Journal of Contemporary Issues in Business and Government Vol. 27, No.5,2021
https://cibg.org.au/
P-ISSN: 2204-1990; E-ISSN: 1323-6903

DEVELOPING A MODEL FOR ESTABLISHMENT OFTELE-DERMATOLOGYIN IRAN

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ABSTRACT

Background: Establishment of telemedicine and especially teledermatologyis quite challenging despite their numerous benefits.This requires an in-depth study of the key factors in this process using a valid and reliable instrument that is tailored to the culture of the studied population. Therefore, the purpose of the present research was to developa modelfor establishment ofteledermatologyin Iran.

Methods: Amixed-methods descriptive design was utilized in this study. The required data were collected using a custom questionnaire. A sample of 384 IT managers and experts in the field of dermatology completed the questionnaire. To verify the validity and reliability of the instrument, Cronbach's alpha as well as exploratory and confirmatory factor analysis were used in LISREL 8.80 and SPSS 24, respectively, and Friedman test was used to rank the factors.

Results: Based on the results of exploratory and confirmatory factor analysis, the key factors in the establishment of teledermatology in Iran included: provider (8 components), recipient (11components), economic (8 components), structural (6 components), technological (9 components), policy making (5 components), legal (6 components), and cultural (5 components) factors. Cultural factors had the greatest impact and economic factors had the least impact on establishment ofteledermatology in Iran.

Conclusion: Theproposed model consisting of 8 factors can serve as a useful and comprehensive guide for policy-making and decision-making on how to establishteledermatology.

Keywords: Telemedicine; Teledermatology; Modeling.

INTRODUCTION

With the advent of the digital age and the evolution of information and communication technology (ICT), there has been an increasing research interest in the field of telemedicine. Today, the health sector is one of the key areas of application of ICT[1]. Telemedicine is the practice of using ICT to provide healthcare services at a distance and exchange health information [2]. Establishing a telemedicine network is especially critical in sparsely populated rural and remote areas that lack sufficient health care services[3].Telemedicine can be used forchronic diseasemanagement, diagnosis, treatment, follow-up, counseling, and training. In this approach, all health-related components areinterconnected—thepatient to the medical center, the medical center to the hospital, and even the hospital to specialty hospital [4].In general, telemedicine increases the quality and improves access to health care in deprived and rural areas, promotes professional interactions between specialists in rural areas and urban centers, reduces costs, facilitatesinformation sharing and transfer, increasesproductivity, reduces mortality and morbidity rates, and promotesequity [5].

Telemedicine has applications in different fields of medicine, including dermatology [6]. Dermatology is mainly visual in nature, making it ideal for telemedicine. Teledermatologyrefers to the use of videoconferencing or store-and-forward (SF) systems to store and transfer digital images and clinical information to specialists for later assessment and consultation [7]. In a prospective study, hospital dermatology consultation requests were recorded over a period of 4 months and 313 requests were evaluated. The results showed thatin 169 complaints (54%) were resolved with a single visit and only 39% of the patients required follow-up. This indicates that most patients had common diseases and a clinical diagnosis was enough to enable treatment by the specialist[8].Teledermatology increases population access to dermatologist specialists regardless of geographical location, shortens waiting time, and reduces cost of access (visit, travel, andaccommodation) [9].Despite the various benefits of teledermatology, there are many human, organizational, and clinicalchallenges associated with this practice. Security,encryption, privacy, identification, authentication, and data integrity are some ofthe most important challenges to consider[10].In addition, the patient's visual or hearing impairmentandsocial and psychological status can affect their perception of what the physician or consultant says [11]. ICT infrastructure and equipment, their expensive costs, policies of health care organizations involved, and the extent of intersectoral collaboration are important factors in the development of teledermatology networks. Economic considerations are also an important aspectof planning and implementation of a telemedicine program, including perspectives, fixed versus variable costs, labor costs, and cost-effectiveness [12].

Iran, with its numerous rural and remote areas and shortage of specialists in various fields of medicine, requiresmodern technologies and approaches such as telemedicine to remove these obstacles. Considering the importance, advantages, characteristics, and difficulties of using this technology, the purpose of the present research was to develop a modelfor establishment ofteledermatologyin Iran.

