THE ACCEPTANCE OF BREAST SELF-EXAMINATION (BSE) TELECONSULTATION USING TAM-IDT-TRUST MODEL

By

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LIST OF ABBREVIATIONS

AGFI	Adjusted Goodness-of-Fit Index
AMOS	Analysis of Moment Structures
ATT	Attitude
BI	Behavioral Intention
CFI	Comparative Fit Index
COMPAT	Compatibility
DF	Degree of Freedom
GFI	Goodness- of- Fit Index
IT	Information Technology
IS	Information Systems
ICT	Information and Communication Technology
IDT	Innovation Diffusion Theory
ML	Maximum Likelihood
PBC	Perceived Behaviour Control
PEOU	Perceived Ease Of Use
PU	Perceived Usefulness
RMSEA	Root Mean Square Error of Approximation
SE	Self-Efficacy
SI	Social Influence
SMC	Squared Multiple Correlations
SEM	Structural Equation Modelling
SN	Subjective Norms
TAM	Technology Acceptance Model
TAM2	Technology Acceptance Model 2
TBP	Theory of Planned Behaviour
TLI	Tucker-Lewis Coefficient Index
TR	Trust
UTAUT	Unified Theory of Acceptance and Use of Technology

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PENERIMAAN TELEKONSULTASI PEMERIKSAAN SENDIRI PAYUDARA (PSP) MENGGUNAKAN MODEL TAM-IDT-TRUST

ABSTRAK

Penyelidikan informatik kesihatan berkembang pesat dan akhir-akhir ini tertumpu pada rekabentuk dan pembangunan sistem maklumat. Namun, penyelidikan tentang bagaimana reaksi pengguna akhir terhadap sistem sedia ada adalah terhad. Maka, terdapat keperluan yang tinggi untuk membangunkan dan mendapatkan sokongan empirikal untuk model penerimaan teknologi yang mana akan lebih meningkatkan penerimaan sistem maklumat dan penggunaannya.

Maka, penyelidikan ini telah mengkaji faktor-faktor berkaitan dengan model penerimaan TAM-IDT-TRUST dan hubungannya dalam menentukan niat kelakuan pengguna untuk menggunakan sistem telekonsultasi PSP. PSP adalah pemeriksaan sendiri payudara yang dilakukan oleh wanita sekali setiap bulan untuk membolehkan mereka mengesan kelainanan dan perubahan pada payudara sendiri.

Penyelidikan ini menggunapakai metodologi campuran di mana penyelidikan bermula dengan metodologi kualitatif (temubual) dan berakhir dengan metodologi kuantitatif (kajian survey). Menggunakan kaedah yang pertama, faktor-faktor penyebab kepada tidak mengamalkan PSP setiap bulan telah dikenalpasti. Penyelidikan tentang penerimaan awal pengguna terhadap cadangan telekonsultasi PSP turut dijalankan. Seterusnya, didalam membangunkan sistem, pendekatan *Modified User-Created Content (MUCC)* dicadang dan digunapakai. Menggunakan kaedah kedua, model TAM-IDT-TRUST diformulasi, diuji dan disahkan secara statistik menggunakan *Structural Equation Modeling*.

Secara umum, didapati bahawa faktor-faktor (kepercayaan bersama dengan persepsi kebergunaan, kemudahan penggunaan dan keserasian) berkaitan dengan TAM-IDT-TRUST adalah penentu penting persepsi. Ini menunjukkan bahawa faktor-faktor ini adalah sangat penting di dalam pembangunan sistem telekonsultasi PSP. Model TAM-IDT-TRUST mempunyai kemampuan untuk menjelaskan varians untuk kepercayaan (55.7%), persepsi kebergunaan (76.9%), sikap (86.6%) dan niat kelakuan pengguna (78.5%).

Penemuan-penemuan penyelidikan ini mempunyai pelbagai implikasi untuk penyelidikan dan amalan. Pertama, kepercayaan, sikap, keserasian, persepsi kebergunaan, persepsi kemudahan penggunaan adalah sangat penting untuk penerimaan sistem telekonsultasi PSP. Kedua, keyakinan mempengaruhi kepercayaan pengguna dalam menggunakan sistem telekonsultasi. Oleh kerana, kepercayaan dan persepsi kebergunaan yang dirasakan adalah faktor yang paling penting yg memengaruhi niat pengguna, maka dapat dirumuskan bahawa, untuk meningkatkan niat penggunaan pengguna, pemaju sistem harus meningkatkan keyakinan pengguna akhir tentang bagaimana sistem ini dapat meningkatkan prestasi dan keberkesanan dengan mengintegrasikan mekanisma keselamatan atau kepercayaan yang mencukupi. Keterbatasan utama penyelidikan ini adalah bahawa ia merupakan kajian *one-shot cross-sectional*.

THE ACCEPTANCE OF BREAST SELF-EXAMINATION (BSE) TELECONSULTATION USING TAM-IDT-TRUST MODEL

ABSTRACT

Health informatics research has expanded and recently focuses on information systems design and implementation. However, there is still very limited study on how end users react to already implemented system in this domain. Therefore, there is a strong need to develop and gain empirical support for models of technology acceptance which in turn help in improving the information system acceptance and its usage.

