UNDERSTANDING HEALTHCARE PROFESSIONALS’ RESISTANCE OF TELEMEDICINE: AN EMPIRICAL STUDY IN ETHIOPIA

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Abstract

Telemedicine has great potential to improve health care in Sub-Saharan Africa. Yet resistance from healthcare professionals could prevent telemedicine’s social value from being materialized. This article intends to understand why users resist the use of telemedicine by investigating antecedents of resistance. A research was developed to propose that user resistance is determined by perceived threat and perceived controllability, which in turn are influenced by reduced autonomy, anxiety, and costs. In addition, we examine how government support can be mobilized to alleviate the inhibiting factors that lead to resistance. A survey on 107 healthcare professionals in Ethiopia provides support to most of the hypotheses.

Keywords: telemedicine, perceived threat, perceived controllability, autonomy, anxiety, costs, government support, resistance
1  INTRODUCTION

Telemedicine refers to the use of telecommunication and information technologies to deliver health care services over distance. By eliminating geographical separations between health providers and recipients, telemedicine can improve access to medical services that are often difficult to have in remote rural regions. Sub-Saharan Africa (SSA) is a vast rural region that has poor healthcare conditions and is short of medical personnel and facilities. The existing medical problems of the SSA are alarming. According to the World Health Organization (WHO), about 28.1 million HIV/AIDS carriers, or more than 70% of the worldwide HIV/AIDS population, are in the SSA (Meso et al., 2009). As a matter of fact, the SSA carries 25% of the global burden of disease; yet, it only possesses 1.3% of the world’s health workforce (Nullis-Kapp, 2005). The doctor-to-population ratios in SSA countries range from 1:5000 to 1:30000, which is significantly lower than the average ratio of 1:1400 in other developing countries and 1:300 in developed countries (Meso et al., 2009). The shortage of health care professionals and the rampage of diseases together lead to huge health disparities between the SSA and the rest of the world. Telemedicine is a highly promising technology that can be applied to reduce the SSA health disparities and improve medical conditions of the underserved SSA communities.

Despite its potential in improving access to health care, telemedicine’s impact has been limited, because few health care systems are able to employ telemedicine as a regular approach to delivering routine medical services (WHO, 2010). Telemedicine pilot projects usually suffer from economic sustainability issues after depleting the initial seed funding (Wootton, 2008). Besides economical and technological concerns, a frequently cited challenge for the survival of telemedicine is that complex human and social factors hinder the diffusion of telemedicine services (WHO, 2010). Given that telemedicine represents a novel service model that differs from the familiar traditional face-to-face approaches, it is not uncommon for health care professionals and patients to find the idea difficult to embrace. The medical literature suggests that health care professionals have negative attitude towards telemedicine due to fear of handling computers, anxiety that telemedicine will reduce their job security, apprehension that the return on investment for telemedicine is low, and concern that the physician-patient communications will be ineffective (Bagchi, 2006). Physicians are also concerned that the implementation of telemedicine technologies may alter current work practices, challenge physician referral methods, or interrupt workflow (Kifle et al., 2006). These negative perceptions and concerns about telemedicine tend to give health care providers an impression that telemedicine is threatening rather than beneficial, which leads to resistance of telemedicine adoption. Therefore, understanding why health care professionals resist adopting telemedicine will help to enhance appropriate and meaningful uptake of telemedicine systems in low-income settings.

User resistance has consistently been identified as a major obstacle to the success of IS implementations (Kim & Kankanahalli, 2009; Lapointe & Beaudry, 2014). It has been reported to be the first-ranked challenge for the implementation of large-scale systems, and is widespread in the early system implementation stage when the system is first being introduced (M Lynne Markus, 2004). User resistance is particularly serious in healthcare settings in which healthcare professionals are characterized by high professional autonomy and not easily persuaded by people outside their profession (Bhattacherjee & Hikmet, 2007; Lapointe & Rivard, 2005; Liang et al., 2010). Both qualitative and quantitative studies suggest that physician resistance is one of the top barriers to implement clinical information systems (Poon et al., 2004). Telemedicine, as an innovative approach to delivering care enabled by IT, is new to healthcare professionals in Sub-African countries and will likely encounter resistance. Given that telemedicine carries great social values to Sub-African people, it is important to understand why healthcare professionals tend to resist the use of telemedicine. However, prior research on telemedicine use is predominantly focused on physician adoption of telemedicine (Chau, 2001; Chau & Hu, 2002a,
2002b; Hu et al., 1999), and existing knowledge about healthcare professionals’ resistance of telemedicine is scant. There is a lack of theory-driven quantitative research that delineates what antecedents lead to resistance and in what way. This research attempts to fill this gap in the literature.

