	Clinical decision assistance	Warning system in line with guidelines, standards and protocols
	Administrative support features	Patient evaluation and feedback
	Provision for data security	Integration with third-party services
	Multilingual support	

evaluation summary for each teleconsultation platform. The first and second authors attended all demonstrations and evaluation discussion sessions. **TABLE4** In the third phase of the study, we adopted a consensus development process [38] commonly used to develop guidelines in the healthcare field by synthesizing available information and expert opinions [21]. Inputs from experts (Profile in table 4 were synthesized by first and second author and presented in the form a framework to take their qualitative inputs. The first version of framework had six levels and three feature dimensions (mandatory features, security features, and aspirational features). In total we held five online meetings with experts before finalizing the framework via voting on feature categorization and framework levels [40]. All discussions were carefully documented, and the framework was subsequently modified to address any concerns raised by the experts. We also conducted an online workshop about framework with teleconsultation vendors that participated in evaluation exercise for their input. The teleconsultation maturity evaluation framework resulting from this process is presented in the next section of the paper.

3.2 Positionality

It's important to note that all authors possess relative social and economic capital in Indian society that may distance them from the marginalization experienced by patients who rely on technology-mediated teleconsultation. Nonetheless, drawing from our collective experiences of studying and participating in healthcare delivery among underserved populations in rural and urban India, we were motivated to emphasize patient needs when collaborating with other experts during consensus building on framework. We sought to highlight features that could potentially contribute to more equitable and inclusive teleconsultation offerings. While this goal emerged as a long-term objective in the final framework, it is mentioned here to transparently convey our positionality as we proceed to discuss the findings and framework.

4 FINDINGS

We analyzed the summaries of demonstrations generated by the experts during the evaluation process. The platforms are divided into three groups based on the overall review given by the experts. We compiled a list of scenarios and situations that were considered by the experts during their evaluations, and documented those platforms (see Table 4 and Figure ??) Experts reached consensus on following points: 1) doctors are concerned about the amount of time they need to