Therefore, this research is carried out as an effort to examine the factors associated with the proposed TAM-IDT-TRUST acceptance model and its relationship in determining users' behavioural intentions to use Breast Self-Examination (BSE) Teleconsultation system. BSE is a self examination on the breast carried out by women at monthly basis to determine any abnormalities on their own breast.

This research applied mixed method approach where the study begins with qualitative method (interview) and ends with quantitative method (survey). Using the qualitative method, the factors that contribute to the non-participatory of monthly BSE practice have been determined; the initial acceptance of a group of public users has been investigated; and the system contents suggested by users have been identified. Moreover, in the system development, a Modified User-Created Content (MUCC) approach is proposed and applied. Using the quantitative method, the

proposed TAM-IDT-TRUST model is formulated, tested and validated statistically using Structural Equation Modeling (SEM).

In general it was found that the factors (trust together with perceived usefulness, perceived ease of use and compatibility) associated with TAM-IDT-TRUST are important antecedents of intentions. This implies that these important factors are critical in the deployment of BSE Teleconsultation system in the future. The TAM-IDT-TRUST model has the capability to explain the variance of Trust (55.7%), of Perceived Usefulness (76.9%), of Attitude (86.6%), and of Behavioural Intention (78.5%).

The findings of the present research have various implications on research as well as practice. Firstly, trust, attitude, compatibility, perceived usefulness and perceived ease of use are critical to the acceptance of BSE Teleconsultation system. Second, trust influences users' beliefs in using the system. Since trust and perceived usefulness are the most important antecedents of behavioral intention, it can be concluded that, to increase usage intention, teleconsultation system developers have to increase end users' beliefs that the system can enhance the user performance and effectiveness by integrating enough security or trust-building mechanisms. A major limitation is that this research is a cross-sectional study.

CHAPTER 1

INTRODUCTION AND RESEARCH OVERVIEW

This chapter reports the overview of this thesis structure. Also, it presents all the background information, the important concepts and terms which define the problem that this thesis will address, the significance of this problem and how it applies to the larger field of research. In this chapter, the researcher also outlines the structure of this thesis.

1.1 Introduction

Health IT or Health Informatics research has expanded and often focuses on Information System (IS) or Information Technology (IT) design and implementation (Holden and Karsh, 2010) . However, regardless of the many implemented health IT/IS, there is still a lack of information on how end users react to already implemented system (Aggedis and Chatzoglou, 2009).

Research on technology acceptance within the field of information system has been limited in its application to healthcare and there is a strong need to develop and gain empirical support for models of technology acceptance within this domain. This in turn will improve the acceptance of information system implementation and its usage (Schaper and Pervan, 2004).

Therefore, this research is carried out as an effort to examine the factors associated with the proposed TAM-IDT-TRUST research model and its relationship in determining user's behavioral intention to use Breast Self-Examination (BSE) Teleconsultation system in Malaysian context.

This thesis presents the research conducted and findings of the acceptance of BSE Teleconsultation in Malaysia. Relevant literatures on the theories and models involved are briefly reviewed in the next section to provide a clearer picture on the theoretical perspectives that guide this entire research.

Theoretical-based studies have provided socio-cognitive perspectives with a theoretical framework that guides this research study. It is well-known that this kind of study helps researchers predict and provide explanation to users' behaviour towards adoption and acceptance of any information systems being studied (Rawstorne et al., 2000). Moreover, investigating the determinants associated with user acceptance of software systems or newly introduced information systems has been an essential information system (IS) research stream (Masrom and Hussein, 2008).

With the introduction of teleconsultation as the alternate medium for breast self-examination (BSE) learning, evaluation of such initiative becomes the next logical step (Talib et al., 2009). Even so, for such initiatives to improve BSE learning and teaching effectiveness, such technology-based initiatives must be accepted by women. Therefore, women acceptance towards new e-Health system that will change the way BSE is learnt will be carried out through theory testing. The essence of theory testing is that the process of testing user acceptance of any IT for intended purposes can be modelled and predicted (Masrom and Hussein, 2008).

1.2 Research Approach and Research Scope

This research focuses on extending the Technology Acceptance Model (TAM) by including the Innovation Diffusion Theory (IDT) and trust construct along

with BSE Teleconsultation system which is based on users' requirements. This theoretical basis tests and provides explanations on the weighted factors that guide the acceptance of BSE Teleconsultation system. It investigates the importance of these factors and brings up questions regarding the reasons behind end-users' rejection or acceptance of newly implemented IS. Both TAM-IDT and trust guide this research to explain human behaviours towards the acceptance of BSE Teleconsultation in Malaysian context. Previous studies on TAM-IDT-TRUST are discussed in Chapter 2 (*see* Section 2.6). Figure 1.0 illustrates the overall research approach in this research study.

