The Effects of Culture of Adoption of Telemedicine in Medically Underserved Communities

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Abstract

Within the information systems discipline, three streams have emerged that address the issue of information technology adoption, diffusion and use. The first examines the factors influencing an individual's decision to accept a new technology. The second stream deals with the impact of culture on the development and use of information technology; and the third stream is directed toward the transfer of information technology from one country or context into another. While these three streams have attempted to theorize and empirically explain the factors influencing information technology adoption within a new environment, they have largely been used separately and tested within the context of advanced economies. In this paper we attempt to integrate all three in examining the introduction of telemedicine technology in medically underserved communities. The results suggest that the interaction effects of the factors derived from all theories provide a better explanation of technology introduction in medically underserved communities.

1. Introduction

"...Ever since my eye swelled up, I've gone to church three times a week to pray for a cure. As soon as I'm better I'm going back to thank God. I always knew He would send a way to make me better— I just didn't know that it was going to be from London...but this afternoon I went to London." [1]

This quote is from Anna Mobutsu a 23-year-old farm laborer, who's only experience outside her small African town of Nelspruit was a bus ride a few hours away from her home. Anna is an illiterate single parent with a seven-year-old son and an elderly mother to support on 500 Rands (about US$56) a month. She does not have a television to introduce her to a world beyond her own. Fenster [1] spoke of Anna who had received timely medical attention for an eye disease, all because of a telemedicine initiative between a London-based hospital and a rural medical unit in this small African town. Telemedicine, a healthcare delivery modality where physicians examine patients from distant locations using information technologies (IT), is

an epitome of Anna's experience, as regards to quality healthcare. Essentially, telemedicine is a form of interactive, knowledge-intensive information and communications technology platform that serves the role of mediating medical transactions between non-residents (or remotely located experts) and resident (or local) health services professionals. It could sometimes be as complex as using robotics, such as, in tele-surgery or, as simple as, using text messaging on a mobile phone to transmit medical information between medical personnel at different locations.

Telemedicine highlights the tremendous societal impact that IS research, education and practice can have on people's lives [2]. Globally, many policies have been enacted with strong focus on improving healthcare around the world. In most cases these health policies are implemented with the specific aim of addressing the United Nations (UN) Millennium Development Goals (MDGs). Globally, policy makers have recognized the importance of Information and Communication Technologies (ICTs) as an important enabler of progress towards these goals. The World Summit on the Information Society (WSIS) held in Tunis in 2005, adopted a Plan of Action that urges different stakeholders to contribute actively in harnessing the optimal use of ICTs for achieving the Millennium Development Goals.

The World Health Organization (WHO) has also been assessing the potential of Telemedicine and e-Health applications to strengthen health systems. WHO recognize that adequate use of ICTs has the potential to strengthen the health care industry in many countries as well as significantly improve the quality of health care delivery through avenues such as telemedicine, e-Learning, knowledge management, disease surveillance, response to epidemics, and e-supported resource management. ICTs also have the potential to improve equity by reaching poor populations in medically underserved communities.

Though the potential benefits of ICTs toward improving global healthcare have been established, still the value of an ICT is predicated on it being successfully accepted and implemented by the adopting entity. The context into which the new technology is introduced and adopted also influences the value of the technology to the adopting organization. For the vast number of the lesser-developed nations, ICTs are usually adopted from a foreign entity, and are inserted or made to fit into a local context [2, 6-9] Because of this, factors relating to culture and the efficacy of the technology transfer are expected to have a significant impact on the value derived from the new information technology. Along with the transfer factors affecting the use of the new technology the classical technology acceptance and use

antecedents also influence the value derived from these new technologies.

2. Technology Adoption

In 2003 Venkatesh and others introduced a robust integrative theory, termed the Unified Theory of Acceptance and Use of Technology (UTAUT). Four core determinants of intention and usage—performance expectancy, effort expectancy, social influence and facilitating conditions—and four moderators—gender, age, experience, and voluntariness of use—emerged from the UTAUT model.

