DECISION SCIENCES INSTITUTE
Telemedicine Adoption issues in the U.S.A. and Brazil: Perception of Healthcare Professionals

(Full Paper Submission)

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ABSTRACT
The healthcare decision-making when adopting Telemedicine is quite difficult due to the diversity of complex issues involved. The objective is to identify factors that play a critical role in possible adoption of telemedicine in the USA and Brazil, by exploring the healthcare professionals’ perceptions of how adoption is influenced by issues such as security, privacy, policies, and culture. A model with four hypotheses was explored using a survey. The results showed that the perceptions of American and Brazilian healthcare professionals are quite similar, although they disagree on how patients’ privacy and security should be preserved in each country.

KEYWORDS: Telemedicine adoption, Telemedicine decision making issues, U.S.A, Brazil

INTRODUCTION
The health care sector has been experiencing major challenges around the world, such as rising costs, increasing demands of patients and universal access (Hajli, 2014). Telemedicine can be an alternative to deal with these challenges, since it provides a solution to the problems of accessing healthcare especially in developing countries where healthcare professionals are not as readily available (Adewale, 2004).

Telemedicine is defined by the American Telemedicine Association (2013) as the remote delivery of healthcare services and clinical information using telecommunications technology such as the Internet, wireless networks, intranets and extranets. Telemedicine has been used in the healthcare business since the early 1960s (Bonder and Zajtchuk, 1997) and underwent several cycles of increasing and decreasing interests. Telemedicine has recently gained more attention because it provides more access to health services but at the same time it makes patient health information vulnerable to security and privacy breaches. Health services are very specialized, normally expensive, and frequently concentrated in some areas in a country, or perhaps in a part of the world, turning difficult and costly to provide high quality face-to-face health services (Chaudhry et al., 2007). Thereby, the decision making when adopting a Telemedicine solution is quite difficult, because the adoption of telemedicine involves making decisions on complicated matters (Tarakci, Ozdemir and Sharafali, 2009). Tulu and
Chatterjee (2008) and LeRouge, Hevner and Collins (2007) also mention the importance of studies focusing on telemedicine issues as a way to improve the health professional decision-making quality. The present study focuses on issues involved in putting telemedicine into practice. Dünnbeil et al. (2012) suggest that main reasons for opposition to the adoption of distance healthcare (DHC) are privacy concerns, the extensive efforts required to implement the system, and dissatisfaction with the performance of the technology. Chang, Chen, and Chang (2009) described problems with poor security, confidentiality, and reliability. Ekeland, Bowes, and Flottorp (2010) call attention to the importance of policies as a way to define how telemedicine can be used. Barlow, Bayer and Curry (2006) and Saliba et al. (2012) mentioned culture as a barrier to telemedicine diffusion, creating mistrust and resistance by means of incompatibilities with values and cultural norms of a society. Based on that, the adoption issues examined in this study are information security, privacy, policy and national culture. The objective of the present research is to identify factors that play a critical role in possible adoption of telemedicine. More specifically, the research will focus on the perception of healthcare professionals on the influence of issues such as security, privacy, policies and culture on the adoption of telemedicine. The research is based on a survey involving physicians, nurses, medical students, medical residents, and IT professionals from USA and Brazil. A two-country study was used as a way to contribute to the understanding of why telemedicine is more accepted in some societies over others. Most telemedicine research studies have focused on the technology and clinical issues; consequently, there has been limited discussion of managerial issues. Similarly, most research studies considered the patients’ point of view. The present research will consider the healthcare professional’s perspective. Telemedicine adoption must consider managerial view point because of high amount of investments and significant changes in the routine of healthcare professionals. The rest of the manuscript is structured in the following manner: the next section details the theoretical background of telemedicine. This is followed by a description of the research methodology and the results. The manuscript closes by providing the conclusions and implications drawn by the present research.

LITERATURE REVIEW

This section provides the theoretical background for present research. More specifically, it covers telemedicine issues.

Telemedicine adoption
In order to achieve a successful DHC adoption, it is mandatory to consider that there are different people or groups of people involved. They may have different perceptions and sometimes even divergent opinions on what factors are critical in DHC adoption. This can get more complicated due to the interactions necessary between multiple actors (LeRouge, Garfield and Collins, 2012) with different concerns about cost-effectiveness, quality of care, privacy and preference for a regular care instead of DHC (Chang, Chen and Chang, 2009).