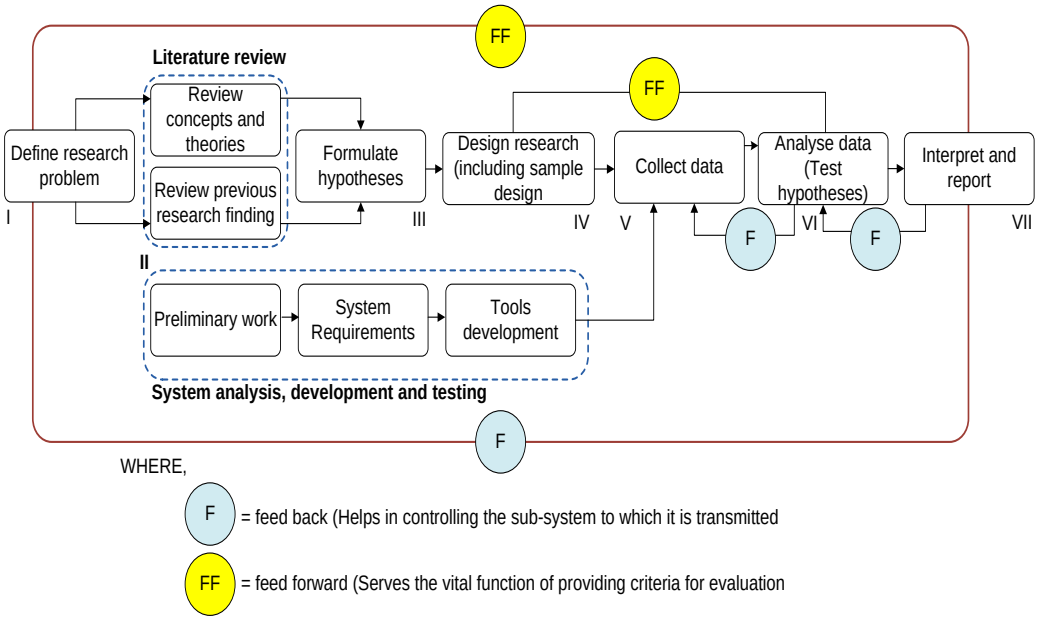

Figure 1.0 Overall Research Approach

This research applied mixed method approach where the study begins with qualitative method (interview) and ends with quantitative method (survey). Using the qualitative method, (1) the factors that contribute to the non-participatory of monthly BSE practice have been determined; (2) the initial acceptance of a group of public users have been investigated; and (3) the system contents suggested by users have

been identified. A Modified User-Created Content (MUCC) approach is proposed and this approach is applied during the system development. After extensive literature reviews on technology acceptance model and theories, the proposed TAM-IDT-TRUST model is formulated, tested and validated statistically using Structural Equation Modeling (SEM). Table 1.0 indicates the scope of this research.

Table 1.0 Research Scope

Items	**Scope of the study**
Types of research	Theory formulation, hypotheses testing
Key Issues	Malaysian women's acceptance towards BSE Teleconsultation System.
Dependent Variable	Perceived Usefulness (PU), Attitude (ATT), Behavioural Intention (BI), Trust (TR)
Independent Variable	Perceived Ease of Use (PEOU), Compatibility (COMPAT)
Underlying Theory	Technology Acceptance Model (TAM), Innovation Diffusion Theory (IDT) and Trust
Testing Location	One of the public university in Malaysia
Unit of Analysis	Malaysian women aged 19-65 years old
Analyzed object	Behavioural Intention to use BSE Teleconsultation System
Research Instrument	Theory inference, research setting, questionnaires, and statistical analysis

As depicted in Table 1.0, the main research is focused on theory formulation and hypothesis testing. The theory is formulated by combining constructs from technology acceptance model (TAM) with innovation diffusion theory (IDT) and external construct of trust. This research is carried out to examine Malaysian women's acceptance towards proposed BSE teleconsultation system. By using four dependent variables (perceived usefulness, attitude, behavioural intention and trust) and two independent variables (perceived ease of use and compatibility), a total

number of 279 Malaysian women aged between 19 to 65 years old has participated in the survey conducted in one of the public university in Malaysia.

1.3 Background of the Study

1.3.1 Current BSE Practices in Malaysia

Breast self-examination (BSE) is a simple, non-invasive, inexpensive, self-perform screening procedure for detecting breast cancer (World Health Organization, 2009). Breast cancer appears to be a major global health problem in women of both the developing and developed countries (World Health Organization, 2009). Similarly, in Malaysia breast cancer was reported as the most common cancer among female and also the most increasing cancer among population in Peninsular Malaysia by the National Cancer Registry (NCR, 2006). A total number of 3525 female breast cancer cases were registered in the NCR for the year 2006, accounted for 16.5% of all cancer cases registered in Malaysia (National Cancer Registry, 2006).