In the UTAUT model, Performance Expectancy represents "the degree to which an individual believes that using the system will help him or her to attain gains in job performance" [23]. Originally derived from the ease of use, complexity, and perceived ease of use constructs, Effort Expectancy represents "the degree of ease associated with the use of the system[23]. Based on the UTAUT study, Social Influence is defined as "the degree to which an individual perceives important that others believe he or she should use the new system" (p. 451)

The construct termed Facilitating Conditions originates from the Model of PC Usage and is defined as "objective factors in the environment that observers agree make an act easy to accomplish". Attitude toward the behavior is defined as the individual's positive or negative feelings about performing a behavior. It is determined through an assessment of one's beliefs regarding the consequences arising from a behavior and an evaluation of the desirability of these consequences. Images are the self perception that adopting an innovation could result in enhanced socials status for an individual amongst his/her peers [25]. Result demonstrability is the degree to which prospective users see an innovation as being visible in the adoption [26].

In the UTAUT model, gender, age, experience and voluntariness of use are identified as being key moderators of an individual's decision to accept and use a new information technology. Voluntariness of Use originates from the literature on the diffusion of innovations theory. It provides a set of attributes that could affect an individual's opinion on the innovation, prior to adoption [22, 26]. Moore and Benbasat [26], found that voluntariness of use had a significant impact on the decision to adopt an information technology innovation. Venkatesh and Davis [27] also report that experience impacts adoption.

Past studies have found differences between men and women in their adoption of technology. Men's decisions to use technology are more strongly influenced by their perception of usefulness, while

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women's decisions are based more on perceptions of the technology's ease of use. Women and men differ in their perceptions of, but not their use of, email technology. Further, men and women may view the same mode of communication differently. Past studies also point to age as a factor that influences when and how an individual adopts new technologies. Studies on cyberphobia indicate that age is a key factor in the adoption of technology, with older people tending to exhibit higher phobic levels. Consequently, these individuals tend to adopt new technologies much more slowly than younger users [27].

3. Culture

Many studies have determined that culture has a strong contextual influence on whether and how individuals, organizations, and societies employ ICT [2, 46]. These findings demonstrate that (1) technology diffusion differs across cultures; (2) the technology-diffusion patterns in a given culture are influenced by the culture's beliefs, norms, and values, among other cultural dimensions; and (3) different cultures tend to prefer different technologies. Therefore we expect cultural influences on the individual users to impact their adoption of telemedicine.

Hofstede [28] defines culture as, "collective programming of the mind" (p. 13). Kluckhohn [29] defines culture as consisting "in patterned ways of thinking, feeling and reacting, acquired and transmitted by symbols, constituting the distinctive achievements of human groups, including their embodiments in artifacts; the essential core of culture consists of traditional (i.e., historically derived and selected) ideas and especially their attached values" (p.86). Culture is composed of symbols, heroes, rituals, and values that are learned from the environment. This learning begins at birth, shapes individual values and affects behavior [28, 30, 31]. The extent to which culture affects a person is determined by how much a person is oriented to the dimensions of culture [32] Earlier theorists like Inkles and Livinson [30] found four common internal conflicts that were culturally related. Hofstede [30] found a corresponding relationship among workers at IBM labeling these relationships as power distance, collectivism versus individualism, femininity versus masculinity, and uncertainty avoidance.

In a comprehensive review of research studies on culture within the IS discipline, Leidner and Kayworth [33] identified the core constructs defined for culture and also identified two key themes that relate to culture and its impact on the diffusion, adoption and use of information technology. The first theme addresses the influence of culture on the way individuals choose to use IT. Leidner and Kayworth [34] identify the key constructs in this stream of research to be locus of control, time-orientation, monochronism-polychronism, and context. These constructs derive from studies whose focus is on use of technology after adoption, rather on the ways that culture shapes adoption behavior. For this reason, we do not include these constructs in the model we propose and empirically test in this research.

