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Technology acceptance, psychological needs and corporate reputation as determinants of telemedicine continuance intention: a cross-sectional study in Peruvian private clinics

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Abstract

Background

Telemedicine expanded rapidly during the COVID-19 pandemic, but its sustained use has remained uneven once in-person care became available again, particularly in emerging economies. Research has relied predominantly on technology acceptance models that emphasise cognitive evaluations of technology and give limited attention to the psychological and institutional dimensions of the clinical encounter. Peru is informative because one private network spans regions with markedly different digital connectivity. This study examines the determinants of telemedicine continuance intention among prior users by combining the Technology Acceptance Model, Self-Determination Theory and corporate reputation.

Methods

A cross-sectional survey was administered by email between 15 January and 26 March 2025 to 2,925 patients who had previously used the teleconsultation service of eight private clinics in four regions of Peru, each clinic treated as an independent stratum. Because all respondents were prior users, the outcome is continuance intention rather than initial adoption, and perceived ease of use and perceived usefulness are experience-based evaluations. Data were analysed using partial least squares structural equation modelling with 10,000 bootstrap resamples, and the model was re-estimated separately for each clinic as a robustness check.

Results

Seven of the eight hypotheses were supported. Perceived ease of use predicted continuance intention (β = 0.307) and perceived usefulness (β = 0.571), and perceived usefulness predicted continuance intention (β = 0.388). Competence (β = 0.383) and autonomy (β = 0.111) were positively associated with emotions, whereas relatedness was not (β = -0.028; p = 0.258). Emotions predicted continuance intention (β = 0.163), and corporate reputation was positively associated with emotions (β = 0.191). The model explained 51.8% of the variance in continuance intention and 34.8% in emotions. Site-level estimation showed that the technology-acceptance and reputation-to-emotion paths held in all eight clinics, while the null relatedness association replicated across every site.

Conclusions

Among patients who have already used teleconsultation, continuance intention is not explained by technological evaluations alone. Motivational and reputational determinants contribute meaningfully, and the consistent absence of an effect of relatedness across eight independent samples suggests that remote consultation, as currently delivered, does not satisfy patients' need for interpersonal connection.

Background

The COVID-19 pandemic rapidly transformed the delivery of health services worldwide and positioned telemedicine as a strategic tool for ensuring the continuity of healthcare. Between 2020 and 2021, approximately 18.2 million deaths associated with the pandemic were recorded globally [1], a situation that drove the massive adoption of digital health solutions. In this context, telemedicine went from being a complementary alternative to becoming an essential mechanism for the provision of medical services. However, despite its rapid expansion and its documented benefits in terms of access, efficiency, and cost reduction [2–4], studies on the adoption of telemedicine continue to show heterogeneous results.

Recent evidence suggests that barriers to adoption can be grouped into privacy risks, risks associated with the healthcare provider, technological risks, and concerns related to physical safety [5]. More recently, the experience accumulated during the pandemic has made it possible to identify new explanatory factors linked to patients’ psychological dimension, broadening the traditional debate centered exclusively on technological aspects [6,7]. Consequently, understanding the mechanisms that explain telemedicine adoption has become a relevant issue both for technology adoption theory and for the management of health systems.

Research on telemedicine adoption has primarily been grounded in models derived from the Theory of Reasoned Action and its extensions, particularly the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT [8,9]. These approaches assume that use intention (UI) can be explained by cognitive perceptions related to a technology’s usefulness, ease of use, or performance expectancy [10]. However, several critiques have questioned the capacity of these theories to capture the complexity of human behavior, noting that decision-making cannot be understood solely through linear relationships between beliefs and behaviors, as it also involves emotional, motivational, and contextual dimensions [11,12]. Although TAM and the UTAUT have been widely used in the field of healthcare, these models were originally developed in information systems contexts and not for the particularities of the medical encounter or the relational complexity inherent to healthcare [13]. As a result, the literature has begun to explore complementary frameworks incorporating psychological and emotional variables capable of offering a more comprehensive understanding of technology adoption in health services [6,7].

Despite these advances, important gaps persist in the literature. First, there is limited evidence on how emotional factors interact with traditional technological determinants to explain the adoption of telemedicine. Most studies continue to prioritize explanations centered on functional perceptions

of technology, relegating dimensions linked to autonomy, competence, or the emotions experienced during virtual medical care to a secondary role. This limitation is particularly relevant in telemedicine, in which the care process involves a complex interaction between patients and health professionals that substantially differs from other technological contexts. Second, the empirical evidence available comes predominantly from the United States and Europe [14], regions where telemedicine had relatively high levels of development before the pandemic. In contrast, countries such as Peru faced accelerated implementation processes, significant regulatory changes, and a recent expansion of these services [15,16], creating a distinct context that remains scarcely studied. This situation raises a relevant paradox: while telemedicine was consolidated as a strategic tool during the health emergency, the volume of consultations declined substantially once the critical phase of the pandemic had passed, suggesting that the factors explaining its adoption and continued use are not yet adequately understood.

From this problem emerges the following research question: which variables explain the intention to adopt telemedicine in the Peruvian context when traditional technological determinants are complemented with psychological factors derived from the Self-Determination Theory (SDT)? This question seeks to contribute to the debate on the explanatory limits of classical technology adoption models in healthcare contexts and to assess whether incorporating variables associated with autonomy, competence, and motivation allows for a more complete understanding of the adoption of telemedicine services.

The purpose of this study was to propose and test a comprehensive telemedicine adoption model that combines the traditional TAM constructs, dimensions derived from the SDT and Corporate reputation. Through a structural equation modeling analysis applied to users of telemedicine services in Peru, this study seeks to extend the literature in three ways. First, it broadens the prevailing technology adoption models by incorporating psychological variables that reflect the particular nature of the medical encounter. Second, it provides empirical evidence from a Latin American context characterized by a recent and accelerated implementation of telemedicine. Third, it offers a more holistic perspective on the mechanisms that explain UI, contributing to the design of more effective, patient-centered implementation strategies. In this way, the study advances the theoretical understanding of technology adoption in healthcare by demonstrating that emotional and motivational factors can play a role as relevant as traditional technological perceptions.

The remainder of this article is organized as follows. First, the theoretical framework supporting the integration of the TAM, the SDT and Corporate reputation is developed, together with the formulation of the research hypotheses. Next, the methodological design is described, including the data collection process and the analytical strategy based on structural equation modeling using Partial Least Squares Structural Equation Modeling. The empirical results and the evaluation of the proposed model are then presented. Finally, the main findings are discussed in light of the existing literature, highlighting their theoretical and managerial implications for the implementation of telemedicine services, as well as the study's limitations and future research directions.

Why Peru is an informative setting

The rationale for studying telemedicine in an emerging economy is not only that evidence is scarcer there. Emerging health systems combine conditions that are usually separated in the settings where acceptance models were developed: rapid and externally imposed digitalisation, pronounced internal inequality in connectivity, and a fragmented insurance structure in which private provision coexists with an overstretched public sector. Peru presents these conditions in a form that is analytically useful rather than merely illustrative.

First, the country's digital divide is large and follows a clear geographic pattern. By the end of 2023, 85.2% of the population aged six and over on the coast used the internet, compared with 67.8% in the highlands and 62.7% in the Amazon region, a gap of more than seventeen percentage points between the coast and the highlands [Ref-CEPLAN]. In the first quarter of 2025, household internet access reached 80.3% in Metropolitan Lima but only 20.5% in rural areas, and close to nine out of ten users connected through a mobile phone rather than a fixed connection [Ref-INEI]. Telemedicine in Peru is therefore delivered to populations whose technological conditions differ substantially within the same country and, in the present study, within the same provider network.