The late detection of symptoms is the cause that leads to higher mortality rate associated with breast cancer (Hisham and Yip, 2004; Meechan et al., 2002). Hisham and Yip (2004) indicates that the average tumour size is 5.4 cm in diameter and it appears that Malaysian women usually find out that they have cancer at acute levels which are classified as stage 3 and 4 (Hisham and Yip, 2004). Generally, women who found the lump accidentally or during monthly BSE practice, could have consulted medical assistance earlier and therefore reduced the delay time in comparison with women who had experienced pain beforehand (Meechan et al., 2002). In addition, studies have also proven that in general, it is easier to treat early stage cancers than later ones and the survivor rate is increased proportionately (Wah,

2006). Therefore, BSE has become one of the effective ways to promote breast cancer awareness and help women in detecting abnormalities in their breasts, if regular and correct techniques are practised by women (Smith et al., 2009).

Previous studies conducted worldwide have shown that women do not have accurate or sufficient knowledge on BSE (Gursoy et al., 2009). The research findings shows a lack of BSE knowledge as the reason for not practicing BSE and it demonstrates the needs for BSE education (Gursoy et al., 2009). In order to increase women's awareness and knowledge that will encourage them to practice BSE as preventive self-care measures, it is important to initiate interventions to provide health education (Chan et al., 2007).

1.3.2 Current Teleconsultation Services in Malaysia

Teleconsultation enables real-time two way communication between the caregivers and patient through the Internet (Verhoeven et al., 2007). Teleconsultation services had been introduced in Malaysia for almost 10 years yet it has not been optimally adopted even though it was found that teleconsultation in general is cost saving, efficient in allocating resources, enhances diagnostic options and better health outcomes (Maarop et al., 2009).

Therefore, it is essential to investigate its under-usage factors which will in turn encourage its utilization in the future. Information and Communications Technology (ICT) advancement has enabled multi-disciplinary approach to be applied in healthcare settings through telemedicine (Spanjers et al., 2001). This approach has resulted in easy accessibility to specialists' consultation and diagnosis without boundaries (Leiba et al., 2002). Online consultation using videoconferencing

facilities has been researched and tested in many areas and has been proven to be effective and positively acceptable (Verhoeven et al, 2007), for instance, in the area of psychiatry, neurosurgical, and cancer. However, teleconsultation for breast-self examination has not yet been studied elsewhere (Talib et al., 2008). This research is the first attempt at introducing BSE consultation through web-based videoconferencing.

1.3.3 An Urge to Understand Users' Acceptance of Health IT

The implementation of Health IT has demonstrated improvement in terms of quality of treatment and services, medical personnel's effectiveness and efficiency, and also provides cost cutting solutions in which has made this approach fairly acceptable by end-users (Aggedis and Chatzoglou, 2009).

Considering the most technical obstacles are gradually eliminated, the question that arises is whether people are willing to use these new technological advancements (Chismar and Wiley-Patton, 2003).

A better understanding of the possibilities of using IS/IT by users is therefore required, in order for new implementation methods to be developed. These methods must be able to identify users' attitudes towards the system, thus helping the developers to improve and maximizing its possible acceptance level by the users (Aggedis and Chatzoglou, 2009).

It has been identified that the two key factors for IS implementation and success are researching and forecasting user's acceptance of information system utilization (Davis, 1993; Mathieson et al., 2001). Therefore, acceptance theories are

essential to model, forecast and elucidate the end-users' acceptance of any Health IT and its usage (Holden and Karsh, 2010; Masrom and Hussein, 2008).

Despite the growing attention in end users' perspective towards Health IT implementation and service utilization, very few acceptance research has been conducted in health care domain (Aggedis and Chatzoglou, 2009) and yet, most studies of Health IT are about its adoption and focuses on clinics, hospitals, or clinicians' acceptance rather than end-user reactions (Holden and Karsh, 2010). Not surprisingly, therefore, there are strong current needs to empirically assess newly develop models to sustain and add value to the original models.

1.4 Motivation of the Research

The motivation that guided this whole research is listed as follows:

(1) The BSE Teleconsultation system is a newly proposed e-Health system, thus it becomes a worthwhile topic to investigate as in this research a teleconsultation service has been implemented with the facilitation of video conferencing as the new way of getting BSE consultation. Therefore, an empirical and statistical evaluation becomes the foremost need before it is introduced to the public. Even so, for such system pre-implementation to be widely accepted and fully utilized by its end-users, the researcher suggests testing each construct in the integrated model (TAM-IDT-TRUST) as antecedents to successful change efforts that involve the introduction and adoption of new technology intervention or application.

(2) Combination of TAM-IDT has been studied in various fields recently. However, none of TAM-IDT model has been tested on a newly proposed system (in this case, a system which is built based on users' suggested contents and functionality approach) and has not yet been investigated using BSE Teleconsultation system. New hypothesis extends the existing knowledge through the integration of ideas and concepts from within or between disciplines. Models and theories integrated across different fields allow researchers to propose and test new relationships, processes and explanations. The result of this integrated knowledge is often a new heuristic which can inform both academics and practitioners (Lippert and Davis, 2006).

(3) The BSE has been taught to women for some time and has received various feedbacks. Much effort has been put to increase mammography but little has been done to improve earlier detection of lumps. In line with what was suggested by Lannin and Ponn (2005), a personalized BSE Teleconsultation system that delivers various BSE educational messages based on public user's (women) suggested contents is designed and developed.