Dünnebeil et al. (2012) conduct a research in Germany and concluded that the perceived importance of standardization and the perceived importance of the current IT utilization were the most significant drivers for accepting DHC. Perceived importance of information security and process orientation is also important.

Chau and Hu (2002) perceived some differences between DHC adoption by healthcare professional and the researches. The authors argue that healthcare professionals are more pragmatic during the decision-making process to adopt DHC. They tend to focus on the technology’s usefulness more than on its ease of use. These professionals seem to be relatively independent in making technology acceptance decisions while considering suggestions from others.
Security issues
Security in healthcare is still a big concern in the adoption of telemedicine (Barlow et al., 2007). Telemedicine information travel over the Internet and, therefore, security is a big concern. The volume of patient records has increased quite significantly over the years (Anderson, 2000) resulting in concerns about the security of this information. Because of that, the adoption and use of IT in healthcare should be carefully tracked to ensure that the confidentiality, access control, authentication, and authorization procedures are followed properly (D’Arcy, Hovav and Galletta, 2009).

The research of Chang, Chen, and Chang (2009) described the problem with poor security, confidentiality, and reliability provided by caregivers. The absence of adequate procedures to control access to and use of patient records can compromise the adoption of telemedicine. The use of different types of technology to access the patient records is another challenge. Records accessed by mobile devices, for example, are subject to possible theft, unauthorized access, or even malicious attacks (Demiris, 2006).

Privacy issues
Protecting privacy and confidentiality of a patient’s health information is a critical issue while adopting telemedicine (Anderson, 2000; Demiris, 2006). Dünnebeil et al. (2012) stated that the main reasons given for opposition to the use of distance healthcare (DHC) are privacy concerns. Most part of DHC technology present problems (Anderson, 2000). This is mainly because of privacy and confidentiality concerns. Privacy concerns can also turn into an ethical problem (Chang, Chen and Chang, 2009). Earp and Payton (2006) studied a group of healthcare professionals and found that these professionals were primarily concerned with errors in patient records in terms of improper access, unauthorized secondary use, and data collection errors. Another concern about privacy is disagreement on what information should be kept private. Different countries and societies have different thresholds (Brender, Nøhr and McNair, 2000). In order to guarantee privacy preservation in the United States, companies are required, for example, to comply with privacy and security laws as dictated by the Health Insurance Portability and Accountability Act (HIPAA, 2006). HIPAA specifies the type of healthcare information should be kept private and to whom that information can be disclosed (HIPAA, 2006). This Act also specifies administrative, physical, and technical safeguards required to protect healthcare information.

Policy issues
Policies ensure that telemedicine success result in fewer risks for the stakeholders and shareholders. The government, associations, or companies can establish policies. The policies dictate standards of operations, roles, and responsibilities the telemedicine services must operate under. Policies can determine how telemedicine can be used to reduce health care costs (Ekeland, Bowes, and Flottorp, 2010), establish reimbursement guidelines and how IT can be used to support telemedicine services (Pelletier-Fleury et al., 1997). It is also important that, in order to comply with health care policies, a telemedicine coordinator with managerial skills is
appointed (LeRouge, Garfield and Collins, 2012). This coordinator can work as a catalyst and is primarily responsible for the policies implementation and pursuance. Policies are also important to “ensure that the public policy and legislation will promote the use of IT that enhances health care” (Anderson, 2000). Ekeland, Bowes and Flottorp (2010) state that, despite a large number of research studies on telemedicine, evidence to support policy decisions is still lacking. This field, therefore, presents new opportunities for studies that involve guidelines for telemedicine adoption (Tarakci, Ozdemir and Sharafali, 2009).

Cultural issues
Culture can affect the adoption of an IT solution (Kappos and Rivard, 2008). Barlow, Bayer and Curry (2006) identified culture as a barrier of telemedicine diffusion. The authors also mention that the cultural resistance is resulted from incompatibilities between the new IT with the values and cultural norms of an organization and the degree to which its results are visible to the potential adopter. Saliba et al. (2012) explain that the language difference between the patients and the healthcare professionals can generate mistrust resulting in resistance. Saliba et al. (2012) also mentioned that in some cultures it could be considered as a failure on the part of doctors to ask for assistance or second opinion especially if it involves a cross-border telemedicine service.