Second, telemedicine was implemented abruptly rather than gradually. Before the pandemic, few telehealth experiences had been documented in the country, and the regulatory framework required two professionals to be present in the exchange, which effectively prevented direct patient-physician remote consultation. That framework was modified during the emergency, and providers designed and deployed teleconsultation services within weeks [Ref-Curioso; Ref-HH2022]. The resulting adoption was induced by the suppression of alternatives rather than chosen among them, which makes the subsequent behaviour of these users particularly informative about what sustains use once the alternatives return.

Third, prior evidence from the network studied here shows that the relationship between territory and remote care is not the one that might be assumed. Between April 2020 and December 2021, teleconsultation accounted for 6.6% of 1,156,253 outpatient visits across the eight clinics, but the highest proportions were recorded not in Lima but in two provincial sites, La Merced in Trujillo (12.5%) and San Pablo in Huaraz (11.2%), while one Lima site reached only 1.2% [Ref-HH2022]. Within a single organisation, with the same platform, the same protocols and the same administrative process, the uptake of remote care varied by an order of magnitude across sites. This heterogeneity is what makes the setting valuable: it allows the same model to be estimated in eight contexts that differ in connectivity, patient profile and local organisational practice, while holding the technology and the provider constant.

Compared with other Latin American emerging markets, Peru combines an unusually steep internal connectivity gradient with a private sector that expanded teleconsultation rapidly and a public sector that did so unevenly. The country therefore functions less as a representative case of the region than as a setting in which within-country variation can be exploited analytically, which is the design adopted here.

Theoretical framework and hypothesis development

Theoretical framework

This research is grounded in a combination of the Theory of Reasoned Action (TRA), SDT, and Corporate reputation. The TRA provides a solid basis for understanding individuals' intentions and behaviors regarding technology adoption [17], while the SDT focuses on the intrinsic motivation and basic psychological needs that may influence the adoption of telemedicine [18]. Fombrun's reputation theory proposes that reputation is composed of rational dimensions that converge into an emotional bond with the organization [19]. This theoretical integration allows the research question to be comprehensively addressed, considering users' beliefs and perceptions as well as their intrinsic motivations and needs regarding telemedicine adoption.

In 1972, Ajzen published a review of the operationalization of UI; in his assessment, he found that authors had used definitions based on feelings, knowledge, and opinions. To unify these concepts, the TRA was conceptualized [17]. According to this theory, a person's behavior is contingent on intention [20,21]. Different models have been developed from this theory to operationalize its measurement. In the field of technology adoption, these include the diffusion of innovation model and the task–technology fit model, among others [22,23]. Health-specific models have even been created, such as the Health Belief Model [24,25]. However, in the specific case of telemedicine adoption, a systematic review showed that the two most widely used models have been TAM and the UTAUT, with TAM slightly predominating [13].

Along these lines, TAM is the oldest model, having been created in 1986 by Davis [10]. It builds on the TRA and seeks to understand why users adopt certain technologies. Modifications have subsequently been introduced; for example, Venkatesh and colleagues incorporated new variables, giving rise to TAM 2, TAM 3, and the UTAUT [26–28]. The model posits that ease of use and Perceived Usefulness (PU) influence attitude, which in turn determines use behavior [10]. This model explains 40% of the variance in technology use and is considered the most widely used model for technology adoption [29].

The most recent modification of TAM is included in its third version, which was developed by Venkatesh, who is also the creator of UTAUT [30]. Several criticisms, which can be divided into five, have been leveled at the model. First, it focuses on predicting technology use, but not on how use changes over time in relation to user performance [22,31]. The second limitation concerns its application to actual use. UI is not consistent with the actual use of the technology being evaluated, because it is a self-administered assessment [32]. The third criticism concerns its positivist character and its reductionist tendency to establish cause-and-effect relationships [5,31]. The fourth criticism relates to the population, since a homogeneous population is required, and the model is not designed to assess different levels of technology-related skills. Finally, the model does not consider users' own characteristics, such as individual variables including age, gender, and specific psychological variables [29].

Regarding the criticisms of TAM in relation to telemedicine, the one concerning psychological variables is of particular interest to the present study. The care process, in this regard, is a heterogeneous process mediated by a service provider and a consumer [33]. The health professional possesses the knowledge and is guided by parameters learned throughout academic training, but the process is human-dependent, since only the physician holds that knowledge [34]. To complete the assessment, a dialogue, a clinical examination, and, in some cases, complementary tests are required. In a teleconsultation, the clinical examination is compromised by the technology. The service consumer, in turn, is a patient who presents an ailment. In addition to the physical sphere of discomfort, there is a psychological sphere. Telemedicine changes this process, as the absence of physical contact hinders the clinical examination, which becomes a purely declarative process on the patient's part [35].

Along these lines, the need arises to analyze this phenomenon in a much more complex way, considering patients' psychological factors and emotions. At this point, the SDT [36] becomes vitally important, as it considers intrinsic motivation and the self-determination of human behavior [18]. This theory highlights the importance of the active human being, drawing on other theories such as Maslow's theory of basic needs and Rogers's humanism. It has been tested in different contexts, including education and psychology, among others [36].

Hypothesis development

Perceived ease of use (PEU)

According to Venkatesh and Davis [30], PEU is defined as the patient's perception that using the technological tool requires the least possible effort. This construct is part of the TAM model and is linked to UI. In relation to telemedicine, it refers to the patient's perception of the use of technological tools, which should not require highly complex activities from the patient [37]. The evidence confirms the path between telemedicine adoption and PEU; there is a positive and significant effect on perceived usefulness (PU), which even mediates the relationship between other factors and UI [37–39]. According to Kamal, this variable becomes tangible when patients prefer to accept and use telemedicine services because they feel that using them will not lead to additional learning effort [38].

Perceived usefulness (PU)

According to Davis, PU refers to a person's belief or assessment of the usefulness or benefit they will obtain from using a particular technology [10]. This construct is part of the TAM model. Likewise, there is a direct relationship between PU and UI. Prior literature has shown that this domain is consistent for the adoption of health information technology [37,39]. Along these lines, it becomes tangible for patients when they feel that adopting telemedicine services will be useful only if it leads to faster delivery of healthcare services [40,41]. According to Kamal et al. [38], another aspect that allows this

variable to be observed is the perception of saving time in administrative processes; that is, a reduction in the time spent generating documentation. Economic savings may likewise be perceived in this respect; the cost of a telemedicine consultation may be lower than that of an in-person visit [41].

Based on the above, the study hypotheses are as follows:

Hypothesis 1

PEU has a positive and significant association with UI in telemedicine.

Hypothesis 2

PEU has a positive and significant association with PU in telemedicine.

Hypothesis 3

PU has a positive and significant association with UI in telemedicine.

Emotions

Emotions, according to Brosch [42], can be defined as a conscious affective state that manifests in different forms, such as fear, worry, and others, but also as a basic endogenous motivation of every human being [43]. This construct derives from the SDT, developed by Deci and Ryan [18], which refers to three basic psychological needs: competence (CMPT), autonomy (ATM), and relatedness (RLN) [18]. Several studies have shown that emotions are related to technology adoption [44,45]; however, in relation to telemedicine, it is a new concept that has been explored with positive results by Iyanna et al. [6] and Yuen *et al.* [7]. Under this logic, the positive emotions that a user experiences toward a service end up increasing its adoption. Accordingly, the model incorporates this hypothesis.

The incorporation of emotions as a direct antecedent of UI responds to a recognized limitation in the literature on technology acceptance: classical models have prioritized rational beliefs —usefulness and ease of use— and have neglected, or only superficially explored, the role of affect, despite evidence that users' emotions affect their intentions, behaviors, and beliefs [46,47].