(4) To date, most of the research done in this area focuses on non-preventive teleconsultation services (for instances, telepsychiatry and teledermatology) while this current research focus on preventive methods for breast cancer with early diagnosis through BSE (Talib et al., 2008). Previous telemedicine related studies have only investigated and focused on its profits, effectiveness and patient's satisfactory level with the services (Debnath, 2004). None of the

studies investigated acceptance of such technology as a whole or from end-users' acceptance (Holden and Karsh, 2010).

(5) Prior research on BSE education has been diversely tested for many years. Methods such as individual teaching, pamphlet education, group teaching, using breast model, video, peer education, and website were studied previously. To our knowledge, no study elsewhere uses our proposed method. Furthermore, previous studies tested on the intervention in regards to BSE knowledge practice and belief but none tested on the acceptance of the system itself.

The research represented by this thesis is therefore well-motivated, not just by the findings listed above that make a strong case for Health IT system, for instance, a web-based BSE Teleconsultation system, but also by the current needs to have such system to aid women towards preventive self-care. The short-term objective of this thesis is to design, and develop a web-based BSE Teleconsultation system that is based on public users' requirements. The long-term objective of this stream of research is to evaluate the acceptance of such system from theoretical perspective.

1.5 Research Objectives

The main focus of this thesis is on testing the theoretical extension of TAM-IDT-Trust model to evaluate users' behavioral intention to use BSE teleconsultation. The research objectives are listed as follow:

(1) To elicit the factors that contributes to the non-participatory in practicing monthly BSE.

(2) To investigate initial acceptance of potential users on initial ideas of having such system and current BSE practice among Malaysian women.

(3) To develop BSE Teleconsultation system that is based on users input.

(4) To formulate, validate the research model that describes Malaysian women behavioural intention to use BSE Teleconsultation. To identify the factors that is significant and influence women's acceptance of the BSE Teleconsultation; determine the relationships between the identified factors which will in turn provide insight of user acceptance to BSE Teleconsultation system.

1.6 Research Questions

Recently, many IS researchers have begun to rely on the theories of technology acceptance to study implementation problems. A major focus on these studies shows how potential users' perceptions of the information technology influences its acceptance by users and hence its adoption.

This study attempts to answer the four research questions that motivated and guided this research as follows:

(1) How users' inputs aid in the development of BSE Teleconsultation system? And what factors contribute to the non-participatory in practicing BSE among potential users? What are the factors that influence their initial acceptance?

(2) What factors influence the acceptance of BSE Teleconsultation system among potential users in Malaysia's context? What is the relative importance of these factors and the relationships between them?

(3) How can the findings of this study be used to benefit the telemedicine sector in regards with teleconsultation in Breast Self-Examination (BSE) practice? What are the implications?

(4) What is the role of trust in the acceptance of technology? How important is trust variable in the context of BSE Teleconsultation, and whether its relative importance varies from other prior research?

1.7 Plan of Thesis Structure

Chapter 1 consists of an overview of breast cancer in Malaysia, current approach in breast cancer preventive method, brief information on teleconsultation technology, and the aims of the research. This chapter will further discuss the important concept and factors, and motivations behind the aim.

Chapter 2 consists of literature reviews and theoretical discussion. This chapter will focus on literature on the chosen theoretical background such as the Technology Acceptance Model (TAM) and Innovation Diffusion Theory (IDT). It will also cover technologies used for the system which is teleconsultation technology using video conferencing facilities and literature on breast self-examination (BSE). The findings from the literature will show the gaps found in the research area. This chapter also consists of a theoretical framework which is comprised of key

determinants that are expected to influence women's intention to use BSE Teleconsultation. Then, the research hypotheses are proposed.

Chapter 3 presents the research methodology and methods as well as the justification of choices and uses. In addition, the research process, design, development of the instrument, sample and data collection, data analysis methods, and data management of multivariate analysis are presented. The development of the relevant instrument and the outlines of survey problems are discussed. This chapter also presents and discusses about the preliminary study, the analysis and design of the BSE Teleconsultation System.

Chapter 4 presents the main data analysis related to testing and developing the model of technology acceptance called the "BSE Teleconsultation Acceptance Model (TAM-IDT-TRUST)" by utilizing the Structural Equation Modeling analysis using the AMOS software version 18.0.

Chapter 5 highlights the key findings and the BSE Teleconsultation Acceptance Model (TAM-IDT-TRUST). In addition, the research implications including theoretical, methodological and practical implications are discussed along with the limitations of the study and suggestions for further research.

1.8 Summary

This chapter presents the background of this research, research problem, objectives, significance, contributions, scope of the study, as well as the structure of five chapters of this study. The next chapter will present a literature review relating to technology acceptance theories/models, teleconsultation in health care settings and

breast self-examination (BSE). The next chapter will also extend on theoretical framework and hypothesis development.