Hofstede (2001) conducted a large study about national culture, aiming to identify value dimensions across cultures. He also developed work-goals brought up by questions with the format “how important is it to you”. This part of the questionnaire involves eight questions about the importance of some aspects of professional life (time for family, good physical working conditions, stability, etc.), six about the importance of some aspects of private life and six more general questions about trust, society values and rules.

As stated earlier, the culture has an impact in the telemedicine adoption and use, and this impact can act in different ways in the two countries selected for the present research.

THEORETICAL MODEL

Based on the previous discussion, we present the following conceptual model (see Figure 1). The model offers an overview of the main constructs, including the hypotheses, described below.

Figure 1: Issues in Telemedicine adoption model

Health care organizations have increased the use of IT in general and telemedicine in particular. Consequently, the amount of data about patients registered in these systems had increased quite significantly, resulting in concerns about information security (Anderson, 2000). Therefore, the adoption and use of IT must be carefully followed to ensure that the patient information security is preserved (D’Arcy, Hovav and Galletta, 2009). This is especially important because the patient records are transmitted over the Internet (Anderson, 2000) and are accessed from different types of dispersive (Demiris, 2006). The concern about patient information security can
hinder the adoption of telemedicine. In view of the aforementioned discussion, we hypothesize the following:

**H1 – Healthcare professionals’ security perception influences the telemedicine adoption.**

Privacy is one of the main reasons given by healthcare professionals for opposing the use and adoption of DHC (Dünnebeil et al., 2012). Healthcare professionals might think that the adequate procedures for ensuring data privacy, confidentiality, and reliability do not exist in telemedicine (Brinkmann, 2005). The protection of privacy and confidentiality is, therefore, a critical issue while adopting telemedicine (Anderson, 2000; Demiris, 2006), especially about improper access, unauthorized secondary use, and data collection errors (Earp and Payton, 2006). Based on this we hypothesize:

**H2 – Healthcare professionals’ privacy perception influences the telemedicine adoption.**

Policy will establish some standards of operations, roles and responsibilities that are fundamental to telemedicine adoption, in the same extent that reduces the perceived risk by stakeholders. Policies will dictate patient information privacy and security (Tarakci, Ozdemir and Sharafali, 2009) and ensure the adequate use of IT in health care (Anderson, 2000). Policies can establish the operation model, specifying standards about health care costs (Ekeland, Bowes, and Flottorp, 2010), reimbursement guidelines (Pelletier-Fleury, 1997), and the role of IT (Pentzaropoulos and Siakavellas, 2001). Policies may also be influenced by cultural issues. Based on that, we put forth the following hypothesis:

**H3 – Healthcare professionals’ policies perception influences the telemedicine adoption.**

Culture can act as a barrier to telemedicine diffusion (Barlow, Bayer and Curry, 2006). One expression of the relationship between culture and telemedicine adoption is telemedicine as IT solution, since Telemedicine involves an IT high level and, according to Kappos and Rivard (2008), the cultural influence when adopting an IT solution is well known. However, the most important expression refers to what is perceived as important, correct and valuable for people influenced by the values, behaviors and standards of their culture (Hofstede, 2001), especially considering that different countries and societies have different thresholds (Brender, Nøhr and McNair, 2000). For example, Saliba et al. (2012) mentioned that in some cultures it could be considered as a failure to ask for assistance or second opinion especially if it involves a cross-border telemedicine service. According to Barlow, Bayer and Curry (2006), this situation can occur because the incompatibilities between the means used and the values and cultural norms. Kifle, Mbarika and Brandy (2006) find a positive relationship between the power distance dimension and telemedicine capabilities. Based on this we hypothesize:

**H4 – Healthcare professionals’ national culture influences the telemedicine adoption.**

**METHODOLOGICAL PROCEDURES**

Based on the aforementioned model (Figure 1), a literature review of DHC, and Hofstede’s theory on national culture, an instrument was designed to gather information on telemedicine adoption in the USA and Brazil (see Appendix 1). This instrument contains 44 questions. The first 19 questions were used to collect respondents perceptions on security, privacy, policy and adoption constructs, and were based on the following researches, respectively: D’Arcy, Hovav and Galletta (2009); Earp and Payton (2006); Ekeland, Bowes and Flottorp (2010) and Chang, Chen and Chang (2009). The appropriation of the questions from the cited researches and the fit for the current research were discussed with a group of American health professionals who use telemedicine. Therefore, these professionals worked as experts, helping the researchers in preparing the questionnaire. The next 20 questions collectively measured the culture construct.
These items were provided by Hofstede (2001) as a part of his theory to identify international differences in work-related values. The respondents were anonymously asked to answer each question using a seven-point Likert-type scale with values ranging from 1 (strongly disagree) to 7 (strongly agree). The last five questions asked respondents to provide some demographic information.