According to the SDT competence is "the feeling of effectiveness generated when a person takes on optimal challenges, being able to exert a certain impact on the environment" [36]. In telemedicine, it becomes tangible when users display positive emotions because of being able to overcome the barriers of technology use and carry out the consultation. When patients have the skills and knowledge to adequately complete a telemedicine consultation, positive emotions are generated that favor its adoption [7].

Likewise, autonomy establishes that individuals need to feel capable of choosing their actions and taking control of their consequences [18]. This allows them to connect directly with the actions they perform. In relation to telemedicine, when patients feel empowered, they tend to experience positive emotions toward the adoption of this technology [7]. Greater patient interaction with telemedicine services is achieved when an environment that supports patient autonomy and facilitates interaction with the health professional is created [48]. Moreover, when people feel empowered, it means that their psychological needs are satisfied, which leads to greater satisfaction and, ultimately, to positive emotions [7].

Relatedness represents the experience of relationships between a person and their social environment. Individuals need to feel involved in interactions in which they feel protected [18]. When an impersonal encounter takes place through a video call, the patient may feel unprotected. This is a critical point for the adoption of telemedicine services [49]. This variable is operationalized when individuals feel connected to and cared for by others, creating a sense of belonging. Consequently, this sense of belonging would lead to the development of positive emotions [7].

Based on the above, the study hypotheses are as follows:

Hypothesis 4

Competence (CMPT) has a positive and significant association with emotions (EMT)

Hypothesis 5

Autonomy has a positive and significant association with EMT.

Hypothesis 6

Relatedness (RLN) has a positive and significant association with EMT.

Hypothesis 7

EMT has a positive and significant association with UI in telemedicine.

Reputation

Corporate reputation has been studied from different perspectives, giving rise to various definitions based on different stakeholder groups [50]. However, there is consensus around the proposal of Fombrun [51], who defines corporate reputation as "a collective representation of a firm's past actions and results that describes the firm's ability to deliver valued outcomes to multiple stakeholders. It gauges a firm's relative standing both internally, with employees, and externally, with its stakeholders, in both its competitive and institutional environments."

Given that health services are intangible and their quality is difficult to evaluate before consumption, reputation plays a fundamental role. According to Spence's [76] signaling theory, unobservable attributes (such as reputation) are used to infer attributes such as service quality. In medical care, and specifically in a teleconsultation, the patient has no objective measure of quality; for this reason, reputation becomes a critical input for the user's decision to use the service.

Fombrun's theory holds that reputation is established through an affective bond between the individual and the organization, which is generated from rational evaluations of the products or services provided [51]. This has been validated by Ponzi [52], who developed and validated a scale known as RepTrak Pulse, which takes emotions as a measure for the construction of reputation.

The evidence also indicates that perceived quality is one of the main antecedents of reputation. Su [53] and Walsh [54] document that quality evaluation is directly related to users' reputational judgments. Song [55] assessed reputation through service quality at *Asiana Airlines* in South Korea, showing that responsiveness and service quality directly influence reputation. In healthcare, Epstein and Street [56] describe how quality of care becomes the primary input for reputational judgment.

The innovation dimension refers to how the institution adapts to change and launches new products and services onto the market [19]. In healthcare, it refers to health professionals' technical competence, scientific currency, and orientation toward the adoption of new technologies, attributes that are valued by patients in the digital health context [57]. Likewise, environmental respect refers to the perception of the organization in relation to social responsibility and support for causes that protect the environment. Lubis [58] published a study reviewing 200 hospitals in Indonesia, showing that social responsibility has a direct impact on the reputation of healthcare facilities.

Management and leadership refer to the perception that the organization has a clear vision of the future with excellent leaders. Zhu [59] confirmed the positive connection between ethical leadership, social responsibility, and reputation. Finally, it is posited that the greater the perceived credibility and trust (CT), the more favorable the reputation of the telemedicine provider organization will be. These hypotheses are supported by the findings of Johnson and Grayson [60].

Based on the above, the study hypotheses are as follows:

Hypothesis 8

Corporate reputation (REP) has a positive and significant association with the emotions associated with telemedicine use (EMT).

A specification point requires explicit statement here, because it determines how the reputation block may legitimately be interpreted. Quality of attention (QA), research, development and training (RDF), respect for the environment (RE), management and leadership (ML), and credibility and trust (CT) are treated in this study as the constitutive dimensions of the reputation composite, not as independent causal antecedents of it. They therefore belong to the measurement model and are reported as outer weights, and no structural hypotheses are formulated for them. An earlier version of this model treated these dimensions simultaneously as formative components and as predictors of reputation; that specification is circular, because the coefficients obtained are measurement relationships and cannot also be read as causal tests. Only the association between the reputation composite and emotions is advanced as a structural hypothesis.

The proposed model is shown in Fig. 1.

Methods

Research design

This research adopts a quantitative approach aimed at analyzing the relationships among constructs derived from the TAM and SDT, operationalized through the TAM [10], SDT [18] and Corporate reputation theory of Fombrun. This approach makes it possible to quantify the relationships between latent variables and their indicators, facilitating the assessment of associations and possible causal relationships among the constructs studied [61]. A non-experimental, cross-sectional, correlational design was employed to examine the relationships between the intention to use telemedicine (dependent variable) and the constructs PU, perceived ease of use, and emotions (independent variables).

Data were analyzed using Partial Least Squares Structural Equation Modeling, following the two-stage procedure recommended by Hair *et al.* [62]: (a) assessment of the measurement model and (b) assessment of the structural model. Higher-order constructs (REP and CT were also included, estimated using the *extended repeated indicators approach*, which is recommended for this type of hierarchical specification [63]. All analyses were performed using SmartPLS 4 software.

Study setting, data collection and ethical approval. The study was conducted in the San Pablo Clinic Network, a private provider comprising eight healthcare institutions located in four regions of Peru. Data were collected between 15 January and 26 March 2025. The questionnaire was administered

electronically: an invitation containing the study information sheet and a link to the self-administered instrument was sent by email to patients who had used the telemedicine service and who met the inclusion criteria. Participation was voluntary and anonymous, and no incentives were offered. Responses with more than ten per cent of missing items, with fully invariant response patterns, or without completed consent were discarded prior to analysis.

The study protocol was approved by the Research Ethics Committee of the Pontificia Universidad Católica del Perú (approval number 137-2024-CEI-CCSSHHyAA/PUCP). The research was conducted in accordance with the principles of the Declaration of Helsinki. Electronic informed consent was obtained from all participants before they accessed the questionnaire; completion of the consent section was a mandatory condition for participation.

During the preparation of this manuscript the authors used ChatGPT to improve the readability and language of the text. After using this tool, the authors reviewed and edited the content as required and take full responsibility for the content of the publication.

Population and sample

The study population consisted of patients treated at the San Pablo Clinic Network, made up of eight healthcare provider institutions (IPRESS, for the Spanish acronym) located in four regions of Peru. These sites present differentiated sociodemographic and sociocultural characteristics and levels of technology adoption [16,64]. According to the Peruvian Association of Private Clinics [65], the San Pablo Clinic Network is the private network with the largest number of IPRESS in the country.

Stratified probability sampling was applied, with each site considered an independent stratum. Sample size was determined using the formula for finite populations, taking the average number of consultations recorded during 2023 at each clinic as a reference. Table 1 shows the estimated sample size and the sample obtained per site, with the latter exceeding the estimated sample in all cases.