The second of these two themes concerned itself with the culture's influence on diffusion and adoption of IT. Leidner and Kayworth [33] report that the vast majority of articles in this theme made use of Hofstede's model. For example, nine of the fifteen national level studies that they classified as belonging to this theme operationalized uncertainty avoidance as a construct, seven employed power distance, four used individualism-collectivism, and three used masculinity-femininity. This theme of research provides clear evidence of the connectedness of culture and IS culture research to that on technology acceptance. Despite this, the leading model for technology acceptance—UTAUT—and its predecessors leave out culture as a key antecedent to technology acceptance and use. Leidner and Kayworth [33] thus propose that "studies need to move beyond trying to use cultural values to predict whether or not a group will adopt an IT to understanding the dynamics of adoption". They also note that an important theme emerging from these studies is the idea that groups of technology-users are more likely to accept and use a technology if the values embedded in the technology to be adopted are congruent with or fit the individual and societal/group values that the group holds as endearing to them. This aspect of fit is a key issue in technology transfer studies. As such these observations suggest that there is a close association between technology adoption, culture and technology transfer research concerning the introduction of a technology into a new context. This begs for a broader based technology adoption model that incorporates key culture constructs as well as key technology acceptance and technology transfer constructs.

4. Research Model & Hypothesis

Our proposed model combines well-validated constructs used in a previous study that focused on technology adoption combining the constructs from Technology Acceptance Model (TAM) and Innovation Diffusion Theory (IDT) and the Theory of Planned Behavior (TPB) [2, 14, 15, 26, 27, 38-40]. Thus, based on our review of the literature we adopted the constructs contained in study by Venkatesh and others [23] and tested the same hypotheses contained in that study, in a new context – medically under served communities in SSA.

We extend the model proposed and validated by Venkatesh and others [23] by incorporating cultural constructs into the technology acceptance model. Out intent is to examine both the direct and indirect effects of culture on classical technology acceptance constructs on the behavioral intention to use a new technology (Figure 1)
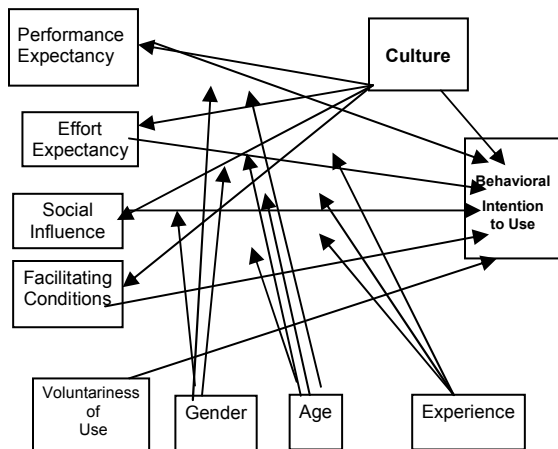

Figure 1
Research Model

Culture is one of the key factors that Venkatesh [23] recommended to be examined in concert with classical technology acceptance antecedents. Therefore our study makes two major contributions: It empirically validates the UTAUT model within a context in which the model has yet to be tested, i.e. technology acceptance in a resource-poor medically underserved environments; and, it also extends the model by factoring in the direct and interactive effects of culture. We then draw inferences relating to technology transfer and the effective management of the introduction of new technologies into such contexts.

For this study, culture is measured according to Hofstede's [30] dimensions; Power vs. Distance, Individualism vs. Collectivism, Masculinity vs. Femininity, and Uncertainty vs. Avoidance.

Technology acceptance is defined as a physician's psychological state with regard to their intention to adopt telemedicine. Because telemedicine in Sub-Saharan Africa is still in the early adoption stage, we targeted both image-based telemedicine practices such as users of radiology services, and patient contact-based telemedicine practices to include a variety of specialties such as radiology, pathology, dermatology, ophthalmology, orthopedics, cardiology, internal medicine, pediatrics, gynecology and psychiatry, to test the following hypotheses:

Direct effects of UTAUT antecedents:

H1: Conventional UTAUT antecedents will influence users' behavioral intention to use telemedicine in medically underserved communities

Direct Effects of Culture:

H2: Culture will have a direct effect on the users' behavioral intention to use telemedicine technology in medically underserved communities.