The objective of this study is to understand why Sub-African healthcare professionals resist the use of telemedicine. Based on technology threat avoidance theory (TTAT) (Liang & Xue, 2009), we propose that perceived threat and perceived controllability are two salient perceptions determining resistance and identify a set of antecedents that influence these two perceptions. We tested the model using data collected from 107 healthcare professionals in Ethiopia and found support to most of the hypotheses.

\[ \text{Figure 1. Research model} \]

2 THEORETICAL FOUNDATION

Our research model is based on TTAT (Liang & Xue, 2009, 2010) which is rooted in coping theory from social psychology (Lazarus & Folkman, 1984). TTAT posits that IT is a two-sided sword that could bring both benefits and losses to individuals and resistance behaviors arise from cognitive appraisals of the situation (Liang & Xue, 2009). Specifically, when an innovative IT such as telemedicine is introduced, a stressful situation is created for the users. To cope with this situation, a user goes through two stages: cognitive appraisal and coping. During cognitive appraisal, he or she determines whether the IT impacts his or her well-being, and if so, how (Folkman et al., 1986). This process can be further divided into primary appraisal, which decides what may be at stake, and secondary appraisal, which determines what can be done to prevent or reduce harm or improve benefits. In the case of telemedicine, the primary appraisal gives rise to perceived threat, defined as the extent to which a user believes that telemedicine harms his or her personal well-being or benefits despite its value in improving medical care delivery, and the secondary appraisal leads to perceived controllability, defined as the extent to which a user believes that he or she has the ability and resources to deal with the use of telemedicine. Although other IS scholars suggest that the primary appraisal engenders both perceived threat and perceived opportunity (Beaudry & Pinsonneault, 2005), research has shown that perceived opportunity only influences adaptive coping and perceived threat only affects maladaptive coping (Bala & Venkatesh, Forthcoming). Given that in this research we focus on telemedicine resistance, which is a maladaptive behavior, we stress the effect of perceived threat while consider perceived opportunity as a control variable. The appraisals form the basis of coping, which refers to the user’s cognitive and behavioral efforts to manage (reduce, minimize, master, or tolerate) the stressful situation. Coping is essentially an adaptation behavior which allows users to adjust to the introduced IT in various ways. Adaptation could be adaptive or maladaptive.
based on whether it positively affects users’ performance (Beaudry & Pinsonneault, 2005). Resistance is a maladaptive behavior users take to adapt to telemedicine, in that it does not allow users to leverage telemedicine to improve their capability of delivering medical care. Our model suggests that when users perceive telemedicine to be a threat, they are likely to resist its usage. In contrast, when users perceive that they can control the situation related to telemedicine usage, they are unlikely to resist it.

3 HYPOTHESIS DEVELOPMENT

Piderit (2000) noted that individuals use the potential negative consequences of the target of resistance as the basis for their resistant attitudes or acts of dissent or protest. People refuse to adopt change if they expect it to cause losses of control, resources, or emotional stability which are all lead to the perception of threat (Beaudry & Pinsonneault, 2005; Liang & Xue, 2009). The early study of Markus (1983) finds that accountants’ resistance toward a new financial system was propelled by their expected loss of control over critical data and consequent loss of organizational power. The new system was perceived by accountants as a threat, which led to the eventual implementation failure. Kim and Kankanhalli (2009) suggest that users prefer to maintain status quo when facing changes and will resist using a system if it threatens status quo. Physicians have long been known for being laggards in terms of IT adoption. When studying physician resistance of clinical information systems, Lapointe and Rivard (2005) observes that physicians make projections about the consequences of the use of a new system and resistance behaviors will result if expected conditions are threatening. Bhattacherjee and Hikmet (2007) confirm that physicians’ threat perception of health information technology is a strong predictor of their resistance to change. Based on these previous findings, we hypothesize that if healthcare professionals perceive telemedicine as a threat causing losses to them, they will resist adopting telemedicine.