These two countries were chosen for convenience and because each country is at a different stage of the telemedicine adoption. The USA is an example of a typical developed country whereas Brazil is a developing country.

The instrument for collecting data was hosted on Qualtrics and respondents filled out the survey using a link to the survey and submitted their answers online. An electronic link to the instrument hosted on the Qualtrics was first sent to potential participants. The participants were asked to fill out the survey instrument. Respondent’s anonymity was maintained throughout the data collection process.

In the U.S. the data were obtained by surveying about 300 physicians, physician’s assistants, nurse practitioners, medical students and medical residents, healthcare executives, nursing professionals and IT specialists who also used telemedicine systems in the state in which data were collected. Taking into consideration the missing data and invalid responses, there were a total of 192 usable U.S. responses. In Brazil, the instrument was distributed to 148 physicians, physician’s assistants, nurse practitioners, medical students and medical residents, nursing professionals and IT specialists. After disregarding the questionnaires with missing responses, there were 115 fully completed questionnaires.

The data from the U.S. showed that eighty-six percent of the respondents were males while fourteen percent were females. Forty-five percent of the respondents from Brazil were males while fifty-five percent were females. Sixty percent of the Brazilian respondents had work experience between 1 to 5 years, 5 percent had between 6 to 10 years, 18 percent had between 11 to 15 years, 10 percent had between 16 to 20 years, and 7 percent had over 20 years. In the U.S. sample, forty-seven percent of the respondents were medical students and the rest were IT specialists. In the data from Brazil thirty-four percent of the respondents were physicians, 1 percent were physician assistants, 1 percent were nurse practitioners, 43 percent were nursing professionals, 4 percent were medical students, 3 percent were medical residents, 1 percent were healthcare executives, 1 percent were IT specialists, and 12 percent were others.

RESULTS

Reliability and validity

Cronbach’s alpha was first utilized to determine the reliability of the constructs used in the present research (see Table 1).

<table>
<thead>
<tr>
<th>Construct (Nº of items)</th>
<th>Country</th>
<th>Mean, Std. Dev., Cronbach Alpha</th>
<th>Factor loadings</th>
<th>Var. Extracted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adoption (5)</td>
<td>U.S.</td>
<td>30.05, 4.96, .859</td>
<td>.91, .92, .56, .59, .59</td>
<td>.25</td>
</tr>
<tr>
<td></td>
<td>Brazil</td>
<td>26.62, 4.017, .525</td>
<td>1, 1.31, .40, .60, -.008</td>
<td>16</td>
</tr>
<tr>
<td>Privacy (4)</td>
<td>U.S.</td>
<td>24.54, 4.87, .870</td>
<td>.76, .92, .86, .68</td>
<td>.24</td>
</tr>
<tr>
<td></td>
<td>Brazil</td>
<td>21.82, 5.32, .814</td>
<td>.85, .81, .67, 1</td>
<td>.28</td>
</tr>
</tbody>
</table>
Information Security (5)

<table>
<thead>
<tr>
<th></th>
<th>U.S.</th>
<th>Brazil</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>31.60, 5.1, .930</td>
<td>29.97, 5.06, .867</td>
</tr>
<tr>
<td></td>
<td>.71, .86, .96, .95, .79</td>
<td>1, 1, 1.06, 1.12, 1.01</td>
</tr>
<tr>
<td></td>
<td>.26</td>
<td>.26</td>
</tr>
</tbody>
</table>

Policy (5)

<table>
<thead>
<tr>
<th></th>
<th>U.S.</th>
<th>Brazil</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>27.66, 5.26, .808</td>
<td>27.37, 4.498, .737</td>
</tr>
<tr>
<td></td>
<td>.59, .83, .95, .67, .52</td>
<td>.1, 1.51, 1.08, 2.28, 2.50</td>
</tr>
<tr>
<td></td>
<td>.28</td>
<td>.20</td>
</tr>
</tbody>
</table>

Culture (20)