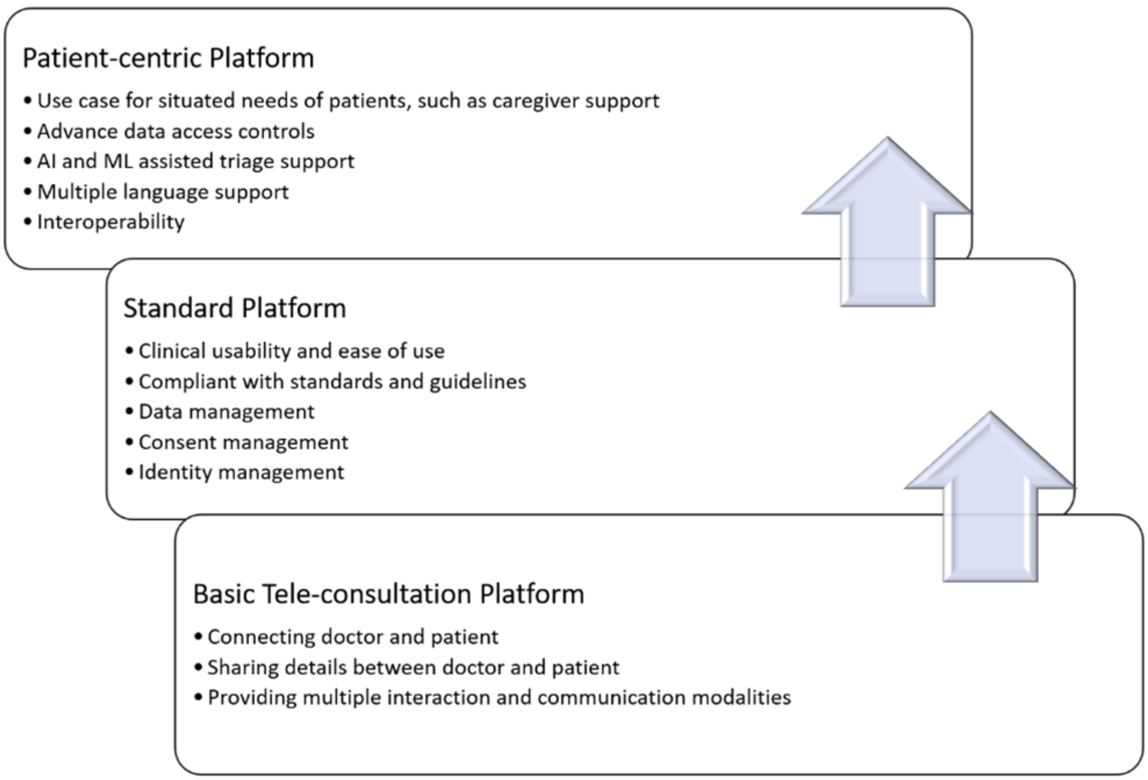

Fig. 1. Layered representation of maturity of Teleconsultation Platforms

spend on documentation and setup tasks, so platforms that are easy to use and navigate would be preferred. For doctors, platform should support necessary medical documentation and legally acceptable modes of communication in order to ensure continuity of care; 2) For patients, clear communication is essential to understand information and instructions provided by doctors, both verbally and through prescribed treatment or medication. It is also valuable for the platform to provide secure connections and protect patient confidentiality, as well as allow for the exchange of information with caregivers, other healthcare specialists, and support staff; 3) From the perspective of hospital administration, it should support regional and national healthcare approaches and provide data/reports for accreditations; 4) IT team expects the chosen platform to be easy to maintain and compliant with all relevant guidelines and laws. Experts agreed on the three-tier format of the framework with patient-centric features at top and standard compliant platform at middle tier (See Figure ??). The above considerations provided structure to maturity evaluation framework. It is stratified into three levels (minimal, comprehensive and smart assist). Each level is further represented by three dimensions (interaction and communication, documentation, compliance) based on commonalities in features and product attributes and product can have varying maturity across three levels. Generally, platforms can offer a range of features spanning from a "minimal" layer to increasingly comprehensive features, ultimately culminating in the "smart assist" category. These features encompass three distinct domains: interaction and communication, documentation and data management, and compliance. However, it is important to note that in practice, there may be some degree of overlap and iteration between these layers across domains. For example, a product might incorporate smart assist features in the realm of interaction and communication while providing only minimal-level features for compliance, documentation, and data management. Summary of maturity framework across three levels is provided in table 5. The maturity framework is descriptive in nature as we provide levels in simple and textual manner [65]. The minimal level of the framework is focused on providing the bare minimum of features or functionality needed to perform the teleconsultation. The comprehensive level builds upon the foundation of the framework, i.e., minimal level and adds features or functionality that help to ensure clinical quality and effectiveness of teleconsultation activity. Platforms at this level provide extensive features to help users meet their clinical and administrative objectives. The comprehensive level is thorough and include features for ensuring teleconsultation and its documentation comparable to physical consultation visit. The smart assist level of teleconsultation platforms as per the framework are focused on providing intelligent and compliant assistance to help users perform their tasks. The features are combined under this category such that the teleconsultation platform provides advanced and sophisticated assistance that is aided by intelligent systems or tools, and that is designed to be both effective and compliant with relevant rules or regulations. The three dimensions across which features are grouped in the proposed framework are elaborated next.

4.1 Interaction and Communication

Interaction and communication are essential capabilities of teleconsultation platforms, include enabling remote connections between doctors and patients. Experts emphasized the importance of platform features that allow patients to transmit their symptoms and signs to physicians remotely, including synchronous (e.g. audio or video consultations) and asynchronous (fax or email) exchange of dialogue and documents such as prescriptions. Experts have also included the features for identity management and administrative tasks on payment and onboarding as part of interaction and communication dimension. We have included comparison of all three levels across this dimension in the Table 6.

4.2 Documentation and Data Management

Proper documentation of clinical interactions during teleconsultation sessions is essential. To this end, experts agreed that teleconsultation platforms should have a feature for documenting assessment and treatment plan. Platforms are expected to maintain a record of interactions that take place using their features, while doctors using platforms with minimal documentation features are responsible for any interactions outside the platform. As a result, maintaining longitudinal records of doctor-patient interactions on basic teleconsultation platforms may not be possible. Experts agreed that doctors using minimal feature platforms may need to rely on patients or their care givers to provide information on previous medical history, symptoms, and vital measurements in order to properly diagnose patients

Table 5. Summary of teleconsultation maturity evaluation framework

Level	Description	Key Capabilities Summary
Minimal	Providing the bare minimum of features or functionalities	Provides multiple remote interaction modality (audio, video) Features for registering patients Supports asynchronous communication (email, SMS for prescription sharing) Payment management Scheduling and calendar management
Comprehensive	Features or functionalities that help to ensure quality and effectiveness of teleconsultation activity comparable to physical consultation visit	Synchronous communication (upload and download of document, image sharing) Advance interaction support (such as, in call chat, drawing pad, customizable information brochure, and private note taking) Compatibility with basic consultation workflow and supports specialty specific customization Platform facilitated proforma for assessment and treatment plan documentation and communicating documented details Referral management Identification and authentication features Provision of role-based login Onboarding training Consent management Data management including data provenance Integration with third party applications for interaction and communication Clinically relevant database integration (such as drug, diagnostic, hospital held electronic patient records)
Smart assist	Platform provides advanced assistance that is aided by intelligent systems or tools, and is designed to facilitate adherence with relevant rules or regulations	Consent management system adaptable for functionally illiterate patient, stigmatized clinical condition, etc. Multilingual and translation support wherever required by patient Interaction and communication support features for caregivers, minors, etc. Patient portal and provision for maintaining longitudinal health record Customizable alerts and reminders Recommendations on clinical assessment and treatment guidance based on latest research IoT integration Rule based optimization of varied features by applying learning algorithms Personalized training and grievance redressal Data lifecycle management