Materials & Methods

The present research used a mixed methods (qualitative-descriptive and quantitative-exploratory) design and the data were collected through a survey. This study was conducted in 2018.

The population consisted of the research community, experts, and managers in Iran's health system, including all universities of medical sciences across the country. Stratified random sampling with proportional allocation was used to select the participants. The population consisted of ten strata, corresponding to the ten medical districts in the country. Cochran's formula was used to determine the maximum required sample. This formula is calculated with a proportion of 50%, a margin of error of 5%, and a 95% confidence interval (p = 0.5, d = 0.05). The sample size was 384. The number of individuals in each stratum was determined based on the proportion of that stratum to the population.Accordingly, the sample size for each university was 6 individuals who were randomly selected in each stratum.

The research setting was Iran's health system and the population consisted of key stakeholders such as executives and specialists in the fields of IT and dermatology. Experts in this field wereselected from organizations involved in the establishment of teledermatology, including the Ministry of Health (Deputy of Health, Policy Council of the Ministry of Health, universities of medical sciences, faculty members) andthe Ministry of Cooperatives, Labor and Social Welfare (Health Insurance Organization).

In the first stage, a systematic review of the literature was conducted to identify the dimensions of teledermatology. Research papers, reviews and meta-analyses in the field of telemedicine and teledermatology published between 2000 and 2018 in either Persian or English were included in the systematic review. Conference papers, articles not available in full-text form, reports, and short communication papers were excluded. To find relevant studies, the keywords Telemedicine, Telemedicine Dermatology, Teledermatology, Remote Dermatology were used to search the titles and abstracts of articles published in Persian databases including Magiran, SID, MEDLIB, and IranMedex as well as international databases including ProQuest, Elsevier, Ovid, PubMed, CINAHL, Google Scholar, ScienceDirect, Web of Science, and Scopus. Moreover, the reference list of the articles were reviewed to identify additional studies that met the above criteria, but were not found in our initial search. Finally, Google search engine was used to verify the search results. In addition to the exclusion criteria above, studies that discussed or examined attitudes in other non-health groups and students were also excluded. To assess the quality of the articles, databases were searched independently by each of the authors and the results were compared. Searching Magiran, SID, MEDLIB, and IranMedex resulted in 4, 7, 3, and 5 full-text articles, respectively, while searching PubMed, Ovid, Web of Science, ProQuest, Google Scholar, ScienceDirect, Scopus, and CINAHL resulted in 18, 3, 14, 3, 11, 8, 8, and 2 full-text articles, respectively. After removing the duplicates, 49 studies remained for final review and analysis. Also, 2 additional articles were identified by reviewing the reference lists of the articles and through Google search, and the total number of articles reached 51. After a careful review and extraction of the required information, the results were first summarized in a data extraction table and were then analyzed manually. Endnote X5 reference management tool was used to organize the data, review titles and abstracts, and identify duplicates.

In the second stage, the questionnaire items were adaptedfromrelevant documents, identified articles, and questionnaires developed in Iran and other countries. The original version of the instrument contained 73 items. Face validity, content validity, and construct validity were used to evaluate and determine the validity of the items. To determine the instrument'squalitative face validity, a panel of 10 experts consisting ofnational and provincialexecutives from the Statistics and Technology Management Center of the Ministry of Health (3 people), dermatologists (2 people), professors of health services management and other faculty members (3 people),and researchers (2 people) were asked to review the questionnaire items in terms of simplicity, grammar, and clarity. In addition,the impact scores of the items were calculated to determine the instrument'squantitative face validity. Accordingly, the 10 experts were asked to rate the importance of each item in the original version of the instrument on a 3-point Likert scale. Items with animpact score of 1.5 or higher were retained for further analysis. Content validity index (CVI) and content validity ratio (CVR) were used to test theinstrument's content validity. CVR was calculated to be 0.62 based on Lawshe's (1975) table and the opinion of the panel of experts, while CVI was calculated in terms of three criteria, i.e. simplicity, relevance, and clarity of the item. Finally, after calculating CVI and CVR, the validity of 58 items was confirmed.