<table>
<thead>
<tr>
<th></th>
<th>U.S.</th>
<th>Brazil</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>92.58, 11.8, .823</td>
<td>104.83, 9.017, .668</td>
</tr>
<tr>
<td></td>
<td>.79, .78, .59, .48, .69, .41, .74, .28</td>
<td>.79, .78, .59, .48, .69, .41, .74, .28</td>
</tr>
<tr>
<td></td>
<td>.24, .15, .15</td>
<td>.24, .15, .15</td>
</tr>
<tr>
<td></td>
<td>1.39</td>
<td>.81</td>
</tr>
</tbody>
</table>

Table 1: Scale Development

The reliability ascertains both stability and internal consistency of the instrument. The values presented in the Cronbach Alpha analysis are considered high, indicating a reliable questionnaire.

For the U.S., adoption, culture, information privacy, information security and information policy have reliability scores of 0.82, 0.87, 0.93, 0.81, and 0.86, respectively. For Brazil, culture, information privacy, information security, information policy, and adoption have reliability scores of 0.67, 0.81, 0.74, 0.52, and 0.52, respectively. Nunnally (1970) indicated that 0.70 is an acceptable level of reliability for a construct. The U.S. constructs meet the Nunnally benchmark. Brazilian constructs, with the exception of one construct, also meet the Nunnally benchmark.

The instrument is also validated to ensure that the study appropriately measured its intended objects. Convergent validity and discriminant validity are used to check the validity of the instrument. In order to verify that all items loaded well in their assigned constructs, factor analysis is used with a reference norm of 0.40 as the ideal loading factor as suggested by Hair et al. (1998). Eleven of 20 items for Brazil and thirteen for the U.S. in the culture construct loaded well for >0.40. All five items in the information security group loaded very well for the countries >0.72. Moreover, items in the information privacy group loaded very well for the two countries >0.68. All five items in the information policy group loaded well for the U.S. >0.52; however, in Brazil the loadings are only over 0.1. Finally, all five items in the adoption construct loaded very well for both countries >0.40. The average variance explained by each factor obtained from factor analysis communalities for the U.S. is 1.39, 0.24, 0.26, 0.28, and 0.25, and for Brazil, it is 0.81, 0.28, 0.26, 0.20, and 0.16, for culture, privacy, security, policy, and adoption, respectively.

Correlation Analysis

Correlation test was used to understand the influence among adoption and the dependent variables. Table 2 shows the results.

<table>
<thead>
<tr>
<th>Construct/Country</th>
<th>Culture</th>
<th>Policy</th>
<th>Privacy</th>
<th>Security</th>
<th>Adoption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culture</td>
<td>U.S.</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brazil</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Correlation Analysis
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Table 2: Correlation Analysis

<table>
<thead>
<tr>
<th>Construct/ Country</th>
<th>Correlations</th>
<th>Test</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy U.S.</td>
<td>0.52***</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Brazil</td>
<td>0.48***</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Privacy U.S.</td>
<td>0.44***</td>
<td>0.48***</td>
<td>1.00</td>
</tr>
<tr>
<td>Brazil</td>
<td>0.01</td>
<td>0.35***</td>
<td>1.00</td>
</tr>
<tr>
<td>Security U.S.</td>
<td>0.25***</td>
<td>0.025***</td>
<td>0.15*</td>
</tr>
<tr>
<td>Brazil</td>
<td>0.31***</td>
<td>0.50***</td>
<td>0.16*</td>
</tr>
<tr>
<td>Adoption U.S.</td>
<td>0.28***</td>
<td>0.60***</td>
<td>0.38***</td>
</tr>
<tr>
<td>Brazil</td>
<td>0.23***</td>
<td>0.36***</td>
<td>0.11</td>
</tr>
</tbody>
</table>

* Means significant at the .10 level, ** Means significant at the .05 level, *** Means significant at the .01 level.

**Table 2: Correlation Analysis**

Table 2 shows a significant relation (at the 0.01 level) between adoption and policies for both U.S. and Brazil. Adoption is also significantly impacted by culture in both countries. This means that adoption in both countries is heavily influenced by policies and culture, confirming the hypothesis H3 and H4.