The sampling frame consisted of the records of patients who had completed at least one teleconsultation in the participating clinics during the reference period and for whom a valid email address was registered in the electronic health record system. Stratification by clinic was chosen rather than simple random sampling across the network because the eight sites differ systematically in patient profile, regional connectivity and local organisational practice, and because the analytical design required each site to support an independent estimation of the model. Allocation across strata was proportional to the volume of teleconsultations registered at each site during 2023, with the minimum per-stratum size set by the finite-population formula reported in Table 1. Within each stratum, invitations were issued to a randomly ordered list of eligible records until the target was reached. [NOTA PARA LOS AUTORES: completar aqui el numero de invitaciones enviadas, la tasa de respuesta por sede y el manejo de no respuesta. El revisor pide explicitamente estos datos y no estan en el manuscrito.]

Table 1
Estimated and obtained sample size by site.

Site	Estimated sample (n)	Obtained sample (n')
Clínica San Pablo Surco	343	366
Clínica San Gabriel	382	402
Clínica Jesús del Norte	334	366
Clínica La Merced	328	444
Clínica Santa Martha	311	335
Clínica Cerro Colorado	326	346
Clínica San Pablo Huaraz	347	372
Clínica San Juan Bautista	273	294
Total	**2,644**	**2,925**

Instruments and pilot test

Data were collected using a structured questionnaire that integrated previously validated instruments for measuring the constructs of interest. To assess the components of the TAM, specifically PEU, PU, and UI, the scale developed and validated by Kamal *et al.* [38] for telemedicine contexts was used. The constructs associated with the SDT (EMT, CMPT, ATM, and RLN) were measured using the instrument proposed by Yuen et al. [7]. Finally, the constructs associated with reputation (REP, QC, RDF, RE, ML, CT, and dimensions) were measured using the instrument of Navarro et al. [66]. Both instruments were adapted and integrated into a single questionnaire for administration to the study population.

Since the original instruments were in English, a process of translation and adaptation into Spanish was carried out to ensure their semantic and cultural equivalence. In a first stage, two bilingual translators independently translated the items. A consensus meeting was then held between the two translators to review the discrepancies identified and agree on the final wording of each item, seeking to maintain conceptual equivalence with the original version and to ensure comprehension in the local context [67,68].

Additionally, the preliminary version of the questionnaire was reviewed by specialists with experience in health, management, and information technologies applied to the healthcare sector, who assessed the clarity, relevance, and contextual adequacy of the items for the reality of telemedicine in

Peru. The feedback received allowed minor wording adjustments to be made before final administration [67].

Finally, a pilot test was conducted with 50 participants randomly selected from among patients who met the inclusion and exclusion criteria established for the study. The objective of this phase was to identify potential comprehension problems, ambiguities in wording, and aspects for improvement that could affect response quality. The results of the pilot test allowed minor adjustments to the wording of some items, helping to optimize the clarity of the instrument and maximize the response rate [69].

Results

Measurement model assessment

The assessment of the measurement model comprised the analysis of individual indicator reliability, the internal consistency of the constructs, convergent validity, and discriminant validity. The results are presented in Tables 2 and 3. First, individual indicator reliability was assessed through factor loadings. According to Hair *et al*. [62], loadings should exceed the 0.70 threshold; however, indicators with values between 0.40 and 0.70 may be retained when there is sufficient theoretical support. In the present study, most indicators exceeded the recommended value, with only a few moderately lower values observed (e.g., Assitential Progress (AP) = 0.603, CMPT2 = 0.574, and CMPT4 = 0.615), which were retained on account of their conceptual contribution to the corresponding construct.

The retention of indicators below the conventional 0.70 threshold follows the criterion set out by Hair and colleagues, who recommend that indicators loading between 0.40 and 0.70 be considered for deletion only when their removal increases composite reliability or average variance extracted above the corresponding threshold, and retained otherwise on content-validity grounds. In the present case the constructs concerned already exceeded both thresholds, although the average variance extracted was only marginally above 0.50 for QA (0.531) and CMPT (0.532), which makes this decision consequential rather than incidental. [NOTA PARA LOS AUTORES: el revisor pide (i) el enunciado literal de los items AP, CMPT2, CMPT4 y CMPT6, (ii) intervalos de confianza bootstrap para las cargas, y (iii) un analisis de sensibilidad que muestre el efecto de eliminarlos sobre AVE, rho_A, fiabilidad compuesta, HTMT y los coeficientes estructurales. Estos analisis deben ejecutarse en SmartPLS; no pueden redactarse.]

Internal consistency was examined using Cronbach's alpha (α) and composite reliability. Following the recommendations of Hair *et al*. [62], all constructs showed values above the 0.70 threshold for both α and composite reliability (CR). Cronbach's alpha values ranged from 0.704 to 0.897, while composite reliability values ranged from 0.818 to 0.936, evidencing adequate levels of internal reliability. Convergent validity was assessed using the average variance extracted. All constructs reached values above the minimum criterion of 0.50 proposed by Fornell and Larcker [70], with values ranging from 0.531 to 0.848. These results indicate that the constructs explain a sufficient proportion of the variance of their indicators.

Table 2
Reliability and convergent validity.

Construct	Indicator	Factor loading	α	CR	AVE
PCC	PCC1	0.847	0.867	0.909	0.715
	PCC2	0.869			
	PCC3	0.856			
	PCC4	0.808			
ATM	ATM1	0.819	0.872	0.907	0.662
	ATM2	0.811			
	ATM3	0.845			
	ATM4	0.840			
	ATM5	0.750			
GR	GR1	0.878	0.734	0.882	0.790
	GR2	0.899			
QA	EIM	0.757	0.704	0.818	0.531
	AP	0.603			
	CPR	0.806			
	CSP	0.733			
CMPT	CMPT1	0.825	0.822	0.869	0.532
	CMPT2	0.574			
	CMPT3	0.850			
	CMPT4	0.615			
	CMPT5	0.823			
	CMPT6	0.637			
EMT	EMT1	0.861	0.847	0.903	0.757
	EMT2	0.875			
	EMT3	0.874			
CP	CP1	0.849	0.788	0.877	0.704
	CP2	0.887			
	CP3	0.778			
ML	ML1	0.911	0.793	0.906	0.829
	ML2	0.909			
RDF	RDF1	0.920	0.821	0.918	0.848
	RDF2	0.922			
UI	UI1	0.904	0.897	0.936	0.830
	UI2	0.928			
	UI3	0.901			
PEU	PEU1	0.852	0.807	0.886	0.722
	PEU2	0.836			
	PEU3	0.861			
FBGH	FBGH1	0.883	0.861	0.915	0.782
	FBGH2	0.889			
	FBGH3	0.882			

Construct	Indicator	Factor loading	α	CR	AVE
PU	PU1	0.862	0.820	0.893	0.735
	PU2	0.875			
	PU3	0.835			
RLN	RLN1	0.820	0.814	0.890	0.730
	RLN2	0.878			
	RLN3	0.864			

Since the second-order construct CT and the third-order construct REP were specified as formative constructs composed of conceptually distinct dimensions, they were not assessed using internal consistency indicators such as Cronbach's alpha, composite reliability, or average variance extracted (AVE). In line with the methodological recommendations of Hair *et al*. and Sarstedt *et al.*, these criteria are appropriate only for reflective measurement models. Consequently, the assessment of the higher-order construct focused on the analysis of collinearity among dimensions using the variance inflation factor (VIF) and on the significance and relevance of the outer weights of each formative dimension.

Discriminant validity was then assessed using two complementary criteria. First, the Fornell and Larcker [70] criterion was applied, showing that the square root of the AVE of each construct was greater than its correlations with the other constructs. Second, the heterotrait-monotrait ratio (HTMT) criterion proposed by Henseler et al. [71] was employed, verifying that all HTMT values were below the 0.90 threshold. Taken together, these results support the adequate empirical differentiation among the constructs included in the model. Consequently, the results confirm that the measurement model presents satisfactory levels of reliability, convergent validity, and discriminant validity.