In the third stage, exploratory factor analysis (EFA) was used to establish the instrument'sconstruct validity. Accordingly, the questionnaire was distributed among 384 individuals based on the inclusion criteria. EFA was conductedusing Principal Component Analysis (PCA) with Varimax rotation. The minimum factor loading of an item was considered when deciding whether to maintainit in theanalysis. Cronbach's alpha was used to assess the reliability and internal consistency of the questionnaire. Also, the test-retest method was used to assess the external reliability of the instrument.Accordingly, the questionnaire was distributed among 50 experts in two stages one week apart, and the data were collected and analyzed. Subsequently, the approved and finalized questionnaire was distributed among the entire sample. Due to the geographical dispersion of the statistical sampleacross the country, the questionnaires were sent outand returned via web forms. In cases where the participants' e-mail was available, the electronic version of the questionnaire was sent out and returned via e-mail for those who preferred this medium. A maximum of three reminders were made by phone, email, and/or SMS for follow up.

Descriptive statistics, including the mean and standard deviation of the variables, were calculated. EFA (PCA with Varimax rotation)was used for data reduction in SPSS 21, and confirmatory factor analysis (CFA) was used in LISREL 8.80 to examine the suitability of the measurement tool. The minimum factor loading of an item was considered when deciding whether to maintain it in EFA.The Friedman test was used to rank influential factors.

Results

Theresults showed that the mean age of the sample was 42.2±6.9 years, ranging from 26 to 57 years. Most participants were in the 36-40 years age group (n = 104, 27.1%), were female (n = 226, 58.9%), had a master's degree (n = 192, 50%), had 10-15 years of work experience (n = 161, 41.9%), and below 5 years of management experience (n = 208, 54.2%). The average work experience of the sample was 14.8±6.7 years, ranging from 3 to 26 years. The meanmanagement experience of the sample was 8.3±4.6 years,ranging from 2 to 15 years.

The questionnaire items were adapted from relevant documents, identified articles, and questionnaires developed in Iran and other countries, and 58 items were analyzedto determinethe appropriate factor structure. The value of 0.932 obtained for the Kaiser-Meyer-Olkin(KMO) test statistics indicates sampling adequacy, and the near-zero p-valueof Bartlett's test indicates the suitability of the proposed factor analysis model. The results of the KMO test and Bartlett's test are provided in Table 1.

As reported in Table 2, eightprimary factors were identified using PCA with Varimax rotation, which areconsistent with the screeplotoutput of the software (Figure 1). Therefore, the 58-item questionnaire was broken down into eight factors using exploratory factor analysis.

To verify the internal consistency of the questionnaire, the reliability of each of the identified factors was evaluated using Cronbach's alpha. The Cronbach's alpha for all these factors was above 0.7, which is within the acceptable range. In addition, the Cronbach's alpha for the whole questionnaire with 58 items and 384 samples was 0.97.

After determining the factor structure in EFA, its accuracy was tested using CFA. The results of this analysis are provided in Table 3.

The ratio of chi-square to degree of freedom is less than 3 and theroot mean square error of approximation (RMSEA)isless than 0.08,indicating that the model has a good fit.Also, normed fit index (NFI), non-normed fit index (NNFI), incremental fit index (IFI), and comparative fit index (CFI)were used to verify the goodness of fit of the model, all of which were above 0.9 and indicatedthe very good fit of the proposedmodel compared to other possible models. In addition, the goodness of fit index(GFI) was close to 0.9, indicating that the model adequately fit the construct data (Table 4).

As reportedin Table 5, the value of the Friedman test statisticis 387.048 with ap-value less than 0.05, which indicates that the null hypothesis is rejected and the alternative hypothesis forsignificant differencesbetween the factors is confirmed. Therefore, it can be stated that the identified factorshave different effects on the establishment of teledermatology in Iran. Cultural factors have the greatest and economic factors the least impact on the establishment of teledermatology in Iran. The final research model and t-test coefficients in the CFA model are presented in Figure 2.

Discussion

Due to the importance of telemedicine and teledermatology, the present study was conducted to design a model for the establishment of teledermatology in Iran. The results of this study showed that structural, technological, provider, recipient, economic, cultural, policy, and legal factors affect the establishmentof teledermatology. However, the effect of these factors varied, with cultural factors having the greatest and economic factors having the least impact on the establishment of teledermatology in Iran.