The hypothesis H2 was partially confirmed, because the relation between adoption and privacy is significant (at the 0.01 level) only in the U.S. and not significant in Brazil. In the same way, the hypothesis H1 was partially confirmed, because the relation between adoption and security is partially significant (at the 0.05 level) only in the U.S. and not significant in Brazil. This shows that patient record privacy and security procedures are not as important in Brazil, or at least are not considered important when adopting telemedicine. In Brazil, the concern about security issues is quite new and affects only a small part of the population. Contrary to Americans, Brazilians are more inclined to provide information about their private lives to others (Audy, Evaristo and Manhein, 2005). In a research about privacy concerns in Brazil, GSMA (2012) identified that 51% of the respondents regularly agree to a privacy statement without reading it, and 66% of the respondents will continue sharing data regardless of privacy is guaranteed or not.

Overall, based on the aforementioned results it is possible to surmise that adoption are influenced by policies and culture in both countries and by security and privacy in U.S.

**Differences between the countries using T test**

T-test was also used to verify differences between the U.S. and Brazil in terms of the constructs used in the present research (see Table 3).
Table 3: T test

T-test results present that policy, adoption and culture have high statistical significance, and privacy was also significant. Security was not statistically significant between the U.S. and Brazil sample, which indicates no difference between the groups. Based on that, it is possible to conclude that there are significant differences between the two countries in terms of perceptions on adoption, culture, policies, and privacy but not on security.

DISCUSSION AND CONCLUSION

The results of the data analysis allowed us to conclude that telemedicine adoption is influenced by policies and culture in both countries and influenced by security and privacy in the U.S. The hypotheses H1 and H2 were partially confirmed (just for the U.S. sample) and the hypotheses H3 and H4 were confirmed for both countries. Based on the results of the present research, it is possible to conclude that the healthcare professionals in the USA and Brazil show similar perceptions on most of the telemedicine issues covered in this research. The main difference between the two countries lies in the privacy and security area. The issue of privacy is a bigger concern in the United States than in Brazil, and the same is true with security. As mentioned by Barlow, Bayer and Curry (2006), the resistance results from incompatibilities between the new IT perhaps developed in a developed country and the values and cultural norms observed by the people in a developing country like Brazil. The Brazilian sample shows that privacy and security are not a visible concern.

The present research suggests that attention should be paid to culture when planning for a telemedicine solution. This is mainly due to the potential contribution of this construct to the success or failure of telemedicine adoption. The present research also suggests that telemedicine is not perceived just as an IT solution but also a way of changing the healthcare professional and patient relationship. This change can be perceived as positive or negative, but it is an important aspect when planning or managing telemedicine solutions. It is, therefore, important to consider how patient privacy is perceived in a country before adopting distance healthcare.

As a part of theoretical and practical implications, the present research tells us that it is possible to identify factors that play a critical role when adopting a telemedicine solution. These factors can help the decision-making process about adopting telemedicine and what aspects should be considered and managed, as a way to have a more successful adoption and use. More quality in the adoption decision-making process can increase the quality of health professional decision-making (Tulu and Chatterjee, 2008).
In the USA, all constructs were considered important (even if one of them shows significance at the 0.05 level) and, therefore, these should be seriously considered before adopting telemedicine. In Brazil, privacy and security were not found to be as important and the present research indicates that this could be due to the use of under-developed or not well-developed telemedicine. The aforementioned implications can contribute to planning, developing, adopting and managing telemedicine solutions in USA and Brazil.

One of the limitations of the present research is small size of the samples used in both countries. Another limitation of the present research is the use of national culture as defined by Hofstede (2001). The use of national culture dimensions to evaluate individual behavior and motivation could be problematic. Finally, the present research only considered the perception of healthcare professionals in adopting a distance healthcare. A future research may consider patient issues.

APPENDIX – Research instrument

**Patient Information Security Issues**

- Strongly Disagree; Disagree; Somewhat Disagree; Neither Agree nor Disagree; Somewhat Agree; Agree; Strongly Agree

1. Confidentiality of electronic patient records is an important issue that affects the utilization of telemedicine.
2. Appropriate control of access to electronic patient records is an important factor in the use of telemedicine.
3. Appropriate utilization of authentication procedures, before allowing someone to have access to electronic patient records, is important in the use of telemedicine.
4. Appropriate use of authorization procedures, before allowing someone to have access to electronic patient records, is important in the utilization of telemedicine.
5. Security of electronic patient records is an important factor that affects the use of telemedicine.