Table 3
Discriminant validity

Construct	PCC	ATM	GR	QA	CMPT	EMT	CP	ML	RDF	UI	PEU	FBGH	PU	RLN
PCC	0.845	0.681*	0.595*	0.839*	0.494*	0.386*	0.575*	0.738*	0.602*	0.494*	0.293*	0.788*	0.551*	0.506*
ATM	0.588	0.814	0.617*	0.750*	0.859*	0.548*	0.578*	0.710*	0.605*	0.818*	0.637*	0.760*	0.790*	0.797*
GR	0.477	0.496	0.889	0.854*	0.618*	0.508*	0.629*	0.765*	0.708*	0.566*	0.411*	0.724*	0.543*	0.471*
QA	0.672	0.597	0.608	0.729	0.668*	0.530*	0.629*	0.862*	0.759*	0.598*	0.369*	0.881*	0.648*	0.554*
CMPT	0.396	0.720	0.460	0.481	0.730	0.610*	0.555*	0.608*	0.582*	0.842*	0.852*	0.682*	0.788*	0.737*
EMT	0.350	0.500	0.410	0.424	0.556	0.870	0.273*	0.456*	0.410*	0.545*	0.542*	0.448*	0.580*	0.427*
CP	0.478	0.482	0.478	0.472	0.424	0.245	0.839	0.641*	0.584*	0.532*	0.529*	0.693*	0.504*	0.642*
ML	0.612	0.590	0.585	0.649	0.470	0.384	0.507	0.910	0.793*	0.536*	0.356*	0.889*	0.554*	0.539*
RDF	0.508	0.511	0.550	0.575	0.460	0.354	0.468	0.640	0.921	0.522*	0.359*	0.772*	0.493*	0.474*
UI	0.434	0.727	0.460	0.483	0.727	0.504	0.447	0.452	0.448	0.911	0.709*	0.631*	0.751*	0.655*
PEU	0.249	0.543	0.318	0.285	0.724	0.473	0.424	0.287	0.294	0.605	0.850	0.428*	0.696*	0.668*
FBGH	0.681	0.657	0.577	0.694	0.550	0.406	0.572	0.735	0.649	0.554	0.360	0.884	0.621*	0.585*
PU	0.464	0.670	0.422	0.504	0.645	0.509	0.406	0.447	0.405	0.645	0.571	0.521	0.858	0.641*
RLN	0.425	0.676	0.366	0.427	0.601	0.376	0.515	0.434	0.388	0.561	0.545	0.490	0.524	0.854

Note. Values below the diagonal are construct correlations; values on the diagonal, in bold, are the square root of the average variance extracted (Fornell-Larcker criterion); values above the diagonal, marked with an asterisk, are heterotrait-monotrait (HTMT) ratios. The note in the previous version of this table, which described these values as variance inflation factors, was incorrect.

Since the data were collected using a single measurement instrument at a single point in time, the possible presence of Common Method Bias was assessed. Following the recommendations of Kock [72], a full collinearity assessment was applied, showing that all variance inflation factor (VIF) values were below the threshold of 5, and even below the more conservative criterion of 3.3 (Table 5). These results suggest that common method bias does not represent a significant threat to the validity of the relationships estimated in the model.

Discriminant validity was additionally examined using the heterotrait-monotrait (HTMT) ratio. All values remained below the 0.90 threshold commonly applied to conceptually proximate constructs. It should be stated explicitly, however, that several pairs exceed the more conservative 0.85 criterion, namely autonomy with competence (0.859), competence with perceived ease of use (0.852), quality of attention with the credibility dimension FBGH (0.881), and management and leadership with FBGH (0.889). These pairs involve constructs that are theoretically adjacent, and the 0.90 threshold is the one recommended for such cases, but the proximity indicates that competence and perceived ease of use in particular capture partially overlapping evaluations of the user's capacity to operate the service. This is treated as a limitation rather than resolved by assertion. [NOTA PARA LOS AUTORES: el revisor pide intervalos de confianza bootstrap para HTMT; deben obtenerse en SmartPLS.]

Structural model assessment

Once the measurement model had been validated, the structural model was assessed using bootstrapping with 10,000 resamples. As a preliminary step, the possible presence of collinearity among the exogenous constructs was examined using the variance inflation factor (VIF). Following the criterion recommended by Hair et al. [62], all values obtained were below 5, ruling out collinearity problems, as shown in Table 5.

Table 4
Collinearity, significance and relevance.

Indicator	VIF	Outer weight	Std. D	T-stat.	CI
CT					
GR	1.575	0.299***	0.007	44.334	[0.287; 0.313]
CP	1.562	0.380***	0.007	55.517	[0.365; 0.392]
FBGH	1.805	0.510***	0.010	52.813	[0.492; 0.53]
REP					
QA	2.242	0.460***	0.060	7.724	[0.342; 0.576]
RDF	2.146	0.140*	0.060	2.332	[0.024; 0.259]
RE	2.176	0.041	0.063	0.647	[-0.082; 0.165]
ML	2.772	0.154*	0.066	2.323	[0.024; 0.281]
CT	3.159	0.345***	0.072	4.784	[0.204; 0.486]
Note. **p*-value < 0.05, ***p*-value < 0.01, ****p*-value < 0.001.					

According to Table 5, the results of the structural analysis show that PEU positively influences UI (β = 0.307, $p < 0.001$) and PU (β = 0.571, $p < 0.001$). Likewise, PU exerts a positive and significant effect on UI (β = 0.388, $p < 0.001$). These findings support the fundamental postulates of the TAM.

Regarding the emotional antecedents, CMPT showed a positive and significant association with the emotions linked to telemedicine use (EMT) (β = 0.383, $p < 0.001$). Similarly, ATM had a positive effect on EMT (β = 0.111, $p = 0.001$). In contrast, the RLN variable did not show a statistically significant relationship with EMT (β = -0.028, $p = 0.258$), and thus, the corresponding hypothesis did not receive empirical support. The emotions associated with telemedicine use positively influenced UI (β = 0.163, $p < 0.001$). Likewise, the REP construct showed a positive and significant relationship with EMT (β = 0.191, $p < 0.001$), suggesting that higher levels of reputational evaluation favor positive emotional responses toward telemedicine.

The outer weights of the reputation composite are reported in Table 4 and describe how each dimension contributes to the formation of the construct: quality of attention carries the largest weight (0.460), followed by credibility and trust (0.345), management and leadership (0.154) and research, development and training (0.140), while respect for the environment does not contribute significantly (0.041). These are measurement coefficients and are not interpreted as causal effects on reputation.

Overall, seven of the eight structural hypotheses received empirical support. The only hypothesis that was not supported was the RLN → EMT relationship (Hypothesis 6). Among the control variables, age exerted a positive and significant effect on continuance intention in the pooled sample (β = 0.140, p = 0.020), whereas gender did not (β = 0.009, p = 0.539). As reported below, the age effect was not reproduced in any of the eight site-level estimations, which advises caution in its interpretation.

Table 5
Bootstrapping procedure (10,000 repetitions) – Full sample.

Relationship	VIF	Path coefficient	Std. Dv.	p-value	CI
PEU → UI	1.592	0.307	0.020	0.000***	[0.267; 0.347]
PEU → PU	1.000	0.571	0.019	0.000***	[0.533; 0.607]
PU → UI	1.668	0.388	0.022	0.000***	[0.345; 0.43]
CMPT → EMT	2.232	0.383	0.026	0.000***	[0.332; 0.433]
ATM → EMT	3.135	0.111	0.034	0.001***	[0.041; 0.174]
RLN → EMT	1.945	-0.028	0.025	0.258	[-0.074; 0.021]
EMT → UI	1.449	0.163	0.018	0.000***	[0.128; 0.196]
REP → EMT	1.961	0.191	0.025	0.000***	[0.147; 0.244]
Age → UI	1.009	0.140	0.06	0.020*	[0.019; 0.256]
Gender → UI	1.006	0.009	0.014	0.539	[-0.019; 0.037]

Note. **p*-value < 0.05, ***p*-value < 0.01, ****p*-value < 0.001.

