Formulating a Success Model for Teleconsultation Implementation in Health Care Organizations through the Integration of Users and Organisational Perspectives

Ramli R¹, and Ali N²
¹Universiti Tenaga Nasional, rohaini@uniten.edu.my
²Universiti Tenaga Nasional, shikin@uniten.edu.my

ABSTRACT
The success of teleconsultation requires the willingness of medical practitioners to share knowledge via the system. Previous studies have emphasized the importance of organisational issues in addition to technical issues for successful knowledge sharing through Knowledge Management Systems (KMS) (i.e. teleconsultation); however, empirical evidence is limited. Furthermore, few studies have integrated system and organisational issues simultaneously in a comprehensive framework and empirically tested its applicability in healthcare context. This study will provide insights on the factors that may influence the success of teleconsultation and thus, can be used as a guideline for a policy development by the national health care administration to design and develop telemedicine services for public health care providers. The survey, using questionnaire will be conducted to medical practitioners in community clinics in the rural areas and the hospitals in the cities.

Keywords: Teleconsultation, Success Model, Knowledge Management System, Technology Acceptance

I. INTRODUCTION
Healthcare organizations are a special type of organization, largely manned by practitioners with very specialized knowledge and functions in mono-disciplinary communities of practice (Nicolini, Powell, Conville, and Martinez-Solano, 2007). In acknowledging the highly distributed nature of healthcare medical knowledge and in catering for the current demands for online dissemination of knowledge among medical practitioners, it has been evident that health care organizations are embracing the adaptation and implementation of Knowledge Management technologies (Ali, Tretiakov, and Whiddett, 2009). Examples of KMS technologies implemented are portal for nurses (Hsia, Lin, Wu and Tsai, 2006), telemedicine with Knowledge Management capabilities (Paul, 2006), the intranet/internet (Koumpouros, Nicolosi, and Martinez-Selles, 2006) and decision support systems with Knowledge Management (Bose, 2003).

One of the most emerging telemedicine applications, which can be categorised as KMS is teleconsultation. From the perspectives of knowledge management, teleconsultation works as a powerful communication and knowledge sharing tool between health care providers (Maarop, Win, Masrom, and Singh, 2011; Singh, 2011; Zanaboni and Woonton, 2009). Mirroring the common practice of referral between medical practitioners, the general practitioners at the community clinics are given access to the specialists and second opinion services while providing health care for patients, through the use of telecommunication technology. This ability has served tremendously in reducing physical referral from primary health care centres to hospitals, hence promoting better utilization of physical resources at the hospitals (Maarop, Win, Masrom, and Singh, 2011; Singh, 2011). Teleconsultation can also work between doctors and patients to provide faster and more convenient quick check (Zanaboni et al., 2009). However, this study will focus only on the medical practitioners.

II. PROBLEM STATEMENT
Primary and Secondary Health Care providers being reluctant to make a full use of teleconsultation services has led to the underutilization of Knowledge Management Systems (KMS) in healthcare organizations (Maarop, et al., 2011). There have been stories
of failure of Knowledge Management initiatives due to the reluctance of employees to use the systems (Ali et al., 2009; Kankanhalli, Tan, and Wei, 2005; Barth, 2000; O’Dell and Grayson, 1998). It has been established that the reason teleconsultation being underutilized is attributed to the lack of knowledge about the meaning of telemedicine and its importance and the lack of time to adopt telemedicine (El-Mahalli, El-Khaffif, and Al-Qahtani, 2012). Practitioners also feel telemedicine implementation interferes with their traditional routines (Hu and Chau, 2002) hence more hours are added onto their workload. In addition, Singh (2011) has asserted the importance of organization’s change management to ensure the success of teleconsultation implementation among the medical practitioners by stating “if the role of teleconsultation is not specified in job scope, the ability to devote time for it will be hindered”.

III. RESEARCH OBJECTIVES
This study is looking into how teleconsultation can be successfully implemented in health care organizations by focusing on two research dimensions, both from the context of health care services:

1. Overcoming the user acceptance issues, by understanding the users’ attitudes and acceptance towards new technology. Unless the doctors are willing to share their knowledge through these systems, teleconsultation cannot be successful and the transfer of knowledge will not happen.