CHAPTER 2

LITERATURE REVIEWS, THEORETICAL FRAMEWORK AND RESEARCH HYPOTHESES

The earlier chapter has given overall ideas about the research as a whole. This chapter is compiled to provide information concerning literature reviews on theoretical background, background of this research and also relevant literature on teleconsultation. This chapter also presents a theoretical framework for this research. At the end of this chapter, the researcher delineates the research hypotheses that are going to be tested in this research.

2.1 Introduction

This chapter reviews on: 1) BSE and its history, 2) Teleconsultation and 3) Technology Acceptance theories/models. In the first section, extensive literature is presented to discuss on BSE history, critiques on BSE instructions and BSE education practiced worldwide. The second section continues with discussions of teleconsultation technologies, which are used as the environment and technology the study examines. This section discusses Teleconsultation practices in Malaysia and worldwide. The third section presents a literature review on five well-known theories and models in IS research which provides a useful theoretical setting for this research. At the end of this section, after reviewing Technology Acceptance theories, it continues with a discussion of the relationship between TAM and IDT, which serve as the theoretical framework for this study. The chapter continues with discussions of teleconsultation technologies, which are used as the environment and technology the study examines.

The final section will explain and discuss the basic concept of how a theoretical framework is formed and will discuss the theoretical framework

facilitating some characteristics of these theories/models of technology acceptance. The key determinants in the theoretical framework that are expected to be used to investigate the acceptance of BSE Teleconsultation will be proposed and discussed. Lastly, the research hypotheses will be stated and briefly summarized.

2.2 Literature on Breast Self-Examination (BSE)

The concept of breast self-examination (BSE) was promoted by Cushman Haagensen in the 1950s, at a time when mammography was not yet available, and many women were diagnosed with large and untreatable lumps (Thornton and Pillarisetti, 2008).

The American Cancer Society has recommended BSE for women, aged 20 years old and above for the early detection of breast cancer (Smith et al., 2009). Beginning in their early 20s, women should be told about the advantages and limitations of BSE. The importance of the prompt reporting of any new breast cancer symptoms to a healthcare professional should also be greatly emphasized. Besides, women who choose to do BSE should receive instructions and have their techniques reviewed during regular health examinations. It is acceptable for women to choose not to do BSE or to do BSE irregularly.

In Malaysia, the national standard for breast cancer screening in women include: (1) monthly BSE for women aged 20 and above, (2) Clinical Breast Examination (CBE), every three years for the 20– 39 years age group and every year for the 40 years and above age group and (3) mammography, every two years for the 50–69 years age group (Ministry of Health, 2002). This standard is in line with the

American Cancer Society guidelines for early detection of breast cancer (Smith et al., 2009).

2.2.1 Critiques on BSE Instructions

Opinions on the practice of BSE and its benefits are diverse and controversial (Smith et al., 2009). Two major randomized trials that were conducted in China (Thomas et al., 2002) and Russia found that BSE did not bring any benefits, however, this evidence is insufficient to recommend for or against the BSE practice (Smith et al., 2003; Jelinski et al., 2005). Concerns regarding the other potential adverse outcomes of discontinuing BSE, including influence on subsequent screening behaviour, have not been evaluated (Jelinski et al., 2005). The validity of some randomised controlled studies is debatable (Green and Taplin 2003; Funke et al., 2008) as these type of studies are not true types of studies of testing a technology under ideal conditions and prior study was not completed. Smith (2003) has found that several points noted by Shanghai Trial are worth nothing, for instance, it was a trial on BSE instruction, not BSE itself. Therefore, there is no conclusive proof that BSE or BSE instruction is ineffective or would not be effective in any setting, regardless of the interpretation of evidence by some commentators (Smith et al., 2003).

Recent reviews have questioned the value of traditional breast cancer screening methods. In a large study, breast self-examination has been shown to be insignificant in improving cancer-related or all-cause mortality, but it is commonly advocated as a non-invasive screen or in other words, for preventive breast awareness (Knutson and Steiner, 2007). Even though it is proven that BSE does not

decrease the mortality rate due to breast cancer and cannot be beneficially recommended based on current evidence, it does lower the risk of mortality and creates awareness to women who practice BSE regularly (Hackshaw and Paul, 2003).

As a result, the American Cancer Society (ACS) still advocates and do not actively discourage BSE as BSE instruction may have a greater value, not so much in stimulating regular self-examinations, but rather in promoting greater awareness of breast cancer symptoms(Avci et al., 2008). The same recommendation is made for CBE screening because there is, nevertheless, an evidence based on its efficiency (Smith et al., 2003; Knutson and Steiner, 2007). Therefore, healthcare professionals continue teaching BSE to their patients as they argue that these techniques are simple, cheap, and without side effects (Lannin and Ponn, 2005; Avci and Gozum, 2009).