Explanatory and predictive power of the model

The explanatory power of the model was assessed using the coefficient of determination (R^2). Following the recommendations of Hair *et al.* [62], this indicator should be interpreted considering the disciplinary context and the complexity of the model analyzed. The results show that the model explains 34.8% of the variance of EMT ($R^2 = 0.348$) and 51.8% of the variance of UI ($R^2 = 0.518$). These values suggest a moderate explanatory capacity, especially with respect to the main dependent variable (Table 6).

Effect size was also examined using the f^2 statistic. According to Cohen [74] and Hair et al. [62], values of 0.02, 0.15, and 0.35 represent small, moderate, and large effects, respectively. The results indicate that PU ($f^2 = 0.187$) exerts a moderate effect on UI, while PEU ($f^2 = 0.123$) and CMPT ($f^2 = 0.101$) present effects of small to moderate magnitude. In contrast, autonomy ($f^2 = 0.006$) and RLN ($f^2 = 0.001$) show reduced contributions to the model.

Table 6
Explanatory power

Measure	Constructo	EMT	UI
R-squared		0.348	0.518
f-squared	EMT		0.038
	PEU		0.123
	PU		0.187
	ATM	0.006	
	CMPT	0.101	
	REP	0.028	
	RLN	0.001	

Finally, predictive capacity was assessed using the Q^2 statistic. All indicators showed Q^2 values above zero, meeting the criterion proposed by Hair *et al.* [62] for establishing predictive relevance. Additionally, the comparison between the prediction errors of the partial least squares model and those of the linear benchmark model showed favorable results for most indicators, evidencing an adequate predictive capacity of the model (Table 7).

Table 7
Predictive power

Indicador	Q-square	PLS		LM	
		RMSE	MAE	RMSE	MAE
EIM	0.415	0.495	0.351	0.527	0.372
AP	0.276	0.593	0.461	0.672	0.545
CPR	0.427	0.402	0.277	0.438	0.315
CSP	0.333	0.482	0.355	0.521	0.401
ETM1	0.220	0.697	0.554	0.723	0.588
ETM2	0.222	0.731	0.575	0.765	0.617
EMT3	0.440	0.546	0.409	0.574	0.440
UI1	0.550	0.447	0.327	0.527	0.382
UI2	0.548	0.457	0.336	0.540	0.399
UI3	0.508	0.448	0.328	0.527	0.387
PU1	0.410	0.471	0.325	0.544	0.390
PU2	0.388	0.463	0.320	0.524	0.373
PU3	0.397	0.556	0.403	0.607	0.427

Robustness analysis by site

To assess the stability of the results, the model was estimated independently for each of the eight clinics that make up the healthcare network analyzed. The results show a pattern of high consistency in the model's central relationships.

In particular, the TAM-derived relationships showed stability across all the sites analyzed. Perceived ease of use maintained a positive and significant association with both PU and UI, while PU retained a positive and significant effect on UI in all eight clinics. These findings suggest that the fundamental explanatory mechanisms of TAM remain stable regardless of geographic or institutional context. Similarly, CMPT showed a positive and significant relationship with the emotions associated with telemedicine use across all sites. Likewise, the relationship between REP and EMT remained positive and significant in all the clinics analyzed.

In contrast, some parameters showed greater variability across sites. Specifically, the effect of autonomy on EMT, as well as the outer weights of three components of the reputation composite (RDF, ML and CT), differed in their significance levels depending on the clinic evaluated. However, these fluctuations do not alter the general conclusions obtained in the aggregate sample.

Taken together, the results of the site-level analysis support the robustness of the proposed model and suggest that the main structural relationships remain stable across different organizational and regional contexts.

Discussion

This study aimed to test an integrated model combining TAM with SDT and corporate reputation to explain telemedicine continuance intention in the Peruvian context. Of the eight structural hypotheses proposed, seven received empirical support, backing the relevance of complementing traditional technological determinants with psychological, emotional, and reputational factors. Below, the findings obtained are contrasted with the prior literature that supported each relationship.

Regarding the TAM constructs, the results confirm the hypotheses. The PEU positively influenced UI (β = 0.307; H1) and, with greater magnitude, PU (β = 0.571; H2), while PU exerted a positive effect on use intention (β = 0.388; H3). These findings are consistent with the original formulation of Davis [10]. The author states that ease of use operates as a causal antecedent of usefulness rather than as a direct determinant of use, and they replicate what has been reported in telemedicine adoption studies identifying PU as the most robust predictor of intention [13,38]. The fact that PU shows a larger effect than ease of use (f^2 = 0.187 versus 0.123) is consistent with the evidence that, once the initial barrier of managing the platform has been overcome, it is the concrete benefits —time savings, timely access— that drive use intention in digital health.

Regarding the emotional antecedents, CMPT showed the strongest association with emotions (β = 0.383; H4), and autonomy a positive though smaller effect (β = 0.111; H5). These results are consistent with those of Yuen *et al.* [7], who proposed that when patients have the skills to carry out a virtual consultation and perceive control over the process, positive emotions are generated that favor adoption. In contrast, RLN was not significant (β = -0.028; H6), and thus, the corresponding hypothesis was not supported. This finding, which diverges from the theoretical premise of the SDT, admits a reading consistent with the nature of the channel: since care takes place via video call, the interpersonal bond is weakened by the absence of physical contact, a critical point already noted in the telemedicine literature [49]. It is plausible that, in an early adoption phase, the need for RLN does not translate into

positive emotions because the digital medium fails to satisfy it with the same intensity as an in-person consultation, which constitutes a relevant finding for the design of teleconsultation services more centered on the physician-patient relationship.

Emotions, in turn, positively influenced UI (β = 0.163; H7), confirming the affective path that recent literature has vindicated vis-à-vis purely cognitive models [46]. This result is congruent with Yuen *et al.* [7], who found that emotions mediate the relationship between psychological determinants and the intention to adopt telehealth, and with the evidence that affective responses predict behavioral intention in digital environments [75]. Although the magnitude of the effect is moderate, its significance sustains the study's central argument: telemedicine adoption is not explained solely by functional evaluations of the technology, but also by the user's emotional experience during care.

As for reputation, the construct showed a positive and significant relationship with emotions (β = 0.191; H8), which empirically supports Fombrun's proposition and the validation of the RepTrak Pulse as an emotion-based measure of reputation [52]. Because the five dimensions were specified as formative components of the reputation composite rather than as causal antecedents, their coefficients are outer weights that describe how the construct is formed and are not additional structural tests. Quality of care carries the largest weight (0.460), followed by credibility and trust (0.345), management and leadership (0.154) and innovation and training (0.140). This ordering is consistent with the literature that places perceived quality as the primary input of reputational judgment [53,54] and, in healthcare, with the centrality of quality of care [56]. The weight of credibility and trust is consistent with the high-uncertainty service nature of the teleconsultation, where trust operates as a substitute signal for unobservable quality [60,76].

Respect for the environment carried the smallest weight within the composite (0.041). Although the general literature documents a positive association between environmental responsibility and reputation [58], the specific evidence from the health sector suggests that patients do not perceive a direct link between environmental sustainability and the quality of their care, even when they recognise its effect on satisfaction and institutional image [58]. One explanation is that, in a context of accelerated implementation such as Peru's, telemedicine users prioritise attributes directly linked to the clinical encounter —quality, trust, technical competence— over environmental considerations, which contribute only marginally to the formation of reputational judgment.