H1a: Perceived threat is positively associated with resistance

Perceived controllability is concerned with whether an individual believes that the change associated with telemedicine use is under the command of the individual. Perceived controllability over change is expected to play a central role in determining humans’ self regulated behaviors (Bandura, 2001). When the contingencies in the environment are interpreted to be controllable, individuals tend to respond by mobilizing necessary motivational and cognitive resources to adapt to the required changes (Martocchio & Dulebohn, 1994). Users with a high level of controllability perception tend to view the difficulties in telemedicine use to be under their personal control and thus face the change confidently. On the contrary, users with a low level of controllability perception will be discouraged by the difficulties and may be more inclined to resist the change. Perceived controllability has significant conceptual similarities with other constructs such as perceived behavioral control, self-efficacy, and facilitating conditions (Venkatesh et al., 2003). Strong evidence has emerged from research along the line of theory of planned behavior to show that perceived behavioral control can make individuals more motivated to perform the target behavior (Ajzen, 1991). It is also found that facilitating conditions, which enhances the feeling of controllability, is positively associated with physicians’ use of electronic medical records (Liang et al., 2010). Bala and Venkatesh (Forthcoming) demonstrate that perceived controllability can reduce users’ avoidance of enterprise systems. All of the above evidence suggests that the more people feel in control, the less likely they will resist using telemedicine. Therefore, we propose that as perceived controllability increases, the level of user resistance will decrease.

H1b: Perceived controllability is negatively associated with resistance

Because health care professionals possess specialized expertise and knowledge in the field, one characteristic that distinguishes them from other individuals is the high autonomy in performing their professional tasks (Liang et al., 2010; Sharma, 1997; Wallace, 1995). Professional autonomy is the right of individuals to make independent decisions concerning their work-related tasks and activities. It
generally refers to professionals' control over the conditions, processes, procedures, or content of their work according to their individual or collective judgment in the application of their knowledge and expertise (Walter & Lopez, 2008). For example, a physician has full authority to decide how to deliver medical care to a patient without the uninvited outside influence (Mirvis, 1993). Physicians traditionally form a close-knit social network that views external attempts to exerting controls as a challenge to its autonomy (Edwards et al., 2002). Many privileges emanate from professional autonomy. First, professionals have more access to critical resources than non-professionals. Second, professionals have control over the tasks performed by supporting staff so that these staff’s work is peripheral to their professional activities (Walter & Lopez, 2008). In the context of telemedicine, a physician’s access to resources and control over others’ work are both constrained, because telemedicine services require fewer resources deployed on the local site and many work activities take place on the remote site which is out of the local physician’s reach. In addition, telemedicine implies that the physician would submit to his or her peer’s diagnosis and treatment decisions. These changes brought forth by telemedicine tend to reduce healthcare professionals’ autonomy and undermine their privileges. After evaluating these losses, healthcare professionals are likely to perceive telemedicine as a threat.

H2a: Reduced autonomy is positively associated with perceived threat

The impact of anxiety on users’ attitude towards IT has been extensively documented in IS journals (Brown et al., 2004; Hackbarth et al., 2003; Igbria & Parasuraman, 1989; Thatcher & Perrewe, 2002). Anxiety can be categorized as trait anxiety and state anxiety that is situation specific (e.g. computer/system anxiety, application specific anxiety). Trait Anxiety reflects a chronic and generalized predisposition to be anxious and nervous, while state anxiety is triggered in a situation in which an individual is confronted with problems or challenges (Igbria & Parasuraman, 1989; Thatcher & Perrewe, 2002). In this study, we focus on state anxiety that is invoked by the introduction of telemedicine. Researchers have shown that computer systems could lead to anxiety involving apprehension or fear an individual experiences when faced with the possibility of using an IS (Hackbarth et al., 2003). In our case, physicians tend to have anxious or emotional reactions (e.g. being fearful, nervous, or intimated) when they are requested to use telemedicine. Physicians high in anxiety will have negative attitudes toward telemedicine, and cause their resistance of using telemedicine. Venkatesh et al. (2003) suggested that anxiety does not have a direct effect on individual’s system use intention; rather its impact is indirect. Similarly, we propose the impact of anxiety on physician’s resistance of telemedicine is also indirect. Such impact is mediated via two intervening variables: perceived threat and perceived controllability. When users suffer from anxiety, they are scared and worry about possible harmful consequences caused by telemedicine, giving rise to a perception of threat. In addition, the feeling of anxiety makes users feel vulnerable and powerless, which reduces their self-efficacy and perception of being in control (Thatcher & Perrewe, 2002).