Table 6. Interaction and Communication features across three levels of maturity

Minimal level	Comprehensive level	Smart Assist level
Enable patients to share their symptoms and signs to physicians remotely.	Key features include screen sharing, and other features to enable doctors to explain assessment and diagnosis to patients	Flexibility in modes of interaction, including the ability to switch to audio if there are issues with bandwidth.
Synchronous (e.g. audio or video consultations) and asynchronous (fax or email) exchange of dialogue and documents.	Identity management including verifying, authenticating, and recording the identities of all users.	Allow multiple parties to join consultation sessions
Support clinical documentation of interactions between physicians and patients, including verbal, visual, and text-based communication.	Including digital identities or digitalized version of recognized identifiers of doctors and patients in communication	Support the use of remote devices for data collection and improved diagnosis.
Features for sharing images of handwritten prescriptions,	Easy appointment booking and multiple payment options	Integration with databases and advanced identification methods to verify doctors' credentials and establish the identity of patients and caregivers.
Integration with WhatsApp messaging, and SMS	Cancellation and refund management	Smart recommendations, guidance in choosing a doctor during appointment
For certain situations features for remote teleconsultation centers.	Real time appointment management	Advanced analytics, and integration of medication ordering and tracking.
Management of doctor's availability.	Tools for onboarding training for clinicians and patients.	Application of rule-based learning to optimize the user interface and provide machine learning-based guidance to user
Setting prices and handle payments online.		Inclusion of language translation
		Queue management

during remote consultations. Similarly, private note-taking features may be helpful for doctors consulting with patients on sensitive issues, but can also create challenges for advanced record search and retrieval. Thus, capabilities related to maintaining electronic health record and electronic patient records, along with patient portal etc. are grouped under this dimension. We have included comparison of all three levels across this dimension in the Table 7.

4.3 Compliance

These requirements may vary depending on national guidelines and policies. For instance, in India, it is important for the platform to identify the patient and the type of consultation, whether it is a first-time or follow-up visit to ensure that consent is implicit in the first scenario and executed explicitly between the telemedicine platform and the patient in the second scenario. It is important for the platform to facilitate a secure connection for teleconsultations and allow for flexibility in the use of third-party applications. Experts have also included the features for consent management

Table 7. Documentation and data management features across three levels of maturity

Minimal level	Comprehensive level	Smart Assist level
Feature for audio/video recording interactions between doctors and patients	Support the documentation within the teleconsultation workflow.	Clinical decision support and integration with clinical and drug databases can help reduce the risk of errors in prescription.
Flexibility to communicate with patients in multiple ways, such as sharing pictures and emailing prescriptions through the platform's mail server or external platforms	Template for documenting prescription as per guidelines (such as valid patient identity, generic name of the drug, dosage and formulation, specify frequency and route of administration, and the signature of the doctor).	Robust data management and data exchange capabilities that assist physicians in adhering to clinical rules and guidelines.
Template for documenting perceptions, care plans.	Private note-taking feature	Allow customization of the prescription template and teleconsultation workflow according to specialty or consulting style,
Facility to record verbal consent as required by guidelines.	Provide detailed, specialty-specific documentation template.	Data base integration capabilities for alerting on drug allergies and doses
	Features for the retrieval of past records	Feature for referrals
	Customizable database to alert on medication errors and restricted drug prescription	Facilitate documentation in line with the goal of digital health records i.e. to have a single, longitudinal electronic record for each patient.
	Plotting and charting of vital signs, and warnings and recommendations based on pre-programmed rules.	Natural language processing, and voice typing capabilities.
	Customizable permissions for document sharing	
	Maintain communication logs	

and helath data exchange as part of compliance dimension. We have included comparison of all three levels across this dimension in the Table 8.

5 DISCUSSION

The maturity evaluation framework proposed in this paper lists progression of features of a teleconsultation platform that are aligned with the teleconsultation ecosystem, encompassing healthcare providers, product developers, hospital administrators, and patients. Although, this framework departs from conventional clinical user and service-specific standards typically used to evaluate telehealth systems. But, we find that in the framework doctor-specific features align with previous research on the clinical needs of doctors during different consultations and specialty-specific consultations [18, 59, 67]. It also highlights the importance of features in teleconsultation platforms for identifying and communicating with patients, as well as for maintaining legally acceptable records that patients can understand