Mammography is indeed an important tool for the detection of breast cancer; however, 10 percent of the palpable masses are missed (Gursoy et al., 2009). The contribution of the CBE to early detection is difficult to determine, but studies show that sensitivity is highly dependent on the time of examination and up to 10 percent of cancers are missed by mammograms (Knutson and Steiner, 2007). Women older than 40 years who are in good health are recommended to undergo mammogram but it is not recommended for younger women due to its sensitivity and side effects. Mammography is recommended for women with high-risk and 40 years and above (Knutson and Steiner, 2007; Green and Taplin, 2003; ACS, 2004). Due to this limitation of mammography, BSE is an option for women in their 20’s. BSE is a step-by-step approach to examine the breast that is done on a regular schedule (ACS, 2004). The important message is for women to be aware of how their breasts normally look and feel, and also not to ignore any changes they notice such as

bleeding, discharge, pain or lump found accidentally (Green and Taplin, 2003; ACS, 2004).

Despite the BSE disadvantages reported in prior studies, approximately 30 percent of breast cancers are self-detected through BSE practice (Park et al. 2007). Self-detection is divided equally between those who carried out routine BSE and those who accidentally found a lump (Green and Taplin, 2003). Another study stated that 22 percent of women discovered their breast symptom during regular BSE, 41 percent by chance and 37 percent experienced breast pain (Meechan et al., 2002). Five out of six women who found a lump, performed correct BSE techniques (Simi et al., 2009) and it brings about an awareness among women, empowering them to take care of their breasts as well as advising them to seek medical help when the symptoms persist (Rao et al, 2005). Therefore, BSE becomes an important means for detecting breast changes (Gursoy et al., 2009) and the researcher concludes that having BSE is better than nothing.

Even though it is difficult to determine whether more lumps were found during planned breast self-examination or accidentally by women, the evidence from the United States highlighted that one third of cancerous lumps found by a woman herself has shown that BSE is still appropriate to be taught and learnt especially by young women (Lannin and Ponn, 2005) because the individual may be able to find the disease much earlier than health care providers (Janssens, 2004).

Prior studies conducted worldwide indicated that women do not have accurate or sufficient knowledge on BSE (Gursoy et al., 2009). The fact that lack of BSE knowledge as the reason for not practicing BSE demonstrates the need for education on BSE (Gursoy et al., 2009). Without training programmes, it is unlikely

that women will perform BSE correctly or will practice it at all. On the other hand, women who had undergone the training programme were more likely to perform regular BSE as they have been motivated to learn and practice it (Sorensen et al., 2004; Karayurt et al., 2009), therefore, women should be educated to perform regular BSE in their early 20's (Janssens, 2004).

Putting all these together, interventions to encourage BSE among women with no prior BSE experience should address strategies not only to overcome the disadvantages, but also to help them to see the advantages of performing BSE. Women who choose to perform self-examination should be trained or assisted with appropriate techniques to do it proficiently (Green and Taplin, 2003; Knutson and Steiner, 2007; Thornton and Pillarisetti, 2008; Smith et al., 2009) and also follow-up. They should be taught or should be aware of BSE false-positive (possibility to find lump that is not cancerous) and potential harms. Many breast centres in United States still actively advise rigorous BSE regardless of changed policy directives and evidence from the harms that can result from its practice(Thornton and Pillarisetti, 2008).

2.2.2 Breast Self-Examination (BSE) Education

Expanding public knowledge about breast cancer is an important strategy in influencing women's decision on their participation in preventive cancer practices (Gursoy et al., 2009) especially in breast cancer (Sedjo, et al., 2007). Studies have shown that women who have learned about breast self-examination have positive attitudes towards breast cancer and practise breast self-examination more frequently (Alkhasawneh, 2007).

Although BSE is not effective by itself, it is an effective tool for stimulating awareness on breast cancer and in directing women to consult a doctor early when they note any changes or lumps in their breast (Knutson and Steiner, 2007; Avci et al., 2008). Research has shown that women who were diagnosed with breast cancer had consulted their doctors because they felt a mass in their breast. It was determined that BSE is carried out more effectively if it is taught by physicians, midwives or nurses (Avci et al., 2008).

Physical examination of the breast is not an examination that is easy to excel in (Harris and Kinsinger, 2002). The basic aim of a physical examination is to detect the disease at an early or curable stage, thus reducing the mortality rate due to breast cancer. From the literature, BSE is important for the detection of early breast cancer. This suggests that breast lumps may be found by women themselves at an even higher rate if proper BSE is taught and encouraged.

In order to improve women's awareness and knowledge that will foster and encourage women to practice BSE as preventive self-care behaviours, it is important to initiate interventions to provide health education to women (Chan et al., 2007).

Breast Self-Examination has been proven effective for early detection of breast cancer if proper techniques are followed by women and practised at the recommended frequency (monthly basis). BSE is only useful as part of breast cancer detection and finding lumps themselves are made possible if BSE practice is done regularly and correctly (Funke et al., 2008).

However, few women are reported to perform regular BSE (Lim and Halimah, 2004; Hisham and Yip, 2004). In previous studies, a low compliance rate for BSE has been associated with the following factors: lack of awareness about the

risk of breast cancer, not knowing how to perform a BSE, perception of BSE as useless along with a preference for the high technology of mammography over BSE, lack of confidence in BSE skills, lack of time, fear of finding cancerous lumps, worrying about getting ill from breast cancer, or perceiving the performance of BSE as unpleasant and embarrassing as summarized in Table 2.0.