Consistent with the present research,Oikonomou (2009)argues thatteledermatologyrepresents a high level of coordination in diagnosis and disease management programs and canreduce waiting time as well as travel to clinics.Moreover, the rapid evolution of technology has reduced the cost of medical equipment andincreased the ability to deliver dermatological services in remote areas play,thus supporting primary care physiciansbyenabling more accurate triage of dermatologists andprovision of counseling services [13].

Campagna et al. (2017) argued thatteledermatology as a specialty of telemedicine is a cost-effective way of providing dermatological services. They showed that teledermatologyreliably reduces in-person visits and allows for faster delivery of care[14].

Rao and Lombardi (2009) investigated the current status of telemedicine in developedcountries and showed that many of these countries, including the United States, have prioritized incorporating telemedicine into their healthcare systems. This concept has been adopted by many countries worldwide in an attempt to provide better healthcare for those in rural and remote areas. In addition to facilitatingremote patient diagnosis and treatment, tele-dermatologycan be effective in connecting medical centers,deliveringspecialized and subspecialized consultations,serving educational and research purposes,and saving time and money[15].

Cheung et al. (2018) studied the role of teledermatology services in the assessment of solitary skin lesions in patientsvisiting a clinic in London. The results showed that the pilotteledermatology service decreased referrals to the clinic. In this study, 51 to 68% of the patients did not require a face-to-face appointment, with only 10 to 12% reaching final diagnosis. The useof equipment to obtain high-quality images and the knowledge of general practitioners improved through interaction with specialists, which resulted in an increase patient satisfaction and reduced waiting time between primary and tertiary care by about a third[16].

Hebert and Korabek(2004) studied stakeholder readiness for telehomecare.The sampleincluded various types of stakeholders with different demographic, ethnic, and socioeconomic profiles.Differences were observed in stakeholder perceptions of the technology in relation to the structure, process, and outcome of care. They argued that technology can provide a cost-effective way of providing care to in the patient's place of residence [17].

Warshaw et al. (2010) found thatpatient satisfaction and preferences for teledermatology and clinic dermatology were comparable. They also showed that teledermatology reduced time totreatment and clinic visits [18]. Ilahi and Ghannouchi (2013) showed that deployment ofteleconsulting and remote diagnosis allows for accessing patient information remotely and improves both medical efficiency and patient satisfaction[19].

Batalla et al. (2016)found that the diagnostic agreement between evaluationsof virtual consultations and face-to-face consultations was 89%, while there was a 66% agreement between the pediatrician who provided the virtual consultation and the dermatologist who evaluated it. In addition, the results showed that teledermatologydecreased-face-to-face consultations, shortened the time between referrals and interventions, allowed for greater access to specialized care, reduced patients' travel time to the hospital, and had educational potential [20].

Hebert andKorabek (2004) showed that managers focused on outcomes (i.e., overall system structure, system evaluation, ethics, and sustainability)that were related to effective use of time in providing care rather than travel [17].

Dargahi and Razavi (2005)showed that organizational structure had a significant role in the successful deployment and implementation of telemedicine in the studied hospitals [21].

McNeill et al. (2001) showed that by developing a public telemedicine program and building thenecessary technical infrastructure, each network member caninteractwith any other member for clinical telemedicine services and medical education programming. Cost recovery from the memberships and other centralized cost recovery enabled by the proposed membership model offset 45% of its total nationwide operating costs[27].

In a discussion ondelivery of rehabilitation services through the Internet and communication networks, Amirani (2016)highlights two important areas of telerehabilitation research:determining the concordance of in-person and remote evaluation and treatment, and creating a data collection system to digitize information thata therapist can use in practice [3].

According to Sophia and Anita (2015),the advantages of using telemedicine applications are access over time, travel and expense, health provider collaboration, enhanced communications, enhanced confidence of patients, and less need to move patients. They argued that imagecompressioncan effectively accelerate telemedicine, and highlighted the importance of image quality as well as compressionefficiency[22].