H2b: Anxiety is positively associated with perceived threat

H3a: Anxiety is negatively associated with perceived controllability

Previous research suggests that net inequity, greater costs than benefits (Keen, 1981; M L Markus, 1983), or negative outcome expectations (Martinko et al., 1996) as reasons for user resistance. From the rational decision making perspective, two different types of costs, transition costs and uncertainty costs are identified in the literature causing user resistance prior to a new IS implementation (Kim & Kankanhalli, 2009). Transition costs occur when users try to adapt to the new environment. Such costs include transient costs which occur during the change and permanent costs that are as results of the change (Samuelson & Zeckhauser, 1988). In the telemedicine context, healthcare professionals are required to spend time and efforts in learning the new system and they may face loss of work due to the implementation of telemedicine system. Meanwhile, switching to a new IS environment can lead the psychological uncertainty or perception of risk associated with the new alternative. These are called
uncertainty costs. In our study, both transition and uncertainty costs could result from the use of telemedicine and they contribute to a perception of personal loss. When costs are high, users tend to believe that telemedicine is detrimental, thus increasing perceived threat. In the meantime, high costs could exceed users’ capabilities and resources. As a result, users are likely to be overwhelmed by the costs and feel a diminished control over the situation.

H2c: Cost is positively associated with perceived threat
H3b: Cost is negatively associated with perceived controllability

Governments exert important institutional influences on adoption of innovative technologies (Liang et al., 2007). Government support has been identified as a critical factor in the success of telemedicine (Pal et al., 2005; Tierney et al., 2010; WHO, 2010). The support from government includes several aspects. First, policy makers can enact laws and regulations to afford telemedicine a legal status in the practice. The legitimization of telemedicine can also lead to the acceptance from insurance companies. Once telemedicine becomes a legitimate practice, healthcare professionals’ concerns about legal disputes and return on investments will be alleviated. Second, the government can establish infrastructures and provide various funding support and incentives to stimulate the use of telemedicine. The telecommunication services, power and other major infrastructures of most developing countries are monopolized by government agencies. Therefore, the government has a crucial role in updating, regulating and standardizing the infrastructure and equipments needed for telemedicine. In poor developing countries, the government needs to directly fund or find international sponsors to fund telemedicine facilities to embark on telemedicine initiatives. The government could also offer financial incentives to IT adopters, like what the United States did to promote meaningful use of electronic health records. This can significantly reduce healthcare professionals’ concern about cost of adopting telemedicine. Third, the government can provide institutional support for healthcare professionals. For example, the government can implement operational standards and protocols for telemedicine practices so that the role of telemedicine in clinical decisions is clearly defined and effective communications can be achieved between healthcare professionals in the use of telemedicine. The government can also raise healthcare professionals’ awareness of telemedicine by providing educational programs and disseminating exemplar telemedicine success stories. These governmental initiatives can help healthcare professionals gain an in-depth understanding of telemedicine which defeats their fear of losing job autonomy. Therefore, we hypothesize that government support is able to lessen healthcare professionals’ concerns about reduced autonomy, anxiety, and perceived cost.

H4a: Government support is negatively associated with reduced autonomy
H4b: Government support is negatively associated with anxiety
H4c: Government support is negatively associated with perceived cost

Support from the government not only directly alleviates healthcare professionals’ concerns about IT adoption, but also plays a relatively obscure moderating role. When considering how to cope with the introduction of telemedicine, healthcare professionals appraise both positive and negative consequences of telemedicine, but the threatening negative consequences will loom larger and have a strong impact on their resistance behavior. By providing various supports, the government can legitimize the use of telemedicine and focus the media attention on the benefits of telemedicine. The negative consequences related to telemedicine are deemphasized and become relatively more tolerable to healthcare professionals. When deciding whether to resist telemedicine, perceived threat will be assigned a lower decision weight. Therefore, government support acts as a moderating variable that weakens the relationship between perceived threat and resistance.