Table 8. Compliance features across three levels of maturity

Minimal level	Comprehensive level	Smart Assist level
Not many features and ultimately it is the responsibility of the hospital administrator to set internal guidelines and monitor usage to ensure policies are followed.	Identification and authentication features	Compliance with clinical standards such as ICD10 or ICD11, SNOMED CT, and LOINC.
	Capability to integrate with of national resident identity numbers, mobile/email-based identification methods, and two-factor authentication.	Safe and secure data capture and exchange through integration with IoT devices, third-party solutions such as labs and pharmacies
	Provision to obtain consent for one-time platform use or explicit consent documentation before each virtual encounter	As part of consent management enable anonymous or de-identified data sharing for analytics and clinical research
	Ensure encrypted data transmission, data backup, audit trails, encrypted data backup	Consent management system should consider the privacy requirements of illiterate, dependent, or marginalized patients, considering their socio-cultural and socio-economic background, and obtain consent from patients for the use of their data by third parties. It should also provide access to patients' relatives or other members of their circle of care, clinicians, and healthcare providers for cross-consultation, with encounter-specific consents communicated in a manner that the user can understand and special consideration given to potentially stigmatized conditions.
	Protect the privacy of both doctors and patients.	Manage the data life cycle in accordance with national guidelines
	Capability to integrate with drug databases interoperability standards and requirements, set by the organization	Facilitate secure, encrypted data storage for medico-legal and clinical audit purposes.

and act upon. The features in comprehensive and smart assist level are also relevant for ensuring that patients trust the teleconsultation process, understand information and instructions provided by doctors, and have the option to switch to in-person care, if needed. Previous research has shown that assessing teleconsultation platforms features for both doctor and patient needs can significantly improve outcomes of post-implementation user satisfaction studies [25]. This goes beyond just reducing the time spent during medical interviews [26]. It is important to note that certain patient-centric features, as listed in Table 5, were considered important only during evaluations, as experts discussed the needs of patients with low income and living in remote areas [9, 58]. However, during the consensus development process for the maturity framework, these features lost their relevance for comprehensive teleconsultation platforms. Although patient-centric features were seen as ideal and desirable, it became apparent that "medical care logics" or "professional logics" and "managerial logics" took precedence over "patient-centered logics" [5, 6] during the process of abstraction. As a result, these patient-centric features were placed at the upper end of the maturity model (smart assist). This finding is also consistent with previous research on the limited utilization of patient-centric features and may explain why doctors resist the use of teleconsultation platforms, as they may disrupt their routines and not align with their "logic of care" [56]. In addition, many patients feel a disruption in their relationships with their doctors when interactions are mediated by technology platforms and tend to return to in-person consultations. We would like to caution that both minimalistic and comprehensive teleconsultation platforms may not adequately address the needs and preferences of patients. For all stakeholders, compatibility with previous infrastructure emerged as essential requirement for various reasons. Doctors preferred compatible systems because they would already familiar with existing systems, while administrators valued the convenience of having access to previous reports. IT professionals also valued the ease of integration in order to minimize potential issues during the adoption process. In addition to these factors, for level three platforms, accreditations and the ability to interface with other existing systems are also important considerations for stakeholders [15].It is important to note that the capabilities of comprehensive teleconsultation platforms are also informed by national and organization-level policies, data exchange standards implemented by healthcare organizations [17, 37, 52], and regional healthcare needs.

6 LIMITATIONS

The present study has two notable limitations that should be taken into consideration when interpreting the results. Firstly, only teleconsultation platforms that were available in India at the time of the study were included in the analysis. Secondly, with the exception of one organization, all of the organizations that were part of the alliance were based in India, and all of the professionals who served on the committee were from India as well. Although, it should be noted that several of the nominated experts had experience with healthcare systems in other countries, this geographic and cultural focus may still be a limiting factor in the generalizability of the findings.

7 CONCLUSION

This paper is motivated by the need to have tools to evaluate telemedicine platforms. We looked at a critical health IT component, i.e. Teleconsultation system. COVID 19 has increased both availability and acceptability of teleconsultation platforms across the globe including the low and middle-income countries, such as India. We reviewed previous work relevant to evaluation of teleconsultation platforms/solutions and learnt that stakeholders' engagement was mostly limited or absent resulting in evaluation studies with majority focus on cost and clinical efficacy of the platform. We noted that there is a need to break away from clinical service standard teleconsultation evaluation for an evaluation framework that accounts for situational factors and the complex dynamics of tele healthcare delivery ecosystems. We convened a diverse group of stakeholders to evaluate the feature offerings of existing teleconsultation platforms in India. Drawing upon their feedback, we have formulated an evaluation framework designed for utilization by hospital administrators, healthcare providers, platform developers, and other stakeholders faced with a multitude of teleconsultation platform choices. The framework presented in this paper is intended to be viewed as a step in an ongoing process, rather than a static entity. While we are presenting one version of the framework, it should be seen as a milestone along this continuous process, which can take various forms depending on the context in which it is being developed or applied. The recognition of the temporal nature of the framework relates to the shift among agile developers from specifying requirements in terms of features to focusing on "user stories" and "user journeys". This framework provides the opportunity to understand the process of maturing and hence the evolving maturity of the teleconsultation framework (and therefore this is an agile framework for evaluating maturity) in line with the recent call among information systems usability researchers to prioritize the ongoing temporal flow of IS phenomena (pp. 424, [8]).