Rajda et al. (2018) showed that teledermatology services are easily accessible and are associated with high patient satisfaction [23].A major policy concern regarding the development of telemedicine is its effects on cost of care and the widespread focus on cost-related issues in telemedicine [24], and the role of the Ministry of Health in e-health was found to be a key factor. Dargahi and Razavi (2005) showed that successful deployment and implementation of telemedicine technology requires clear organizational rules and procedures as well as two-way organizational communication [21]. Sophia and Anita (2015) highlighted the importance ofstrategies for reducing the cost of handling medical images in telemedicine environments [22]. Sharma et al. (2016) listed reimbursement, legal/liability issues, and technical issues (e.g., wireless functionality) as the most common concerns in teledermatology. They found that each attending dermatologist was asked for the amount of reimbursement felt adequate for an inpatient teledermatology consultation with no prior guidance or benchmark for reimbursement [25]. Similarly, in the present research, clear regulations were identified as a key legal component. Therefore, teledermatologycan significantly increase access to dermatological services, save money for both suppliers and patients, and prevent capital loss, and it is necessary to invest in this branch of telemedicine by developingthe necessary infrastructure, adoptingrules and regulations for all the parties involved, and protecting patients' rights.

A2004 study on the role of organizational culture in implementing telemedicine in the health care providers affiliated with Tehran University of Medical Sciences (TUMS) showed that organizational culture and national culture arecritical to change acceptance and readiness, and thatsuccessful implementation of telemedicine requiresarestructuring and redesign ofprocesses and roles according to the existing cultural orientation [21] Moreover, Yeung et al. (2018) examined teledermatology and teledermatopathology as educational tools for international dermatologists and found that the studied curriculumimproved interpersonal and communication skills such as understanding cultural and ethical issues in skin health andthe social determinants of health [26].

According to the present findings, provider-related factorsincluding the interaction between general practitioners (GPs)and dermatologists, their training, and increased access to clients are the most important factors in successful establishment of teledermatology. Therefore, it is recommended that managers develop strategies for improving the interactions and agreement between GPs and dermatologists andprovide specialized training and workshops.

The results also showed that cultural factors were the second most important factors in delivery of teledermatology services. Managers and physicians should evaluate these factors and work to improve them in order to continuously improve the quality of teledermatologyservices. It is also recommendedto promote extra-role behaviors in these environments, build a conducive culture, and develop the necessary mechanisms for information exchange amongdifferent parties. To reduce the economic burden ofteledermatology, physicians should carefully examine the causes of skin diseases in order to develop appropriate prevention programs which will reduce the number of referrals as well as the severity of the disease, and will ultimately play a significantrole in reducing the cost of treatment and care of patients with skin diseases.

It is recommended that the system introduced in the present research be designed and developed through systematic assessment of users' needs and based on standard methods and technical criteria in the design of medical software and systems. Moreover,such a system can be operationalized using the existing infrastructure in almost every part of the country. In general, research on social sciences and humanities has special complexities and limitations, including temporal, human, social and economic limitations,which create problems in conducting the research.

Overall, the results of the present research showed that all the identified factors in the proposed model for establishment ofteledermatologyin Iranwere significant, including provider, recipient, structural, technological, economic, policy, legal, and cultural factors. In this study,the wide-ranging infrastructural factors that were identified were divided into several categories using factor analysis, and as noted above, all of these factors were effective in the success of teledermatology. On the other hand, expensiveand/or low-quality services, absence ofa culture that embraces the use of ICTs, lack of stewardship and a legal framework for teledermatology, andlack of infrastructure can lead to the failure of teledermatology.

Acknowledgments

We sincerely thank all the dear participants who helped us in this research.