H5a: Government support moderates the relationship between perceived threat and resistance, so that the relationship is weaker when government support is high.
On the other hand, government support helps to nurture an innovation-friendly environment in which innovative behaviors are encouraged and competence is desirable. Norm can be developed in this environment that one should be autonomous and take controls when trying innovations. The perception of controllability is consistent with this norm. As a result, a healthcare professional who feels that he is able to control the use of telemedicine will be more motivated to adopt telemedicine. In contrast, in the absence of government support, the norm that favors innovation adoption is weak or missing. Although individuals’ perception of controllability can still reduce resistance of telemedicine, its effect could be diluted by other concerns. Therefore, the relationship between perceived controllability and resistance is expected to be stronger when government support is high than when it is low. This logic is consistent with person-environment fit research, suggesting that individuals whose traits match well with the external environment will perform better than those whose traits mismatch with the environment.

H5b: Government support moderates the relationship between perceived controllability and resistance, so that the relationship is stronger when government support is high.

4 METHODOLOGY

4.1 Research Context

Located in Eastern Africa, Ethiopia has an area of 1.1 million square kilometers. The population of Ethiopia is about 93.8 million. The rural population is about 83%. The life expectancy at birth is 56.5 years. The present health care facility and manpower available in the sector is far from satisfactory. For example, the ratio of health centers to citizens is 1:222,850 (compared to the Ministry of Health standard of 1:25,000), and the ratio of physicians to citizens is 1:38,619 (compared to the World Health Organization standard of 1:10,000) (Solomon et al., 2004). The government, foreign alliances and universities have to contribute to improving the existing facilities and personnel. The Ethiopian government has recognized the need to strengthen national capacities to address telemedicine issues, and has worked on policy and strategy, capacity building, and education in the health sector (Solomon et al., 2004). All concerned stakeholders universities, the telecommunication authority, the ministry of health, and other institutions and policy makers have committed themselves to support telemedicine implementations. Most of the existing health care institutions and other infrastructure (such as telecommunications and electricity) are owned and controlled by the government, and their use requires the permission and co-operation of concerned authorities.

4.2 Measurement Development

Except government support, all of the measurements are adapted from validated scales in previous studies. Specifically, resistance was assessed with items from Bhattacherjee and Hikmet (2007). The items for perceived threat and perceived controllability were adapted from Major et al. (1998). The items for costs were obtained from Kim and Kankanhalli (2009). Anxiety was measured by a scale from Venkatesh et al. (2003). Reduced autonomy was measured by items adapted from Walter and Lopez (2008). The items for government support were self-developed because there are no existing measures available. All of the items (Appendix A) were rated by a 5-point Likert scale where 1 means “strongly disagree” and 5 means “strongly agree.” The measures were pre-tested with 10 physicians in Ethiopia to ensure face validity.

4.3 Data Collection

A paper-based questionnaire was used to collect data. Data were collected from 107 healthcare professional during summer 2010 in Ethiopia. Among these respondents, 61 respondents are under 35 (57.0%); 30 are between 35-45 ages old (28.0%); 13 are between 46-55 ages old (12.2%), 3 are over 55
years old (2.8%). A total of 69 respondents are male (64.5%). Their professions include nurse (N=45, 42.1%), health officer (N=4, 3.7%), primary physician (N=11, 10.3%), and specialist (N=47, 43.9%).

5 RESULTS

5.1 Measurement Evaluating

SmartPLS was used for subsequent data analysis (Ringle et al., 2005). Before testing hypotheses, we evaluated validity and reliability of the construct measures. Following Gefen et al. (2000), validity of the measures was tested using two procedures. First, we calculated each construct’s average variance extracted (AVE) and the binary correlations between each construct pair. As Table 1 shows, the square root of each construct’s AVE is much greater than the construct’s correlations with all other constructs, suggesting sufficient discriminant validity. Second, factor loadings and cross loadings are calculated for all the constructs. As Appendix B shows, the loading of each item on its substantive construct is at least .78, suggesting sufficient convergent validity. In addition, each item’s factor loading is much higher than its cross-loadings on other constructs, confirming the sufficiency of discriminant validity (Hair et al., 1998). Reliability of the measurements was examined by computing composite reliability. As Table 1 shows, all reliability scores exceed Nunnally’s (1978) recommended cut-off of .70.