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REFERENCES

[1] MB Alkmim, Milena Soriano Marcolino, Junia Xavier Maia, Cristiane G Pessoa, Elaine Machado, and Lidiane Sousa. 2015. Clinical Quality Control of a Large-Scale Teleconsultation Service. *Studies in Health Technology and Informatics* 216 (2015), 988–988.

[2] Maria BM Alkmim, Milena S Marcolino, Renato M Figueira, Lidiane Sousa, Mariana S Nunes, Clareci S Cardoso, and Antonio L Ribeiro. 2015. Factors associated with the use of a teleconsultation system in Brazilian primary care. *Telemedicine and e-Health* 21, 6 (2015), 473–483.

[3] Hassan Khader Y Almathami, Khin Than Win, and Elena Vlahu-Gjorgievska. 2022. Development and validation of a new tool to identify factors that influence users' motivation toward the use of teleconsultation systems: a modified Delphi study. *International Journal of Medical Informatics* 157 (2022), 104618.

[4] Amirhossein Eslami Andargoli, Helana Scheepers, Diana Rajendran, and Amrik Sohal. 2017. Health information systems evaluation frameworks: A systematic review. *International journal of medical informatics* 97 (2017), 195–209.

[5] Rikke Sand Andersen and Peter Vedsted. 2015. Juggling efficiency. An ethnographic study exploring healthcare seeking practices and institutional logics in Danish primary care settings. *Social Science & Medicine* 128 (2015), 239–245.

[6] Suzanne Bakken. 2022. Centering the patient in informatics applications. , 1027–1028 pages.

[7] David Barrett. 2017. Rethinking presence: a grounded theory of nurses and teleconsultation. *Journal of clinical nursing* 26, 19-20 (2017), 3088–3098.

[8] Reza Mousavi Baygi, Lucas D Introna, and Lotta Hultin. 2021. Everything flows: Studying continuous socio-technological transformation in a fluid and dynamic digital world. *MIS Quarterly* 45, 1 (2021), 423–452.

[9] Sebastian Bergrath, Michael Czaplik, Rolf Rossaint, Frederik Hirsch, Stefan Kurt Beckers, Bernd Valentin, Daniel Wielpütz, Marie-Thérèse Schneiders, and Jörg Christian Brokmann. 2013. Implementation phase of a multicentre prehospital telemedicine system to support paramedics: feasibility and possible limitations. *Scandinavian journal of trauma, resuscitation and emergency medicine* 21, 1 (2013), 1–10.

[10] Donald Berwick and Daniel M Fox. 2016. "Evaluating the quality of medical care": Donabedian's classic article 50 years later. *The Milbank Quarterly* 94, 2 (2016), 237.

[11] Oleg Bestsennyy, Greg Gilbert, Alex Harris, Jennifer Rost, et al. 2021. Telehealth: a quarter-trillion-dollar post-COVID-19 reality. *McKinsey & Company* 9 (2021).

[12] Gustavo Marques Fernandes Bezerra, Enzo Studart de Lucena Feitosa, João Gabriel Vale Catunda, Caio Nogueira Sales Graça, Pedro Lucena de Aquino, Antônio George Bezerra Neto, and Geraldo Bezerra da Silva Junior. 2022. Telemedicine Application and Assessment During the COVID-19 Pandemic. *Studies in health technology and informatics* 290 (2022), 854–857.

[13] Karthik S Bhat, Mohit Jain, and Neha Kumar. 2021. Infrastructuring telehealth in (in) formal patient-doctor contexts. *Proceedings of the ACM on Human-Computer Interaction* 5, CSCW2 (2021), 1–28.

[14] Surya P Bhatt, Siddharth B Patel, Erica M Anderson, Daniel Baugh, Tina Givens, Christopher Schumann, J Gregory Sanders, Samuel T Windham, Gary R Cutter, and Mark T Dransfield. 2019. Video telehealth pulmonary rehabilitation intervention in chronic obstructive pulmonary disease reduces 30-day readmissions. *American journal of respiratory and critical care medicine* 200, 4 (2019), 511–513.

[15] Deborah P Birkmire-Peters, Leslie A Whitaker, and Leslie J Peters. 1997. Usability testing for telemedicine systems: A methodology and case study. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, Vol. 41. SAGE Publications Sage CA: Los Angeles, CA, 792–796.

[16] Rajesh Chandwani and Neha Kumar. 2018. Stitching infrastructures to facilitate telemedicine for low-resource environments. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*. 1–12.