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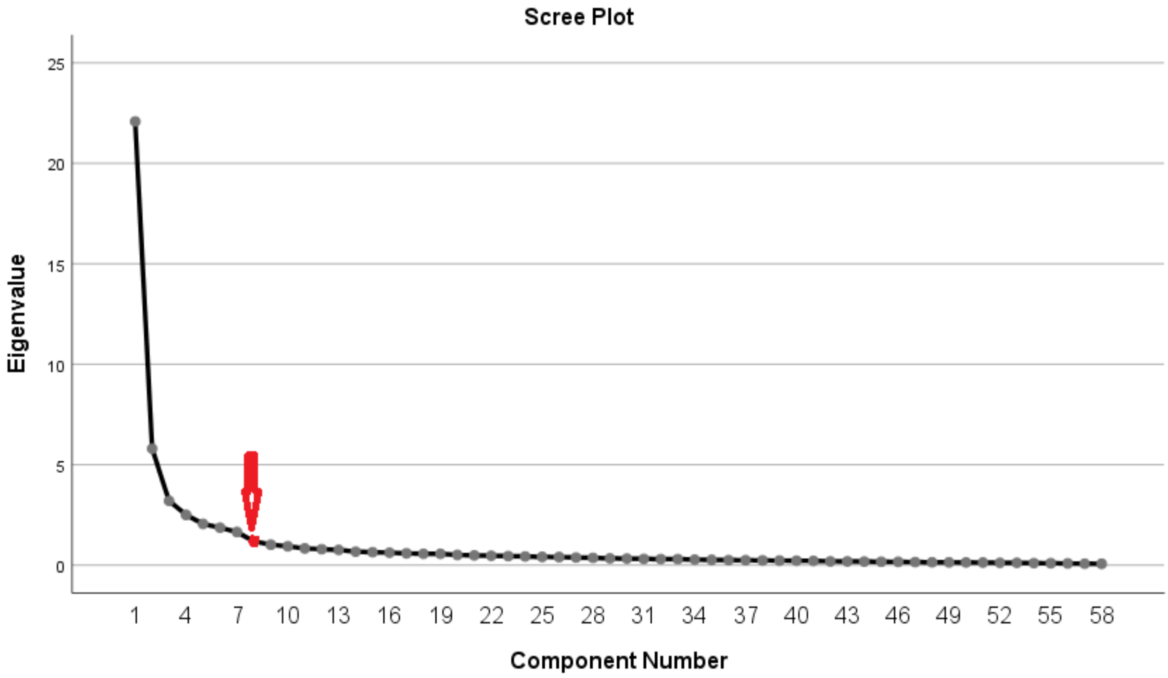
Table 1: Results of KMO and Bartlett Sphericity Test

P.value	Degree of freedom	Bartlett test statistic	KMO Test
0.001	1653	19.82	0.932

Table 2: Statistics related to extracted factors

factors	EigenValues			Sum of non-rotating factor coefficients			Sum of factor coefficients after rotation		
	Value	Percent	Cumulative sum	Value	Percent	Cumulative sum	Value	Percent	Cumulative sum
1	22.079	38.067	38.067	22.079	38.067	38.067	8.635	14.889	14.889
2	5.798	9.996	48.063	5.798	9.996	48.063	6.539	11.274	26.163
3	3.198	5.513	53.576	3.198	5.513	53.576	5.211	8.984	35.147
4	2.503	4.315	57.891	2.503	4.315	57.891	4.482	7.727	42.874
5	2.052	3.538	61.429	2.052	3.538	61.429	4.284	7.387	50.261
6	1.865	3.216	64.645	1.865	3.216	64.645	4.237	7.305	57.565
7	1.650	2.845	67.490	1.650	2.845	67.490	3.726	6.424	63.989
8	1.182	2.038	69.528	1.182	2.038	69.528	3.213	5.539	69.528



Graph 1: Gravel Diagram of Research Questionnaire

Table 3: Matrix of Extracted Factor Loads after Varimax Rotation

Question	Extracted Factors							
	Recipient of the Service	Economic	Service Provider	Technology	Structural	Legal	Policy	Cultural
EQ1	.159	.748	.204	.097	.145	.131	.112	.099
EQ2	.158	.745	.270	.203	.124	.105	.176	.091
EQ3	.111	.811	.100	.047	.059	.176	.176	.175
EQ4	.110	.778	.129	.195	.106	.207	.135	.107
EQ5	.131	.714	.113	.141	.215	.104	.159	.105
EQ6	.165	.804	.136	.112	.201	.141	.102	.032
EQ7	.162	.815	.149	.195	.097	.109	.158	.080
EQ8	.138	.804	.138	.092	.077	.100	.159	.181
ER1	.105	.404	.654	.077	.220	-.010	.046	.034
ER2	.211	.274	.635	.087	.249	.256	.078	.099
ER3	.147	.099	.714	.175	-.045	.189	.222	.078
ER4	.190	.088	.561	.314	.118	.180	.169	.087
ER5	.178	.186	.565	.164	.165	.132	.395	.282
ER6	.195	.217	.692	.149	.216	.197	.187	.123
ER7	.200	.252	.669	.166	.118	.078	.209	.067
ER8	.143	.089	.759	.242	.098	.078	.209	.110
FA1	.187	.211	.430	.475	.298	.202	.157	.136
FA2	.081	.099	.343	.523	.324	.232	.193	.194
FA3	.196	.208	.181	.631	.184	.312	.229	.138
FA4	.156	.256	.230	.740	.193	.145	.051	.121
FA5	.107	.240	.213	.661	.170	.355	.036	.140
FA6	.092	.129	.173	.681	.182	.232	.037	.202