2. Overcoming the organizational and system issues, by understanding the technical factors contributing to the success of Knowledge Management Systems implementation in organization.

This research will focus specifically on factors that can influence medical practitioners’ motivation to share knowledge and thus, use the system to share their knowledge. Researchers examined many variables believed to affect an individual’s knowledge sharing behavior (Ali et al., 2009). Several studies have adopted social psychological approaches in their attempts to understand the behaviour of knowledge contributors (Bock, Zmud, Kim and Lee, 2005; He and Wei, 2009; He, Qiao and Wei, 2009; Kankanhalli et al., 2005; Ryu, Ho and Han, 2003), while other studies focused on organizational issues such as culture (Alavi, Kayworth and Leidner, 2005; Park, Ribier and Schulte, 2004), and leadership and incentives (Kulkarni, Ravindran, and Freeze, 2007) as determinants of KMS in organization. Money (2004) investigated the applicability of Technology Acceptance Model (TAM) by Davis (1986) to user acceptance of KMS and found that TAM can be useful to serve as a basis for investigation of KMS acceptance. He recommended that for future investigation of KMS acceptance using TAM, social and organizational issues should be considered.

Although many studies have expressed their concern on the importance of organisational issues in addition to technical issues for successful KMS, there is still little empirical evidence that addresses both technical and organisational issues in an integrated model specifically in healthcare context. It is the objective of this study to address both technical and organisational issues in an integrated model and empirically test its applicability.

To investigate the determinants of successful implementation of teleconsultation, an integrated success model will be developed and tested; this model puts together both human’s psychometric measures and attitudes towards technology with the organizational factors in the deployment of teleconsultation in community clinics and secondary health care providers (hospitals).

IV. RESEARCH CONSTRUCTS AND PROPOSED MODEL
In looking after users’ acceptance towards the newly introduced technology, the Technology Acceptance Model (TAM), originated by Davis in 1985 (Chuttur, 2009), appears to be the most promising. TAM is an intention-based model developed specifically for explaining and/or predicting user acceptance of computer technology. TAM has been used as the theoretical basis for many empirical studies of user technology acceptance/adoptions and has accumulated ample empirical support and findings, which suggest that TAM is most appropriate for examining technology acceptance by individual professionals. From the perspectives of telemedicine, the TAM has been applied to explain medical practitioners’ decisions to accept telemedicine whereby
Perceived Ease of Use and Perceived Usefulness have been identified as important predictors of adoption by users (Zanaboni et al., 2009).

Taking into consideration the fact that users’ attitude towards technology is also largely influenced by organisation’s culture, the KMS success model by Kulkarni et al. (2007) is selected to be investigated and to be integrated with TAM. Kulkarni et al.’s KMS success model is chosen as it offers an extension to the DeLone and McLean’s (1992) Information Systems (IS) Success Model which had gained strong theoretical and empirical support, and had been widely accepted by most IS researchers in the study of information systems success (Ali et al., 2009). Furthermore, Kulkarni et al. (2007) proposed an extension of the DeLone and McLean’s IS Success Model to include organizational support: leadership, and incentives. Since teleconsultation is a form of KMS, the organizational factors such as leadership, and incentives are applicable to be investigated as factors to encourage utilization of KMS (Nicolini et al., 2007; Ali et al., 2009).

In addition, subjective norms will be included to replace coworkers and supervisors constructs in Kulkarni et al.’s KMS success model as this construct has been empirically tested in healthcare context (Ryu et al., 2003).

Another construct to be incorporated in this study is trust. Previous studies have found the importance of trust in the acceptance of telemedicine (Paul, 2006) and in influencing knowledge sharing behaviour (Lin and Huang, 2009; Lin, Hung and Chen, 2009). In their qualitative study, Maarop et al. (2011) found that a high degree of trust is important to influence the use of teleconsultation.

While these three factors - user perceptions, organizational and trust; were found to be important in the success of knowledge management implementation, none of them were empirically tested in a form of an integrated model, particularly in healthcare context. To develop a more comprehensive perspectives of factors that may influence the success of teleconsultation, it is proposed that all these factors are integrated into one model.