Overall, the model explained 51.8% of the variance in UI and 34.8% of the variance in emotions, values that reflect a moderate explanatory capacity consistent with comparable studies of technology adoption in healthcare. The stability of TAM's central relationships and of the reputation-emotions path across the eight sites analyzed reinforces the robustness of the findings. In summary, the contrast between the literature and the results confirms that TAM's cognitive determinants retain their predictive power, but that their integration with emotional, motivational, and reputational factors offers a more complete understanding of telemedicine adoption, in line with the theoretical gaps identified at the outset of the study.

Regarding the control variables, age showed a positive and significant effect on the intention to use telemedicine (β = 0.140, p = 0.020), evidencing that older participants show a greater predisposition to use this type of service. Since age was incorporated as a continuous variable, the result indicates that as respondents' age increases, so does their intention to use telemedicine. This finding can be explained by the greater healthcare needs typically found in older age groups. Older users may perceive greater value in telemedicine due to the advantages it offers in terms of accessibility, time savings, and reduced travel to receive medical care. In this sense, telemedicine may represent a particularly convenient alternative for people who require more frequent monitoring of their health status or who face greater barriers to accessing health services in person.

Likewise, this result suggests that the potential adoption of telemedicine is not limited to younger or digitally savvy groups but can find favorable acceptance among older users when they perceive clear benefits for the management of their health.

Interpreting the findings in an emerging-market context

Three features of the Peruvian setting help explain the pattern observed and distinguish these results from those obtained in systems with longer telehealth trajectories.

The prominence of perceived usefulness over perceived ease of use is consistent with a population that had already completed at least one teleconsultation. Once the initial operational barrier has been crossed, the marginal relevance of interface simplicity declines and the tangible benefits of the modality dominate the evaluation. In a country where household internet access is concentrated in urban areas and where most users connect through mobile devices, those benefits are substantial and concrete: avoided travel, reduced waiting, and continuity of care without displacement. This also explains why our estimate for perceived usefulness exceeds those typically reported in pre-adoption samples from high-income settings, where respondents evaluate a service they have not yet experienced.

The weight of competence, the strongest motivational antecedent and the only one stable across all eight sites, is best understood as a joint product of the user and the organisation rather than as a fixed individual attribute. What the instrument captures is not general digital literacy but the perception of being able to complete a specific consultation on a specific platform with whatever support the clinic provides. In a setting with marked variation in digital familiarity, the organisational component of that perception carries more explanatory weight than it would in a population with homogeneous digital exposure.

The reputational pathway is where the contextual argument is strongest. In a fragmented system where patients hold limited objective information about clinical quality, institutional reputation operates as the principal substitute signal, and teleconsultation intensifies this because physical examination and in-person contact, the two most direct quality cues, are absent. That the reputation-to-emotion association held in all eight clinics, with markedly different patient profiles, suggests the mechanism is not an artefact of any single local market. Within the reputation composite, the negligible contribution of

environmental respect is consistent with hospital-sector evidence indicating that patients do not connect environmental performance with the quality of their own care.

The null association between relatedness and emotions deserves separate consideration precisely because it replicated in all eight sites, including those where teleconsultation uptake had historically been highest. A result that reproduces across contexts differing in connectivity, region and patient profile is unlikely to reflect local particularities. The more plausible reading is that the remote encounter, as currently configured, does not satisfy the need for interpersonal connection at all, irrespective of how accustomed the population is to using it. This is a finding about the modality rather than about the setting, and it is where our results depart most clearly from the assumption, common in the self-determination literature, that all three basic needs operate in any sufficiently rich interaction.

Theoretical implications

From a theoretical perspective, the study contributes to technology adoption literature by demonstrating that the psychological factors associated with autonomy, competence, and motivation are relevant elements for understanding the acceptance of digital health services. These results support the criticisms leveled at models derived from the Theory of Reasoned Action, which have been questioned for excessively simplifying decision-making processes in contexts involving emotional and relational dimensions. Consequently, the integration of the Technology Acceptance Model and Self-Determination Theory represents a more suitable approach for explaining telemedicine adoption.

The findings also suggest that telemedicine should be understood not only as a technological innovation, but as a transformation of the care process. Unlike other digital technologies, telemedicine modifies the interaction between patients and health professionals, incorporating factors related to trust, perceived control, clinical communication, and the user's emotional experience. Therefore, efforts aimed at increasing its adoption must transcend the development of functional technological platforms and incorporate strategies oriented toward strengthening the patient's experience during virtual care.

From a practical perspective, the results provide useful evidence for healthcare managers, policymakers, and healthcare organizations interested in consolidating telemedicine as a permanent modality of care. Implementation strategies should consider not only aspects related to the ease of use and perceived usefulness of the systems, but also mechanisms that strengthen user trust, promote user autonomy, and reduce the psychological barriers associated with remote care. This approach is especially relevant in countries such as Peru, where the rapid expansion of telemedicine during the pandemic did not necessarily translate into sustained adoption over time.

The study also provides empirical evidence from a Latin American context that has been scarcely represented in the international telemedicine literature. Most previous research has been conducted in countries with more mature digital ecosystems and telemedicine experience predating the pandemic. In contrast, the results obtained reflect the reality of a health system that experienced an accelerated implementation of these services, thereby contributing to extending the external validity of technology adoption models in emerging contexts.

Practical and managerial implications

For clinic managers, the results indicate that the determinants with the largest coefficients are not those offering the most durable differentiation. Interface quality and demonstrable usefulness are necessary conditions that any competitor can match through investment; institutional reputation and the relational quality of the encounter cannot be acquired on the same timescale. Resource allocation guided solely by effect size would therefore concentrate investment where imitation is easiest.

For service design, the weight of competence suggests that support activities usually classified as administrative overhead operate directly on the strongest motivational antecedent in the model. Pre-consultation verification of connectivity and device, anticipatory instructions and assistance during the session are interventions on a determinant of continuance, not ancillary costs.

For clinicians and training, the relatedness result identifies a competence that medical education has not systematically developed. Communication in remote settings requires the explicit verbalisation of what is conveyed non-verbally in person, deliberate management of the opening and closing of the encounter, and attention to the affective dimension of the complaint. Continuity of the treating physician across successive consultations and hybrid care pathways that reserve in-person contact for relationship-sensitive moments are plausible responses, although the present study evaluates none of them.

For policymakers in emerging health systems, the evidence indicates that connectivity and equipment are conditions of access rather than determinants of sustained use. Interventions aimed at building users' capacity to operate remote care, particularly among populations with limited prior digital exposure, act on a determinant that infrastructure investment alone does not address.

Limitations and future research

Four limitations follow directly from the design and should temper the reading of these results. First, all respondents had already used the service, so the findings speak to continuance intention among prior users and not to initial adoption; populations that never tried teleconsultation are absent from the sample and may differ systematically. Second, the outcome is declared intention rather than observed behaviour, and the gap between the two is well documented. Third, the reputation composite is specified formatively on theoretical grounds, but the instrument from which its dimensions derive was originally validated as a reflective multidimensional structure; the appropriateness of the composite specification therefore remains open and would benefit from comparison against alternative specifications in future work. Fourth, the effect of age was significant in the pooled sample but absent in all

eight site-level estimations, a discrepancy attributable to reduced statistical power in subsamples of approximately 350 cases, which nonetheless advises against strong claims regarding this variable.