[17] Arul Chib, Michelle Helena van Velthoven, and Josip Car. 2015. mHealth adoption in low-resource environments: a review of the use of mobile healthcare in developing countries. *Journal of health communication* 20, 1 (2015), 4–34.

[18] Songphan Choemprayong, Chris Charoenlap, Krerk Piromsopa, et al. 2021. Exploring usability issues of a smartphone-based physician-to-physician teleconsultation app in an orthopedic clinic: mixed methods study. *JMIR Human Factors* 8, 4 (2021), e31130.

[19] Malcolm Clarke and Chinnaya A Thiyagarajan. 2008. A systematic review of technical evaluation in telemedicine systems. *Telemedicine and e-Health* 14, 2 (2008), 170–183.

[20] Enrico Coiera. 2003. *Guide to Health Informatics.* CRC Press.

[21] Giselle Corbie-Smith, Mysha Wynn, Alan Richmond, Stuart Rennie, Melissa Green, Stephanie M Hoover, Sable Watson-Hopper, and Kyle Simone Nisbeth. 2018. Stakeholder-driven, consensus development methods to design an ethical framework and guidelines for engaged research. *PLoS One* 13, 6 (2018), e0199451.

[22] Leanne M Currie. 2005. Evaluation frameworks for nursing informatics. *International Journal of Medical Informatics* 74, 11-12 (2005), 908–916.

[23] Łukasz Czekierda, Filip Malawski, and Przemysław Wyszkowski. 2015. Holistic approach to design and implementation of a medical teleconsultation workspace. *Journal of biomedical informatics* 57 (2015), 225–244.

[24] Hallie K DeChant, Walid G Tohme, Seong K Mun, Wendelin S Hayes, and Kevin A Schulman. 1996. Health systems evaluation of telemedicine: a staged approach. *Telemedicine Journal* 2, 4 (1996), 303–312.

[25] Alessandro Di Cerbo, Julio Cesar Morales-Medina, Beniamino Palmieri, and Tommaso Iannitti. 2015. Narrative review of telemedicine consultation in medical practice. *Patient preference and adherence* 9 (2015), 65.

[26] Ronald F Dixon and James E Stahl. 2008. Virtual visits in a general medicine practice: a pilot study. *Telemedicine and e-Health* 14, 6 (2008), 525–530.

[27] Laurence Esterle and Alexandre Mathieu-Fritz. 2013. Teleconsultation in geriatrics: Impact on professional practice. *International Journal of Medical Informatics* 82, 8 (2013), 684–695. https://doi.org/10.1016/j.ijmedinf.2013.04.006

[28] Mehrdad Farzandipour, Ehsan Nabovati, Hamidreza Tadayon, and Monireh Sadeqi Jabali. 2021. Usability evaluation of a nursing information system by applying cognitive walkthrough method. *International Journal of Medical Informatics* 152 (2021), 104459. https://doi.org/10.1016/j.ijmedinf.2021.104459

[29] Racha Ftouni, Baraa AlJardali, Maya Hamdanieh, Louna Ftouni, and Nariman Salem. 2022. Challenges of Telemedicine during the COVID-19 pandemic: a systematic review. *BMC Medical Informatics and Decision Making* 22, 1 (03 Aug 2022), 207. https://doi.org/10.1186/s12911-022-01952-0

[30] Andrzej Gackowski, Łukasz Czekierda, Anton Chrustowicz, Jacek Cała, Michał Nowak, Jerzy Sadowski, Piotr Podolec, Mieczysław Pasowicz, and Krzysztof Zieliński. 2011. Development, Implementation, and Multicenter Clinical Validation of the TeleDICOM—Advanced, Interactive Teleconsultation System. *Journal of Digital Imaging* 24, 3 (01 Jun 2011), 541–551. https://doi.org/10.1007/s10278-010-9303-8

[31] Simone Gallerini, Luca Marsili, Vincenzo Groccia, Manuele Bartalucci, Eleonora Innocenti, Caterina Marotti, Sergio Pieri, Katrin Plewnia, Chiara Scarpini, Elizabeth G. Keeling, Massimo Gregorio, Simone Geraci, Mauro Zocchi, Marco Cirinei, Teresa De Stefano, Stefania Galassi, Giuseppe Martini, Rossana Tassi, Sandra Bracco, Alfonso Cerase, Stefano Dami, Giuseppe Panzardi, Mauro Breggia, and Roberto Marconi. 2020. Appropriateness, safety, and effectiveness of "drip and ship" teleconsultation model in Southeastern Tuscany: a feasibility study. *Neurological Sciences* 41, 10 (01 Oct 2020), 2961–2965. https://doi.org/10.1007/s10072-020-04446-x

[32] Mattias Georgsson, Nancy Staggers, Eirik Årsand, and Andre Kushniruk. 2019. Employing a user-centered cognitive walkthrough to evaluate a mHealth diabetes self-management application: A case study and beginning method validation. *Journal of biomedical informatics* 91 (2019), 103110.