Table 2.0 Factors Why Non-Performers Did Not Perform Breast Self-Examination (BSE)

Factor	References
Do not know how to do BSE	Simi et al., 2009; Yan, 2009 ; Al-Qattan et al., 2008; Gursoy et al., 2009; Motazeri et al.,2003; Karayurt et al., 2009;
Think it is unnecessary or unimportant	Simi et al., 2009; Al-Qattan et al., 2008; Sadler et al.,2003
Have not thought about BSE	Simi et al., 2009;
Afraid of being found positive for cancer	Simi et al., 2009; Al-Qattan et al., 2008;
Forgetfulness	Al-Qattan et al., 2008; Sorensen et al., 2004; Gursoy et al., 2009; Rao et al, 2005
Do not think that they are in risk group	Sorensen et al., 2004
Busy lifestyle	Rao et al, 2005
Language barrier	Sadler et al.,2003
Cost	Sadler et al.,2003

There is no conclusive evidence regarding the most effective technique, the best teaching and reinforcement method or the optimal frequency (Baxter, 2001). However, there is a medical opinion that women are encouraged to perform BSE at a monthly basis. Therefore, the researcher can conclude that proper techniques need to be taught to women in order to perform proper BSE. With the aid of ICT intervention, the situation may improve in compliance with current BSE practice. However, attempts to educate women to do proper BSE technique have had various ways. Education efforts have included self-instruction using verbal and picture

(graphical) representations in pamphlets and magazines, through media and personal instruction.

Most of these studies of different methods have been carried out to learn the effect of education on BSE knowledge, attitude and behaviours; however, none of these studies have examined the acceptance of the intervention itself. Numerous studies have explored the usefulness of educational approaches such as peer education, group education, film, and written documents with women of different ages and gave positive outcomes. Table 2.1 depicts some of the BSE education using various approaches.

Most of the studies that involved controlled groups (without intervention such as using pamphlets, flyers, and booklets) show that it is insufficient to just promote and encourage women to learn and perform BSE compared to the group with intervention in terms of knowledge, beliefs, intention and skills of BSE.

Formal BSE education programme assists in detecting lumps in the patient, specifically women who are young, at high risk, or in the general population. Furthermore, there is a difference between encouraging women to be familiar with their breasts and issuing a strong directive to self-exam via public programmes (Sedjo, et al., 2007). Therefore, it is important to select accurate and effective educational methods to increase knowledge about breast cancer and to improve BSE practice and perceived health belief (Karayurt et al., 2009). Park et al., suggested that any educational intervention for breast cancer prevention should be specified to an individual's stage of BSE (Park et al., 2009).

Table 2.1 Prior Studies on BSE Education using Various Approaches from Year 2000-Present

Authors	Year	Educational Intervention	Participants	No. of Participants	Measures	Result/Finding	Theory tested
Abdul El Aziz et al.,2009	2009	Lecture/discussion using flyers and slides Brainstorming	Underserved area Women	139	Knowledge and practice of BSE	Highly significant improvement in the knowledge of BSE, and higher BSE compliance.	None
Avci and Gozum, 2009	2009	Using breast model and video on BSE.	Primary school teachers in Ordu, Turkey	93	Knowledge, beliefs and behaviours regarding breast cancer screening	Both video and model methods of education were effective in changing health beliefs regarding breast cancer screening and on the same level increasing knowledge and practice of BSE.	None
Gursoy et al., 2009	2009	Daughter-to-mother	Students and mothers in Turkey	200 students, 168 mothers before intervention, 125 post-intervention	BSE knowledge and health belief	Knowledge ratio was doubled after the intervention	None
Karayut et al.,2009	2009	Peer and group education	Female university students in Turkey	193	Knowledge, beliefs and BSE practice	Increased of knowledge, BSE compliance, confidence level, and decreased of perceived barriers	None

Table 2.1 Prior Studies on BSE Education using Various Approaches from Year 2000-Present (Cont.)

Authors	Year	Educational Intervention	Participants	No. of Participants	Measures	Result/Finding	Theory tested
Park et al., 2009	2009	Cognition-Oriented Breast Self-Examination Intervention	Korean women and spouses	48	BSE knowledge and practice	This intervention programme was effective in promoting regular BSE practice and in enhancing confidence in BSE. The intervention also raised awareness among husbands of the importance of breast health for their wives.	None
Hacihasanoglu andGozum, 2008	2008	Lecture on breast cancer, its risk factors, and interventions to reduce the risk of breast cancer, the value of early diagnosis and cancer screening. Video on BSE.	Course attendees at the Erzincan Public Education Centre, Turkey	91	BSE self-efficacy	Increased accuracy of belief about breast cancer and increased positive perception about BSE self-efficacy	Champion's Health Belief Model (CHBM)
Budakoglu et al.,2007	2007	Theoretical and BSE training using a breast simulator	Lowly educated women in Ankara, Turkey	462	BSE knowledge and competency for BSE steps	Positive improvement on BSE knowledge and half of the participants became competent in all BSE steps	None