Although this study contributes to the understanding of telemedicine adoption through the integration of the Technology Acceptance Model, Self-Determination Theory and reputation corporate, its results should be interpreted considering certain limitations. First, the cross-sectional design of the research precludes establishing definitive causal relationships among the constructs analyzed. Although SEM models make it possible to assess complex theoretical relationships and test causal hypotheses, the data were collected at a single point in time. Consequently, the associations observed reflect relational patterns consistent with theory, but they do not allow analysis of how users' perceptions and motivations evolve over time. Future research could employ longitudinal designs to examine how the determinants of adoption change as users gain experience with telemedicine services.

Second, the study focuses on use intention as the dependent variable, an approach widely used in the technology adoption literature. However, intention does not necessarily translate into actual behavior. Previous evidence has shown that important differences may exist between the stated intention to use a technology and its actual use in everyday settings. Therefore, future research should incorporate objective indicators of use, frequency of use, or continuity of use, to better understand the factors that explain the consolidation of telemedicine beyond the initial stages of adoption.

A third limitation relates to the theoretical scope of the model. While the incorporation of the Self-Determination Theory made it possible to capture psychological dimensions insufficiently addressed by traditional technology adoption models, the complexity of the medical encounter suggests that there are other potentially relevant factors that were not included in the present research. Aspects such as trust in the health professional, the perceived quality of care, digital literacy, risk perception, the privacy of medical information, and the quality of the physician-patient relationship could complement the explanatory capacity of the model. In this regard, future research could develop integrative models that simultaneously incorporate technological, psychological, relational, and organizational factors.

Likewise, the research was conducted in the Peruvian context, which is characterized by important geographic, social, economic, and cultural differences. While this characteristic constitutes a strength in that it provides evidence from a context scarcely represented in the international literature, it also limits the generalizability of the results to other health systems with different levels of digital maturity, regulatory frameworks, or population characteristics. Therefore, future research should test the proposed model in other Latin American countries and even conduct comparative studies between developed and emerging contexts to identify possible differences in the mechanisms that explain telemedicine adoption.

Another relevant limitation is that the study analyzed adoption from the patients' perspective. However, the successful implementation of telemedicine depends on multiple actors, including physicians, care staff, healthcare managers, and policymakers. Each of these groups may experience different barriers, incentives, and motivations regarding the use of digital health technologies. Consequently, future research could adopt multilevel approaches to understand how the perceptions of the different actors involved in the provision of telemedicine services interact.

Finally, the results obtained suggest the need to move toward a broader conceptualization of technology adoption in healthcare. The evidence found supports the importance of incorporating psychological and motivational variables; however, it also raises questions about the role of emotions, trust, and the care experience in digital environments. A promising line for future research is to develop and validate healthcare-specific models that overcome the limitations of traditional frameworks derived from information systems. This approach would allow a more precise understanding of how the characteristics of the medical encounter influence the adoption, continued use, and acceptance of digital health technologies in different care settings.

Conclusions

The results of this research show that telemedicine adoption cannot be explained solely based on traditional technological factors. While the constructs derived from the TAM retain a relevant role in explaining use intention, the incorporation of variables from SDT provided a broader understanding of users' behavior toward telemedicine services. This finding supports the need to complement classical technology adoption models when analyzing complex contexts such as healthcare.

Specifically, seven of the eight structural hypotheses were supported. The TAM relationships remained stable and significant, with perceived usefulness being the most influential predictor of continuance intention, in line with international evidence on telemedicine adoption. For their part, competence and autonomy were confirmed as relevant emotional antecedents, and emotions were shown to directly influence continuance intention, empirically validating the affective path that the study incorporated as its central contribution. Likewise, corporate reputation —formed mainly by quality of care and by credibility and trust— was consolidated as a significant antecedent of emotions, extending the explanatory framework beyond technological and motivational determinants.

The relationships that were not supported are equally revealing. The absence of a significant effect of relatedness on emotions suggests that the digital channel, by dispensing with physical contact, fails to satisfy the need for interpersonal connection with the same intensity as in-person care, which invites a rethinking of teleconsultation design to preserve the physician-patient bond. Within the reputation composite, respect for the environment contributed only marginally, indicating that, in a context of recent adoption, users prioritise attributes directly linked to the clinical encounter over environmental considerations. Both findings delimit the boundaries of the direct transfer of general theoretical frameworks to the healthcare domain and open specific questions for future research.

Overall, the study concludes that telemedicine adoption is a multidimensional phenomenon in which technological perceptions, psychological needs, emotional responses, and reputational judgments converge. For healthcare managers, this implies that strategies aimed at consolidating telemedicine as

a permanent modality of care must go beyond platform functionality and incorporate actions that strengthen users' digital competence, reinforce their autonomy, actively manage institutional reputation, and attend to the emotional experience during virtual care. In the Peruvian and Latin American context, characterized by an accelerated and still scarcely studied implementation, these findings provide empirical evidence for designing sustainable, patient-centered telemedicine services capable of translating initial adoption into continued use.

Abbreviations

ATM
autonomy
AVE
average variance extracted
CI
confidence interval
CMPT
competence
CR
composite reliability
CT
credibility and trust
EMT
emotions
HTMT
heterotrait-monotrait ratio
ML
management and leadership
PEU
perceived ease of use
PLS-SEM
partial least squares structural equation modelling
PU
perceived usefulness
QA
quality of care
RDF
research,development and training
RE
environmental respect
REP
corporate reputation
RLN
relatedness
SDT
self-determination theory
TAM
technology acceptance model
UI
usage intention
VIF
variance inflation factor.

Declarations

Ethics approval and consent to participate

The study protocol was approved by the Research Ethics Committee of the Pontificia Universidad Católica del Perú (approval number 137-2024-CEI-CCSSHHyAA/PUCP). All procedures were performed in accordance with the principles of the Declaration of Helsinki. Electronic informed consent was obtained from all participants prior to their access to the questionnaire.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and analysed during the current study are not publicly available because they contain information collected from patients under a confidentiality commitment, but are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

OHH conceived and designed the study, coordinated data collection, performed the statistical analysis and drafted the manuscript. ALA supervised the research, contributed to the theoretical framework and the interpretation of results, and critically revised the manuscript. All authors read and approved the final manuscript.

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Authors' information

Not applicable.

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Figures

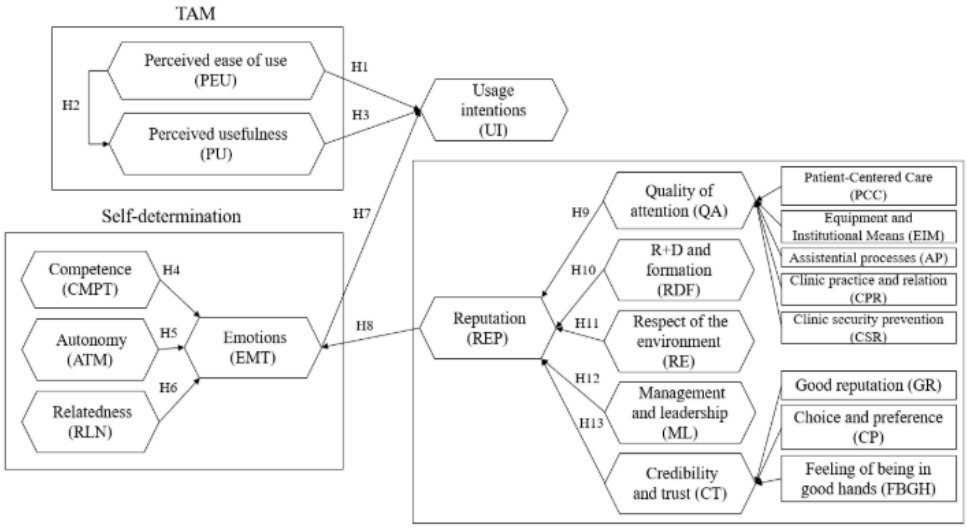


Figure 1

Proposed model