[33] Russell E Glasgow, Thomas M Vogt, and Shawn M Boles. 1999. Evaluating the public health impact of health promotion interventions: the RE-AIM framework. *American journal of public health* 89, 9 (1999), 1322–1327.

[34] Trisha Greenhalgh, Shanti Vijayaraghavan, Joe Wherton, Sara Shaw, Emma Byrne, Desirée Campbell-Richards, Satya Bhattacharya, Philippa Hanson, Seendy Ramoutar, Charles Gutteridge, et al. 2016. Virtual online consultations: advantages and limitations (VOCAL) study. *BMJ open* 6, 1 (2016), e009388.

[35] Antoine Grenier Ouimet, Gerit Wagner, Louis Raymond, and Guy Pare. 2020. Investigating patients' intention to continue using teleconsultation to anticipate postcrisis momentum: Survey study. *Journal of Medical Internet Research* 22, 11 (2020), e22081.

[36] Haerawati Idris. 2021. Utilization of teleconsultation: mitigation in handling mental disorders in the COVID-19 era. *International journal of mental health and addiction* 19, 6 (2021), 2320–2322.

[37] Mohamad Intan Sabrina and Irma Ruslina Defi. 2021. Telemedicine guidelines in South East Asia—a scoping review. *Frontiers in neurology* 11 (2021), 581649.

[38] Daphne James and Helen Warren-Forward. 2015. Research methods for formal consensus development. *Nurse researcher* 22, 3 (2015).

[39] Syeda Ayesha Kamal, Muhammad Shafiq, and Priyanka Kakria. 2020. Investigating acceptance of telemedicine services through an extended technology acceptance model (TAM). *Technology in Society* 60 (2020), 101212.

[40] Bory Kea and Benjamin Chih-An Sun. 2015. Consensus development for healthcare professionals. *Internal and emergency medicine* 10 (2015), 373–383.

[41] Rahul Khandelwal, Ashutosh Kolte, and Matteo Rossi. 2022. A study on entrepreneurial opportunities in digital health-care post-Covid-19 from the perspective of developing countries. *foresight* 24, 3/4 (2022), 527–544.

[42] Kristian Kidholm, Anne Granstrøm Ekeland, Lise Kvistgaard Jensen, Janne Rasmussen, Claus Duedal Pedersen, Alison Bowes, Signe Agnes Flottorp, and Mickael Bech. 2012. A model for assessment of telemedicine applications: mast. *International journal of technology assessment in health care* 28, 1 (2012), 44–51.

[43] Xixi Li, Arun Rai, and Ganapathy Krishnan. 2020. Designing cost-effective telemedicine camps for underprivileged individuals in less developed countries: A decomposed affordance-effectivity framework. *Journal of the Association for Information Systems* 21, 5 (2020), 3.

[44] Ben Light, Jean Burgess, and Stefanie Duguay. 2018. The walkthrough method: An approach to the study of apps. *New media & society* 20, 3 (2018), 881–900.

[45] Antonio Lopez-Villegas, Daniel Catalan-Matamoros, Salvador Peiro, Knut Tore Lappegard, and Remedios Lopez-Liria. 2020. Cost–utility analysis of telemonitoring versus conventional hospital-based follow-up of patients with pacemakers. The NORDLAND randomized clinical trial. *PLOS ONE* 15 (01 2020), 1–17. https://doi.org/10.1371/journal.pone.0226188

[46] Wei Lu, Hongli Hou, Rui Ma, Haotian Chen, Ran Zhang, Fangfang Cui, Qian Zhang, Yacong Gao, Xinpu Wang, Caihong Bu, et al. 2021. Influencing factors of patient satisfaction in teleconsultation: A cross-sectional study. *Technological Forecasting and Social Change* 168 (2021), 120775.

[47] Nurazean Maarop and Khin Than Win. 2012. Understanding the need of health care providers for teleconsultation and technological attributes in relation to the acceptance of teleconsultation in Malaysia: A mixed methods study. *Journal of medical systems* 36 (2012), 2881–2892.

[48] Anthony Maeder and Nathan Poultney. 2016. Evaluation strategies for telehealth implementations. In *2016 IEEE International Conference on Healthcare Informatics (ICHI)*. IEEE, 363–366.

[49] Thomas Mahatody, Mouldi Sagar, and Christophe Kolski. 2010. State of the art on the cognitive walkthrough method, its variants and evolutions. *Intl. Journal of Human–Computer Interaction* 26, 8 (2010), 741–785.

[50] Christopher Becket Mahnke, Christopher P Jordan, Ethan Bergvall, Donald A Person, and Jordan E Pinsker. 2011. The Pacific Asynchronous TeleHealth (PATH) system: review of 1,000 pediatric teleconsultations. *Telemedicine and e-Health* 17, 1 (2011), 35–39.