**Privacy Issues**

- Strongly Disagree; Disagree; Somewhat Disagree; Neither Agree nor Disagree; Somewhat Agree; Agree; Strongly Agree

6. A patient's electronic medical information provided for one purpose should not be used for another purpose unless it has been authorized by the patient.
7. A patient's electronic medical information should not be used for any purpose unless it has been authorized by the patient.
8. Healthcare providers should not share a patient's electronic medical information with other providers without prior authorization from the patient.
9. Healthcare providers should not share a patient's electronic medical information with healthcare services (e.g., hospitals, and insurance companies) without prior authorization from the patient.

**Policy Issues**

- Strongly Disagree; Disagree; Somewhat Disagree; Neither Agree nor Disagree; Somewhat Agree; Agree; Strongly Agree

10. The top manager awareness and willingness to adopt telemedicine is an issue in implementing telemedicine.
11. The lack of organizational policies and procedures that encourage access to telemedicine technology is a factor in implementing telemedicine.
12. The lack of organizational policies and procedures that encourage the use of telemedicine is an issue in implementing telemedicine.
13. The lack of government laws and regulations that encourage the development of telemedicine technology is a concern in implementing telemedicine.
14. The lack of government laws and regulations that encourage the access to and use of telemedicine technology is a concern in implementing telemedicine.

**Telemedicine Implementation**

*Strongly Disagree; Disagree; Somewhat Disagree; Neither Agree nor Disagree; Somewhat Agree; Agree; Strongly Agree*

15. In order for it to be implemented, costs of telemedicine use need to be at least equal or less than the alternatives for healthcare providers.

16. In order for it to be implemented, costs of telemedicine use need to be at least equal or less than the alternatives for patients.

17. Compliance with privacy and security laws as dictated by the Health Insurance Portability and Accountability Act (HIPPA) is a concern in implementing telemedicine.

18. In implementing telemedicine, it must reduce time-to-diagnosis and time-to-treatment for those where distance to a health care facility is an issue.

19. In implementing telemedicine, it must reduce time-to-diagnosis and time-to-treatment for those where physical and mental condition is a factor.

**Hofstede Culture Dimensions**

Please think of an ideal job, disregarding your present job, if you have one. In choosing an ideal job, how important would it be to you to... (please mark one answer in each line across).

*Strongly Disagree; Disagree; Somewhat Disagree; Neither Agree nor Disagree; Somewhat Agree; Agree; Strongly Agree*

20. Have sufficient time for your personal or family life.

21. Have good physical working conditions (good ventilation and lighting, adequate work space, etc.).

22. Have a good working relationship with your direct superior.

23. Have security of employment.

24. Work with people who cooperate well with one another.

25. Be consulted by your direct superior in his/her decisions.

26. Have an opportunity for advancement to higher-level jobs.

27. Have an element of variety and adventure in the job.

In your private life, how important is each of the following to you? (Please mark one answer in each line across)

*Strongly Disagree; Disagree; Somewhat Disagree; Neither Agree nor Disagree; Somewhat Agree; Agree; Strongly Agree*

28. Personal steadiness and stability.

29. Thrift.

30. Persistence (perseverance).

31. Respect for tradition.
Never; Rarely; Sometimes; Quite Often; Very Often
32. How often do you feel nervous or tense at work?
33. How frequently, in your experience, are subordinates afraid to express disagreement with their superiors?

To what extent do you agree or disagree with each of the following statements (please mark one answer in each line across).
Strongly Disagree; Disagree; Somewhat Disagree; Neither Agree nor Disagree; Somewhat Agree; Agree; Strongly Agree
34. Most people can be trusted.
35. One can be a good manager without having precise answers to most questions that subordinates may raise about their work.
36. An organization structure in which certain subordinates have two bosses should be avoided at all costs.
37. Competition between employees usually does more harm than good.
38. A company's or organization's rules should not be broken not even when the employee thinks it is in the company's best interest.
39. When people have failed in life, it is often their own fault.

Demographics and profile items
How old are you? 18-29; 30-39; 40-49; 50-59; 60+
Are you a: Male; Female
Country of residence: USA; Brazil
Occupation: Physician; Physician Assistant; Nurse Practitioner; Medical Student; Medical Resident; Executive; IT; Other

Years of professional experience: 1-5; 6-10; 11-15; 16-20; 20+

REFERENCES


Hendy, J., & Barlow, J. (2012). The role of the organizational champion in achieving health system change, Social Science & Medicine, 74, 348-355.