Indirect Effects of Culture

H3: Culture will influence the individual users' judgments of the UTAUT's antecedents, namely social influence, performance expectancy, effort expectancy and facilitating conditions.

5. Methodology

As previously mentioned, our study used well-validated instruments from two previous studies [23, 28] to develop our survey instrument, using a seven point Likert scale with values ranging from strongly disagree (1) to strongly agree (7). Our instrument included the constructs of ease of use (4 items), perceived usefulness (6 items), compatibility (3 items), image (2 items), self-efficacy (8 items), voluntariness of use (2 items) and behavioral intention to adopt (4). These constructs were adapted from various studies [41]. The anxiety (5 items), social influences (4 items), and facilitating conditions (4 items) constructs were based on the study [39].

The instrument was designed to collect data from two distinct groups of subjects: Prospective users and actual users of telemedicine technology. Prospective users were those individuals familiar with telemedicine technology that had no prior usage experience with the technology but who had an interest in trying out the technology once it was implemented. Actual users were those individuals who are currently using the telemedicine technology. Except for the construct labeled 'behavioral intention to use a new technology' (US), the measures of all constructs in the UTAUT model was the same for both the prospective users and actual users of telemedicine technology in SSA. In the case of behavioral intention to use telemedicine the prospective users were asked if they would use telemedicine technology in the near future once it was implemented. Actual users were asked if they are presently using the technology.

Our survey was administrated to physicians at several hospitals. We selected institutions from each of the following targeted populations (Public Sector, Private Sector, Non-Governments Organizations). These included: (i) a teaching hospital, (ii) a non-teaching hospital (iii) a military hospital, and (iv) a

health post (primary care provider). Also several medical specialty areas were included, such as radiology, pathology, dermatology, ophthalmology, orthopedics, and cardiology, internal medicine, pediatrics, gynecology and psychiatry

A total of 13 institutions were contacted with more than 50 personal visits made to potential candidate organizations. The survey was administrated through departmental or administrative level contacts. The administrator distributed the questionnaires to physicians working within the given healthcare unit. This was followed by telephone calls to the participating institutions that delegated focal persons to collect the surveys from the participants. We administered the surveys to 260 physicians. Out of the 260 surveys distributed, 196 were returned with complete responses. This accounts for a 75% response rate. This high response rate can be attributed to our on-site visits as well as strong government support.

6. Model Testing

Our model was tested using Partial Least Squares (PLS), which is appropriate for testing models that have a well-developed underlying theoretical foundation. We used the Smart PLS software package. By using PLS, we assessed the measurement model as well as the structural model. We tested the model using two different datasets, prospective users (123 subjects) and actual users (73 subjects) of telemedicine technologies.

6. 1 Assessment of the Measurement Model

The measurement model was tested for convergent and discriminant validity. Convergent validity assesses the degree to which items that should be related to a construct are in reality related. This is measured by the rho coefficient, with values equal to or greater than 0.7 normally being kept, with a 0.6 threshold for exploratory research [42]. For the dataset of prospective users, all items had rho coefficients greater than 0.6. The same was true for the actual users' dataset, except that the value for 'Attitude toward Use' was marginal at 0.5485. Therefore the research model satisfied the conditions for convergent validity.

Discriminant validity reflects the degree to which each construct is unique. It is considered satisfactory when the items associated with a construct correlate more highly on their associated construct than with items associated with other constructs in the model. Most constructs satisfied the criterion for discriminant validity. However, a handful of constructs had cases where the square root of the AVE was barely smaller than some correlations. Except for the correlation between Effort Expectancy and Masculinity-

Femininity for prospective users only, the differences are quite minor. Moreover, even in that case, the discriminant validity test never failed for the same variable pairs in both the prospective and actual user datasets; they always passed in one or the other. Considering that the instruments were based on previously validated instruments, we felt confident that the results were satisfactory for us to proceed to assessment of the structural model.