[51] Lena Otto, Diane Whitehouse, and Hannes Schlieter. 2021. Scaling Up Telemedicine Initiatives: Requirements for a New Telemedicine Maturity Model. In *Research Anthology on Telemedicine Efficacy, Adoption, and Impact on Healthcare Delivery*. IGI Global, 240–255.

[52] Rahul Pai. 2021. Analysing the acceptabilityof a mHealth patient applicationfor cross border data exchange by end-users.

[53] Hyun Sang Park, Kwang il Kim, Jae Young Soh, Young Ho Hyun, Bang Eun Lee, Jong Hwa Lee, Jung Gwon Jo, Han Chae Lee, and Hwa Sun Kim. 2020. Development and operation of a video teleconsultation system using integrated medical equipment gateway: A National Project for Workers in Underserved Areas. *Journal of Medical Systems* 44, 11 (2020), 194.

[54] David L Paul and Reuben R McDaniel. 2016. Influences on teleconsultation project utilization rates: the role of dominant logic. *BMC Medical Informatics and Decision Making* 16, 1 (2016), 1–18.

[55] Roland Petcu, Chris Kimble, Roxana Ologeanu-Taddei, Isabelle Bourdon, and Nicolas Giraudeau. 2017. Assessing patient's perception of oral teleconsultation. *International Journal of Technology Assessment in Health Care* 33, 2 (2017), 147–154.

[56] Jennifer J Plumb, Isla Hains, Michael J Parr, David Milliss, Robert Herkes, and Johanna I Westbrook. 2017. Technology meets tradition: The perceived impact of the introduction of information and communication technology on ward rounds in the intensive care unit. *International journal of medical informatics* 105 (2017), 49–58.

[57] Timo Rimner, Eva Blozik, Chantal Begley, Chantal Grandchamp, and Jan von Overbeck. 2011. Patient adherence to recommendations after teleconsultation: survey of patients from a telemedicine centre in Switzerland. *Journal of Telemedicine and Telecare* 17, 5 (2011), 235–239.

[58] Hunter Rogers, Kapil Chalil Madathil, Sruthy Agnisarman, Shraddhaa Narasimha, Aparna Ashok, Aswathi Nair, Brandon M Welch, and James T McElligott. 2017. A systematic review of the implementation challenges of telemedicine systems in ambulances. *Telemedicine and e-Health* 23, 9 (2017), 707–717.

[59] Soontorn Saechow, Sinchai Kamolphiwong, and Verapol Chandeeying. 2014. Web-based teleconsultation for clinical diagnosis. In *2014 International Conference on Electronics, Information and Communications (ICEIC)*. IEEE, 1–2.

[60] Andy Smith, Kaushik Ghosh, and Aniruidha Joshi. 2003. Usability and HCI in India: cultural and technological determinants. *HCI International (Crete)* (2003).

[61] Huidi Tchero, Lazarre Noubou, Beatrice Becsangele, Martin Mukisi-Mukaza, Gerald-Reparate Retali, and Emmanuel Rusch. 2017. Telemedicine in diabetic foot care: a systematic literature review of interventions and meta-analysis of controlled trials. *The international journal of lower extremity wounds* 16, 4 (2017), 274–283.

[62] Frederico G Toledo, Amy Triola, Kristine Ruppert, and Linda M Siminerio. 2012. Telemedicine consultations: an alternative model to increase access to diabetes specialist care in underserved rural communities. *JMIR research protocols* 1, 2 (2012), e2235.

[63] Isabel Torre Díez, Susel Góngora Alonso, Eduardo Motta Cruz, and Manuel A Franco. 2019. Measuring QoE of a Teleconsultation App in Mental Health Using a Pentagram Model. *Journal of Medical Systems* 43, 7 (2019), 1–5.

[64] Mary Uhl-Bien. 2021. Complexity and COVID-19: Leadership and followership in a complex world. *Journal of Management Studies* 58, 5 (2021), 1400.

[65] Liezl Van Dyk and Cornelius SL Schutte. 2013. The telemedicine service maturity model: A framework for the measurement and improvement of telemedicine services. *Telemedicine* (2013), 217–238.

[66] Boyd R Viers, Deborah J Lightner, Marcelino E Rivera, Matthew K Tollefson, Stephen A Boorjian, R Jeffrey Karnes, R Houston Thompson, Daniel A O'Neil, Rachel L Hamilton, Matthew R Gardner, et al. 2015. Efficiency, satisfaction, and costs for remote video visits following radical prostatectomy: a randomized controlled trial. *European urology* 68, 4 (2015), 729–735.

[67] Ziyu Yan, Xitong Guo, and Douglas R Vogel. 2016. Understanding dynamic collaboration in teleconsultation. *Information Technology for Development* 22, 1 (2016), 152–167.

[68] Shaker A Zahra. 2021. International entrepreneurship in the post Covid world. *Journal of World Business* 56, 1 (2021), 101143.

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