A number of determinants that have been identified are perceived ease of use, and perceived usefulness from TAM theory, knowledge content quality, user satisfaction, leadership, incentives, subjective norms (modified from coworkers and supervisors constructs) from Kulkarni et al.’s KMS success model, and trust that is based on social capital theory (Kankanhalli et al., 2005; Lin and Huang, 2009). These factors are hypothesized to affect the success of teleconsultation as presented in Figure 1.0:

Figure 1.0 A proposed integrated success model for teleconsultation

V. METHODOLOGY

The methodology that has been planned for this research is as follows:

A. Research Design phase

In this phase the objective of the research will be mapped against the planning, methodologies, material requirements, milestones identification and deliverable.

B. Preliminary study

Comprehensive literature studies on the telemedicine focusing on the teleconsultation element, issues and success factors will be critically studied. TAM and KMS success models will be studied to see how they can fit in the teleconsultation needs within a health care organization. In addition, various studies on the use of trust construct from social capital theory will be explored.

C. Model development

An integrated success model for the implementation of teleconsultation between primary and secondary health care providers will be developed and formulated as a set of hypotheses.
D. Data Collection
To test the proposed research model, we will adopt the survey research using questionnaire (hardcopy and online) as a method for data collection. The unit of analysis of this study is the medical practitioners of public community clinics and hospitals. The preliminary survey will be conducted to Chief Operating Officer of the clinics and hospitals to obtain information regarding the usage of teleconsultation in their respective clinics and hospitals. The main survey to test the model will be conducted only to clinics and hospitals that are using teleconsultation. The list of medical practitioners will be accessed from the Ministry of Health. Questionnaires will be administered via mail as well as online to 1000 medical practitioners nationwide to obtain a minimum of 250 responses for a minimum of 25% response rate. All variables and instruments are constructed using previously validated instruments with minor modifications based on the healthcare context.

E. Data Analysis
Data collected will be tested using Partial Least Square approach, which is a second generation data analysis technique. This technique allows the assessment of the instruments (i.e. item reliability, convergent and discriminant validity) and the structural model to be done simultaneously.

VI. THE HYPOTHESIS
The following hypotheses are proposed based on the variables in the three original models and theory (TAM, KMS and Social Capital Theory) and presented in the research model shown in Figure 1.0:

- H1 Higher knowledge content quality will result in higher perceived usefulness
- H2 Higher knowledge content quality will result in higher user satisfaction
- H3 Higher perceived ease of use will result in higher perceived usefulness
- H4 Higher perceived ease of use will result in higher user satisfaction
- H5 Higher perceived usefulness will result in higher perceived user satisfaction
- H6 Higher user satisfaction will result in higher usage of teleconsultation
- H7 Higher perceived usefulness will result in higher usage of teleconsultation
- H8 Higher degree of trust will result in higher usage of teleconsultation
- H9 Higher degree of trust will result in higher perceived usefulness
- H10 Higher subjective norms will result in higher perceived usefulness
- H11 Higher incentive will result in higher knowledge content quality
- H12 Higher incentive will result in higher usage of teleconsultation
- H13 Higher level of leadership will result in higher knowledge content quality
- H14 Higher level of leadership will result in higher usage of teleconsultation

This study will be the first to evaluate the constructs from TAM, KMS success model, and trust in one model and test their applicability in teleconsultation context.

It is hoped that the findings of this research will be instrumental in providing insights on factors that may influence medical practitioners to share knowledge, and thus, use teleconsultation. This integrated model can be used as guidelines for the successful implementation of teleconsultation, and can assist in policy development by the national health care administration to design and develop telemedicine services for public health care providers. This aligns well with the National Telemedicine Blueprint (1997) where Teleconsultation and Continuing Medical Education have been identified as two of the main projects by the Ministry of Health, Malaysia.

REFERENCES
Examining the role of extrinsic motivators, social-psychological forces, and organizational climate,” MIS Quarterly (29:1), March, pp 87-111.


Malaysia’s Country Health Plan under the 10th Malaysia Plan (2011).


National Telemedicine Blueprint (1997), Ministry of Health Malaysia.

Knowledge Management International Conference (KMICe) 2014, 12 – 15 August 2014, Malaysia http://www.kmice.cms.net.my/