6.2 Assessment of the Structural Model

In PLS, the structural model tests, which entail estimating the path coefficients and the R^2 values, provides the information necessary to assess the hypotheses in a research model. Path coefficients represent the strength of the relationships between dependent and independent variables. These need to be significant and directionally consistent with the hypotheses. The R^2 value represents the amount of variance explained by the independent variables, thereby providing insights into the model's predictive power. The structural model was tested by running the bootstrap resampling method (with 200 resamples) in PLS. The sample sizes of 73 actual users and 123 prospective users respectively were well above the recommended minimum of 40 for model testing [42-45].

6.3 Hypotheses Testing Results

6.3.1 Direct Effects of UTAUT Antecedents on Telemedicine Usage

Because the first objective of this study was to validate the applicability of the UTAUT model within medically underserved communities, we first tested the effects of the independent variables in the UTAUT model, namely performance expectancy (PU), facilitating conditions (FC), effort expectancy (EF) and social influence (SO), on both the attitude toward using a new technology (AT) and the behavioral intention to use the new technology (US). This test was performed for each of the two datasets. Table 1 (A and B) presents the results of this analysis

Table 1A:
Testing of UTAUT Model for Prospective Users of Telemedicine:

Dependent Construct	Independent Construct	Path Coefficient	T-stat and Effect size	
Behavioral Intention To Use a New Technology (US)	**Social Influence (SO)**	**0.1646**	**4.0194**	**Weak effect**
	Facilitating Conditions (FC)	-0.0107	-0.1245	No effect
	Effort Expectancy (EF)	**0.2633**	**1.7156**	**Non-significant strong effect**
	Performance	**0.4487**	**4.2281**	**Strong**

	Expectancy (PU)			effect
	Attitude Toward Use (AT)	-0.0745	-1.5966	No effect

Table 1B:
Testing of UTAUT Model for Actual Users of Telemedicine:

Dependent Construct	Independent Construct	Path Coefficient	T-stat and Effect size	
Behavioral Intention To Use a New Technology (US)	Social Influence (SO)	-0.1408	-1.3185	No effect
	Facilitating Conditions (FC)	**0.3253**	**3.0235**	**Strong effect**
	Effort Expectancy (EF)	**-0.2510**	**-2.2002**	**Strong negative**
	Performance Expectancy (PU)	0.1773	1.2910	No effect
	Attitude Toward Use (AT)	0.1193	0.8848	No effect

In the interpretation of the results, the measure of the size of the effect is primarily the magnitude of the significant path coefficient. First, the t-statistic of the path coefficient must be above 1.98 to be considered statistically significant; that is, to consider that the measured path coefficient is reliable. However, given a significant t-statistic, the actual value of the path coefficient must be at least 0.2 to be considered a strong effect, or at least 0.1 to be considered a weak effect [43, 44].

Concerning the behavioral intention to use a new technology, prospective users indicated that effort expectancy has a strong (though statistically non-significant) effect on their intention to use telemedicine technology. Surprisingly, however, the actual users indicated that effort expectancy had a strong *negative* effect on their behavioral intention. This could be an indication that they found the technology difficult to use.

Social influence (SO) was found to have a weak effect on the prospective users' intentions to use telemedicine technology, but no effect on actual users. Performance Expectancy (PU) was found to have a strong influence on the prospective users' intentions, but no effect on actual users. Facilitating conditions (FC) while having no effect on behavioral intention for prospective users had a strong effect on actual users' intention to continue to use telemedicine. Attitude toward use (AT) had no effect on behavioral intention for either prospective or actual users.