Journal of Contemporary Issues in Business and Government Vol. 27, No.5,2021
https://cibg.org.au/
P-ISSN: 2204-1990; E-ISSN: 1323-6903

Question	Extracted Factors							
	Recipient of the Service	Economic	Service Provider	Technology	Structural	Legal	Policy	Cultural
FA7	.086	.214	.110	.642	.067	.112	.150	.407
FA8	.145	.308	.254	.448	.233	.175	.073	.221
FA9	.196	.124	.376	.550	.295	.273	.092	.082
FR1	.174	.215	.115	.256	.159	.045	.164	.698
FR2	.109	.264	.056	.141	.050	.213	.187	.681
FR3	.194	.134	.198	.195	.255	.199	.008	.656
FR4	.108	.035	.289	.322	.147	.306	.060	.482
FR5	.120	.129	.094	.146	.131	.169	.105	.802
GA1	.206	.262	.069	.226	.189	.617	.144	.204
GA2	.175	.240	.184	.246	.179	.679	.133	.098
GA3	.117	.138	.210	.183	.189	.699	.189	.160
GA4	.117	.090	.120	.322	.024	.636	.147	.165
GA5	.189	.240	.102	.119	.200	.758	.109	.149
GA6	.153	.161	.222	.197	.187	.668	.128	.107
GI1	.838	.103	.092	.101	.077	.058	.042	.059
GI2	.821	.136	.128	.081	.013	.070	.149	.064
GI3	.794	.149	.110	.098	.097	.134	.042	.041
GI4	.815	.117	.126	.080	.100	.108	.052	.052
GI5	.849	.128	.108	.054	.125	.028	.110	.041
GI6	.844	.087	.080	.063	.091	.052	-.014	.102
GI7	.872	.100	.066	.075	.051	.091	.028	.128
GI8	.822	.133	.120	.082	.128	.103	.051	.079
GI9	.803	.107	.107	.093	.015	.082	.065	.093
GI10	.862	.032	.087	.074	.021	.095	.010	.067
GI11	.846	.073	.141	.040	.112	.143	.122	.039
SA1	.065	.164	.226	.119	.562	.319	.227	.073
SA2	.162	.186	.208	.110	.704	.145	.150	.186
SA3	.109	.233	.163	.072	.755	.161	.029	.134
SA4	.102	.140	.038	.219	.761	.040	.065	.104
SA5	.118	.157	.082	.205	.661	.182	.307	.077
SA6	.147	.095	.181	.258	.727	.163	.196	.097
SI1	.078	.251	.148	.110	.223	.145	.669	.094

Question	Extracted Factors							
	Recipient of the Service	Economic	Service Provider	Technology	Structural	Legal	Policy	Cultural
SI2	.071	.191	.079	.085	.155	.107	.736	.095
SI3	.110	.179	.281	.124	.120	.194	.705	.084
SI4	.116	.182	.270	.085	.150	.099	.699	.169
SI5	.081	.188	.256	.058	.087	.138	.759	.043

Table 4: Results of fittness indices of confirmatory factor analysis models

Indices	Standard rate	Value
Chi-square to freedom ratio (χ2/df)	Less than 3	2.73
Root Mean Square Error of Approximation (RMSEA)	Less than 0.08	0.067
Softened fit index (NFI)	More than 0.09	0.95
Non-Normed Fit Index (NNFI)	More than 0.09	0.97
Comparative FitIndex (CFI)	More than 0.09	0.97
Incremental Fit Index (IFI)	More than 0.09	0.97
Goodness of fit index (GFI)	More than 0.08	0.79

Table 5: Final results of ranking the impact of effective factors in the establishment of teledermatology in Iran