The eight latent constructs were measured by respondents’ self-reports. Thus, common method variance (CMV) might introduce bias into our data analysis. We assessed CMV by performing the Harman’s one-factor test. An exploratory factor analysis was conducted and the factor solution was inspected (Podsakoff et al., 2003; Podsakoff & Organ, 1986). Large common method variance is present when a single factor emerges or one general factor accounts for most of the covariance among the measures. An eight-factor solution explained 81.96% of the data variance. The largest variance explained by a factor was only 12.67% and the smallest variance explained by a factor was 7.99%, suggesting that CMV is not a serious concern.

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<td>AX</td>
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<td>CON</td>
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Note: R = composite reliability; GS = government support; RA = reduced autonomy; AX = anxiety; COS = cost; TH = threat; CON = controllability; RE = resistance; PU = perceived usefulness. Square roots of AVE are in bold and on diagonal cells.

Table 1. Reliability, average variance extracted, and correlations
5.2 Hypothesis Testing

The results of model testing are shown in Figure 2. First, about 38% of variance in resistance is explained by the model. Perceived threat ($b = 0.33$, $p < 0.01$) is positively related to resistance, while perceived controllability ($b = -0.12$, $p < 0.05$) is negatively related. Therefore, we find support for H1a and H1b. Second, about 40% of variance in perceived threat is explained. All of the three antecedents, reduced autonomy ($b = 0.24$, $p < 0.01$), anxiety ($b = 0.37$, $p < 0.01$), and cost ($b = 0.32$, $p < 0.01$), have a significant positive effect on threat, which provides support to H2a, H2b, and H2c. Third, about 23% of variance in perceived controllability is explained by the model. Both anxiety ($b = -0.26$, $p < 0.05$) and cost ($b = -0.35$, $p < 0.01$) are negatively associated with controllability, supporting H3a and H3b. Finally, the influence of government support is revealed. While it is shown to reduce anxiety ($b = -0.29$, $p < 0.05$) and cost ($b = -0.25$, $p < 0.01$), it has no significant effect on reduced autonomy ($b = -0.04$, $p > 0.05$). Thus, we find support for H4b and H4c, but not for H4a.

Government support negatively moderates the positive relationship between perceived threat and resistance so that the relationship is weaker when government support is high ($b = -0.35$, $p < 0.05$). It also negatively moderates the negative relationship between perceived controllability and resistance so that the relationship is stronger (i.e., the absolute value of the decreased negative coefficient is greater) when government support is high ($b = -0.20$, $p < 0.05$). We also calculated the effect size of each moderation effect (Chin et al., 2003). The effect size is medium for the first moderation ($f^2 = 0.13$) and small for the second moderation ($f^2 = 0.03$) (Cohen, 1988).

In addition, the effects of perceived usefulness, age, and gender on resistance are controlled. Perceived usefulness is found to have a significant influence on resistance ($b = -0.19$, $p < 0.05$), whereas age and gender do not have significant relationships with resistance. Overall, our statistical tests provide strong empirical evidence for the research model. Except H4a, all of the hypotheses are supported.

6 DISCUSSION

This research finds that resistance to telemedicine among Ethiopian healthcare professionals can be explained by their perceived threat and controllability over telemedicine use. When they feel that
telemedicine causes negative consequences and harm their autonomy, their threat perception will be heightened and resistance will likely occur. In contrast, a sense of controllability will reduce the possibility of user resistance. When users have sufficient capabilities and resources to cope with telemedicine use and its consequences, they are unlikely to engage in resistance behaviors.