6.3.2 Direct Effects of Culture on Telemedicine Usage

For the second objective of this study, we tested the direct effects of culture on technology acceptance and eventual diffusion within medically underserved communities. The goal here was to examine if culture influences an individual's behavioral intention to use new technology. This test was also performed for each of the two datasets.

With regard to behavioral intention to use a new technology, prospective users indicated that UA had a strong effect and PD had a weak effect on their intention to use telemedicine (Table 2A); however, neither construct had any significant effect for actual users (Table 2B). Neither IC nor MF had any significant effect on either class of users.

Table 2A: Testing of Culture's Direct Influences on Behavioral Intention to use for Prospective Users of Telemedicine

Dependent Construct	Independent Construct	Path Coefficient	T-Value	Effect size
Behavioral Intention To Use a New Technology (US)	*Uncertainty Avoidance (UA)*	**0.8286**	**6.293**	**Strong effect**
	Power Distance (PD)	**0.1033**	**2.4385**	**Weak effect**
	Individuality-Collectivism (IC)	-0.0827	-1.8145	No effect
	Masculinity – Femininity (MF)	0.0606	-2.6505	No effect

Table 2B: Testing of Culture's Direct Influences on Behavioral Intention to Use for Actual Users of Telemedicine

Dependent Construct	Independent Construct	Path Coefficient	T-Value	Effect size
Behavioral Intention To Use a New Technology (US)	Uncertainty Avoidance (UA)	-0.2919	0.1268	No effect
	Power Distance (PD)	0.5620	0.4449	No effect
	Individuality-Collectivism (IC)	0.0089	0.8550	No effect
	Masculinity – Femininity (MF)	-0.1070	-0.3707	No effect

6.3.3 Indirect Effects of Culture on Telemedicine

As a third objective of this study, we tested the indirect effects of culture on technology acceptance and eventual diffusion within medically underserved communities. The goal here was to examine if culture influences the determinants of an individual's behavioral intention to use the new technology within the UTAUT model. In other words, we examined if culture acts as an antecedent to UTAUT. This test was also performed for each of the two datasets.

Among prospective users of telemedicine, we found that the social influence (SO) to use the technology was influenced only by individualism-collectivism (IC). The performance expectancy (PU) was influenced by uncertainty avoidance (UA) and masculinity-femininity (MF). The effort expectancy was influenced by UA and MF. Facilitating conditions

(FC) were influenced only by UA. All the influences that existed were strong (Table 3A).

Among actual users of telemedicine, the only cultural effect we found was that IC strongly influenced SO, as it did with prospective users. There we found no other statistically significant effects (Table 3B)

Table 3A: Testing of Culture's Indirect Influences on Usage Behavior for Prospective Users of Telemedicine in SSA

Dependent Construct	Independent Construct	Path Coefficient	T-Value	Effect size
Social Influence (SO)	Uncertainty Avoidance (UA)	-0.0531	-0.3805	No effect
	Power Distance (PD)	0.0214	0.1651	No effect
	Individuality-Collectivism (IC)	**0.2057**	**2.2352**	**Strong effect**
	Masculinity – Femininity (MF)	0.0466	0.2781	No effect
Performance Expectancy (PU)	**Uncertainty Avoidance (UA)**	**0.5160**	**8.6402**	**Strong effect**
	Power Distance (PD)	-0.0950	-1.7112	No effect
	Individuality-Collectivism (IC)	0.0008	0.0202	No effect
	Masculinity – Femininity (MF)	**0.5169**	**7.2091**	**Strong effect**
Effort Expectancy (EF)	**Uncertainty Avoidance (UA)**	**0.3051**	**5.8696**	**Strong effect**
	Power Distance (PD)	-0.0235	-0.4871	No effect
	Individuality-Collectivism (IC)	-0.0182	-0.5307	No effect
	Masculinity – Femininity (MF)	**0.7173**	**11.4925**	**Strong effect**
Facilitating Conditions (FC)	**Uncertainty Avoidance (UA)**	**0.4741**	**3.9935**	**Strong effect**
	Power Distance (PD)	-0.0690	-0.6253	No effect
	Individuality-Collectivism (IC)	-0.1297	-1.6579	No effect
	Masculinity – Femininity (MF)	0.0909	0.6378	No effect