Effective Factors	Mean Rank	Rank
cultural	6.31	1

Technology	5.06	2
Service provider	4.70	3
Legal	4.54	4
Recipient of the Service	4.32	5
Structural	4.02	6
Policy	3.60	7
Economic	3.44	8

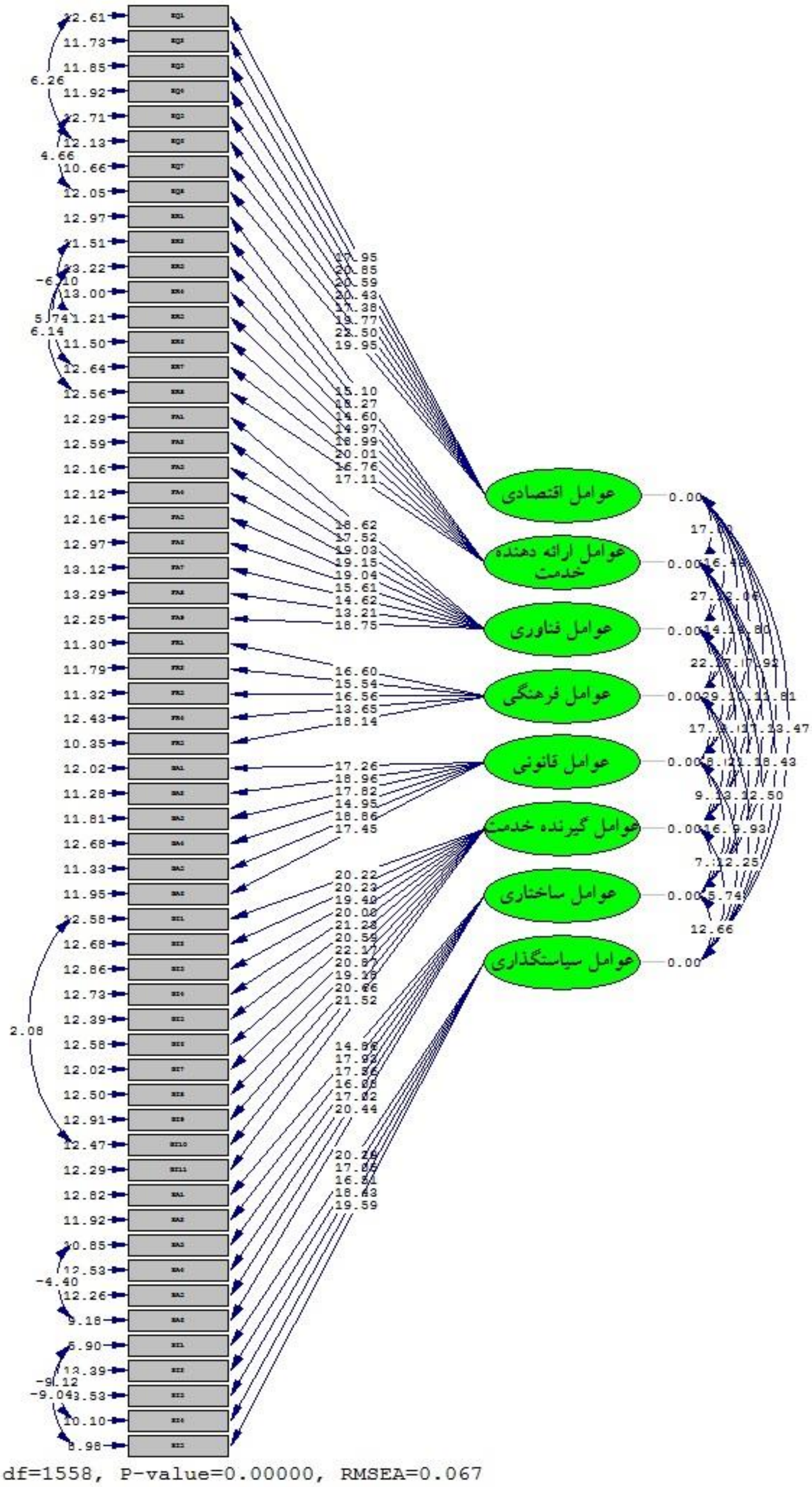


Figure 1: The final research model and significance coefficients of t in the confirmatory factor analysis model