6.1 Implications to Research

This paper makes several contributions to IS research. First, it shows that user resistance can be satisfactorily explained from a threat control perspective suggested by TTAT. We tested a baseline model with resistance being predicted by only perceived threat and perceived controllability, and the variance explained is 44%. This suggests that a concise yet powerful theoretical model for explaining user resistance. Second, it demonstrates that TTAT could be adapted to explain technology induced threats outside of the IT security context. Although TTAT is originally developed to account for users’ avoidance of IT security threats such as malware and cyber crimes, we find that its basic theoretical underpinnings rooted in coping theory are also applicable in contexts involving threats induced by IT intended to improve user performance. Third, we identify three constructs as sources of resistance, namely reduced autonomy, anxiety, and costs. Although these constructs have been found to negatively affect IT adoption or usage and it is not much a contribution to confirm their negative effects, we embed them in our theoretical framework and empirically show that they indeed increase perceived threat and reduce perceived controllability. Fourth, we studied a new construct, government support, which has particular importance in African countries that lack resources. We find that government support not only directly reduces anxiety and costs, but also play significant moderating roles. It weakens the positive effect of perceived threat, while strengthens the negative effect of perceived controllability on resistance. These moderation effects provide a more nuanced understanding of how government can facilitate the implementation of IT.

6.2 Implications to Practice

This study also has practical implications for developing countries which plan to implement IT of extensive social value such as telemedicine. When a technology provides more value to the broad society than the users, users tend to miss the big picture and feel a threat to their personal benefits. In this situation, the governments should act actively to provide resources, develop infrastructures, establish policies, and develop educational programs to eliminate sources of perceived threat. However, we find that government support cannot alleviate the concern for reduced autonomy. This suggests that government support alone is not likely to address all sources of user resistance. Other intervention approaches are required to lessen healthcare professionals’ fear of autonomy loss.

6.3 Limitations

Several limitations should be noted. First, we only study three inhibiting factors as sources of perceived threat. The selection of these factors was based on our interviews with Ethiopian physicians. We tried to identify the most salient factors rather than include a complete list of all possible influencing factors. Future research could look into other factors and examine how they can explain additional variance in perceived threat and perceived controllability. Second, this study was conducted in Ethiopia and the findings could be constrained by the national context. Caution should be taken when generalizing the findings to other SSA countries. Finally, our survey data is cross-sectional and collected from a single source. Common method bias is a concern. Future research can apply a longitudinal design or collect data from multiple sources to validate our findings.
References


APPENDIX A. SURVEY INSTRUMENT

Government support
1. The local government allocated adequate funding to support telemedicine.
2. The local government encourages the use of telemedicine.
3. The local government enacted policies to approve the use of telemedicine.
4. Telemedicine is a legitimate medical practice in my region.

Reduced autonomy
1. Using telemedicine may decrease my control over clinical decisions.
2. Using telemedicine may decrease my professional discretion over patient care decisions.
3. Using telemedicine can decrease my control over each step of the patient care process.
4. Using telemedicine may increase monitoring of my diagnostic and therapeutic decisions by non-providers.

Perceived Threat
1. I am worried that using telemedicine will negatively affect me.
2. I am scared that telemedicine will have harmful (or bad) consequences for me.
3. I feel stressed about using telemedicine.

Perceived Controllability
1. I will be able to overcome any problems I might have from using telemedicine.
2. I will be able to cope well with the use of telemedicine.
3. I have the resources I need to successfully use telemedicine.

Anxiety
1. I feel apprehensive about using telemedicine
2. I hesitate to use telemedicine for fear of liability issues.
3. Telemedicine is somewhat intimidating to me

Cost
1. It takes a lot of time and effort to use telemedicine.
2. Using telemedicine could result in unexpected hassles
3. I would lose a lot in my work to use telemedicine

Resistance
1. I don’t want telemedicine to change the way I make clinical decisions
2. I don’t want telemedicine to change the way I interact with other people on my job
3. Overall, I don’t want telemedicine to change the way I currently work.

Perceived usefulness
1. Using telemedicine can improve my patient care
2. Using telemedicine can enhance my effectiveness in patient care
3. Telemedicine makes it easier to diagnose difficult cases
4. I find telemedicine useful in my job
## APPENDIX B. LOADINGS AND CROSS-LOADINGS

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Note: GS = government support; RA = reduced autonomy; AX = anxiety; COS = cost; TH = threat; CON = controllability; RE = resistance; PU = perceived usefulness.