Table 3B: Testing of Culture's Indirect Influences on Behavioral Intention for Actual Users of Telemedicine

Dependent Construct	Independent Construct	Path Coefficient	T-Value	Effect size
Social Influence (SO)	Uncertainty Avoidance (UA)	-0.1773	-0.5110	No effect
	Power Distance (PD)	0.0176	0.0423	No effect
	Individuality-Collectivism (IC)	**0.3239**	**2.3502**	**Strong effect**
	Masculinity – Femininity (MF)	-0.0844	-0.3682	No effect
Performance Expectancy (PU)	Uncertainty Avoidance (UA)	-0.1818	-0.5035	No effect
	Power Distance (PD)	0.2427	0.5616	No effect
	Individuality-Collectivism (IC)	-0.0782	-0.5455	No effect
	Masculinity – Femininity (MF)	-0.715	-0.3000	No effect
Effort Expectancy (EF)	Uncertainty Avoidance (UA)	-0.1181	-0.3262	No effect
	Power Distance (PD)	0.1547	0.3569	No effect
	Individuality-Collectivism (IC)	-0.0484	-0.3366	No effect
	Masculinity – Femininity (MF)	-0.0426	-0.1783	No effect
Facilitating Conditions (FC)	Uncertainty Avoidance (UA)	-0.2215	-0.6144	No effect
	Power Distance (PD)	0.2902	0.6726	No effect
	Individuality-Collectivism (IC)	-0.0857	-0.5987	No effect
	Masculinity – Femininity (MF)	-0.0785	-0.3298	No effect

7. Discussion of Results

Interesting comparisons can be made in this study of UTAUT in medically underserved communities, More interestingly, when compare the results of this study to the original UTAUT study. In both studies, the relationships were tested between social influence, effort expectancy, and performance expectancy. In the case of UTAUT, these relationships were tested with prospective users of a new technology, not with actual users (their longitudinal study tested subsequent use behavior with these same users). Thus, their findings on these factors are comparable to those in this study for the prospective user dataset.

In both studies, performance expectancy had a strong positive effect on behavioral intention, with high statistical significance. However, in the UTAUT study, considered a preliminary test, effort expectancy and performance expectancy yielded statistically insignificant results with very weak path coefficients; nonetheless, these coefficients were high enough for them to be theoretically retained in the model subject to further research, such as we carry out in this present study. In this study, social influence demonstrated a statistically significant albeit weak effect on behavioral intention. Moreover, although the result of effort expectancy was marginally non-significant, it nonetheless showed a relatively strong path coefficient. Thus, our findings in this study are very consistent with the results of Venkatesh [23] inasmuch as the two studies overlap. The rest of this section discusses our findings in detail with respect to each construct tested.

7.1 Social Influence (SO)

This result indicates that the influences from society or peers are important to a prospective user but diminish in importance once individuals begin to use a new technology and get to know how to work the technology firsthand. Therefore, in managing the

transfer of a new technology to medically underserved communities as exemplified in this study, managers need to concern themselves with diminishing the negative impacts of social expectations while promoting the positive aspects associated with it.

7.2 Facilitating Conditions (FC)

Whereas for prospective users of telemedicine social influence had some effect on their behavioral intentions, the facilitating conditions became the relevant issue for actual users. It seems that prospective users did not appreciate the importance of facilitating conditions in their use and continued use of telemedicine, whereas actual users gave this strong consideration in their behavioral intention, though it did not actually affect their attitude towards using telemedicine. This finding indicates that in managing technology transfer in resource-poor and or medically underserved communities, facilitating conditions should be given high importance for continued use, even though the users might be unlikely to express this concern until they have actually used the technology to some extent.

7.3 Effort Expectancy (EE)

The results of effort expectancy had a strong positive (though statistically non-significant) effect on prospective users' behavioral intention, it had a statistically significant strong *negative* effect on the behavioral intention of actual users.

Perhaps this result reflects that the continued users of telemedicine found that it does in fact require a considerable amount of effort to reap the desired benefits. Thus, those who were willing to commit the requisite amount of effort intended to continue using telemedicine, whereas those who were unwilling to expend such effort did not intend to continue their usage.

7.4 Performance Expectancy (PU)

Performance expectancy had no significant effect on behavioral intention to use telemedicine. This result reflects the need to address concerns relating to the performance of the system to be introduced, and how such performance will impact the overall performance of the individuals that will be expected to use that new system. Failure to do this would more likely lead to failure in the technology transfer initiative or a much slower pace of diffusion of the technology.

7.5 Direct and Indirect Effects of Culture

An interesting finding was that cultural factors affected behavioral intentions only for prospective users, but none for actual users. In general, behavioral

intentions were indirectly affected by various cultural factors through each of the primary UTAUT antecedents for prospective users, but there was no cultural effect on actual users, with the sole exception of social influence, which was strongly affected by individuality-collectivity.

7. 6 Uncertainty Avoidance (UA)

Uncertainty avoidance had a very strong direct effect on prospective users' behavioral intention to use telemedicine, and a strong indirect effect through performance expectancy, effort expectancy, and facilitating conditions. However, it had no effect at all, whether direct or indirect, on actual users of telemedicine.

This might indicate that, contrary to the common perception of the effect of uncertainty avoidance on technology, the effect of uncertainty avoidance on the prospective users in our study was that they had higher assurance of telemedicine's effectiveness because of their perceptions of its relation to higher performance expectancy, effort expectancy, and facilitating conditions. However, actual users' perceptions of the relationship between these indirect factors and uncertainty avoidance might have been adjusted; after using the technology themselves, their attitudes towards use and their behavioral intentions were related neither directly nor indirectly to uncertainty avoidance, but rather to their actual experiences with the technology.

7.7 Power Distance (PD)

Power distance was found to have a weak effect prospective users behavioral intention. This might indicate a slight tendency to defer to the attitudes of superiors among those who perceived power distance to exist. PD had no effect on actual users intention to use the technology. This might indicate that although they were not favorably inclined towards using the technology when they perceive there to be pressure from their superiors, they nonetheless decided to continue using it—or not using it—based on other factors.

7.8 Individualism-Collectivism (IC)

In both prospective and actual users, we found that individualism-collectivism had no significant effect on their behavioral intention to use telemedicine. It was expected that an individual's personal sense of individualism-collectivism would affect their attitudes towards use.

Individualism-collectivism also had a strong effect on both prospective and actual users' perceptions of social influence. This is expected, as an individual's sense of collectivism in society would affect their

perception that society is influencing them to engage in a certain pattern of action. However, it had no effect on the other antecedents in our study.

8. Conclusion

This study has provided empirical testing of some key constructs of the UTAUT model in terms of telemedicine in medically underserved communities, and has demonstrated that the tested parts of the model hold relatively well this context. Of course, this study is not by any means a pure replication of the UTAUT in medically underserved environments, but it does provide a promising first step towards such an endeavor.

In general, what emerges from the results of this study at a very broad level of perspective is that various cultural characteristics are important in the transfer of a new technology to medically underserved and or the SSA context. For one, prior to the introduction of a new technology and before users become acculturated to the technology, culture significantly influences the individuals' intentions to use the prospective new technology. Once the technology is in place and individuals have become familiar with it, culture plays no significant role in the individuals' usage behavior regarding the technology. This study provides a theory for why some implementation programs in such communities may fail after some time. Further studies are needed to compare differences between other cultures and maybe looking into culture as a cause of implementation failure.

9. References

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