

MALAYSIAN BREAST CANCER PATIENTS' PERFORMANCE IN USING SOCIAL NETWORK SITES: A TASK PERSON TECHNOLOGY FIT MODEL

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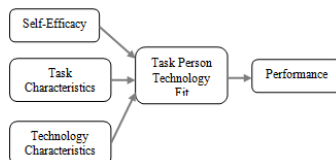
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Graphical abstract



Abstract

Social network communities that provide information about cancer offer environments in which cancer patients can interact, and access information related to the disease, its treatment and its survivorship. Current research into the assessment of cancer patients' performance in the use of Social Network Sites (SNS) continues to be limited, despite SNS potential to serve as a platform for providing cancer information. To investigate the factors that influence the performance of cancer patients in using SNS, this study utilizes the use of a Task Person Technology Fit (TPTF) Model. Questionnaires were distributed to 178 respondents in two hospitals and four cancer support groups in Peninsular Malaysia, using purposive sampling. Data was analysed through the use of Smart PLS 2.0 M3. The results indicated that the performance of cancer patients in using SNS has been determined directly by the fit between self-efficacy and the characteristics of task and technology.

Keywords: Health 2.0; Patient 2.0; Self-efficacy; Social Network; Task Person Technology Fit

Abstrak

Komuniti jaringan sosial (SNS) yang berkaitan kanser menyediakan persekitaran bagi pesakit kanser untuk berinteraksi dan mengakses maklumat berkaitan penyakit tersebut, rawatannya, sertakemandirian dalam menghadapinya. Walaupun SNS berpotensi sebagai platform yang menyediakan maklumat berkaitan kanser, penyelidikan semasa ke atas penilaian prestasi pesakit kanser dalam menggunakan SNS masih terhad. Bagi mengenal pasti faktor-faktor yang mempengaruhi prestasi pesakit kanser dalam menggunakan SNS, kajian ini menggunakan Model Padanan Tugas Individu Teknologi. Berasaskan kaedah pensampelan bertujuan, borang soal selidik diagihkan kepada 178 responden di dua hospital dan empat kumpulan sokongan kanser di Semenanjung Malaysia. Data dianalisis menggunakan Smart PLS 2.0 M3. Hasil kajian menunjukkan bahawa prestasi pesakit dalam menggunakan SNS ditentukan secara langsung oleh padanan antara efikasi sendiri dengan ciri-ciri tugas dan teknologi.

Kata kunci: Kesihatan 2.0; Pesakit 2.0; Efikasi Kendiri; Jaringan Sosial; Padanan Tugas Individu Teknologi

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1.0 INTRODUCTION

One of the main health dilemmas afflicting Malaysia today is cancer. The incidence of cancer is estimated to be 30000 each year, with breast cancer being the most common cancer according to the Malaysian National Cancer Registry (NCR) report [1]. According to Pereira et al. [2], patients in the 21st century are not like patients in the past. Many of them like to obtain a broader range of information about their illness. In fact, social network intervention serves as a means of sharing information that can help patients to obtain cancer related information helping them to better cope with their illness. Loader et al. [3] highlighted that informational support can be provided to online communities through virtual relationships. Luo and Smith [4] stated that the social network phenomenon provides an opportunity for patients, physicians, health providers and other stakeholders share experiences and information in every health context from disease and health to recovery and treatment. The earliest studies on Social Network Sites (SNS) for cancer patients, involving a thematic analysis of messages posted on forums and SNS received limited attention within cancer related research [5]. There is no comprehensive model of cancer patients' performance using SNSs; in particular, there is a lack of models guided by IS theories. The majority of research on the use of SNSs for healthcare has limited methodologies and is mainly descriptive in nature. Few studies have considered the role of social network sites in disseminating health information despite their potential to deliver health messages to large audiences [6,7]. Van de Belt et al. [8] explored the use of SNS by 873 hospitals in 12 Western European countries and found the use of Facebook increased in all the countries. In Malaysia SNS including Facebook and Twitter was used by different government and private hospitals and cancer support groups. Many patients are the members of cancer support groups including the Pink Unity and Breast Cancer Survivors and Warriors Facebook pages, in addition to the Facebook pages of hospitals such as Mount Miriam Cancer Hospital in Malaysia. Searching Facebook with the 'Breast Cancer' keyword brings up 620 groups with 1,090,397 members who share information regarding breast cancer [9]. Some studies have described the improvements that social networks can offer in regards to healthcare [10]. Therefore, research should focus on explaining the best practices and recommendations which can help speed up the effective use of social networks as support for patients. The existence of the impact social networks have on the health sector provides a strong theoretical and practical justification for the field of Health Information System (HIS). Social network support seems to be an important source of support for individuals with cancer, and there is a need for more research into how SNS can have an effect on cancer patients. There is also a need to understand how the Facebook groups can sustain the support. According to Bowling [11] there are many difficulties involved in measuring the support provided by social

networks, as most measures have not been fully tested reliability and validity, and should be tested accordingly.

Currently very little research has been conducted regarding the impact of SNS on people affected by cancer. The impact of SNS on users can be assessed through their performance in social media [12]. There is still a lack of studies investigating the impacts of participation in breast cancer support groups [13]. Further investigation into these factors that could affect breast cancer patients' performance is extremely valuable, for both practitioners and academics, and the results might help online cancer support groups to obtain a more comprehensive view about the way SNS participation affects the performance of cancer patients. The main objective of this study has been to use the Task Person Technology Fit (TPTF) Model to assess the performance of breast cancer patients in using SNS.

2.0 LITERATURE REVIEW

The research study's literature review is divided into four main sections. Firstly, a brief description of SNS in healthcare is provided. Secondly, the benefits of SNS in healthcare are described. Thirdly, the concept of Patient 2.0 Empowerment is explained. Finally, the theoretical perspective is considered.

2.1 Social Network Sites in Healthcare

An increase in SNS membership has been followed by an increase in SNS user research [15]. Various studies have described improvements that SNS can offer to healthcare including openness, communication, greater transparency, improved patient support and knowledge translation [10]. As a result, research should focus on explaining the best recommendations and practices which may help speed up the effective usage of SNS as a support service for cancer patients.

Social networking platforms offer an opportunity for users to build, represent, and manage their own social networks. In addition, healthcare providers have used these technologies to collaborate and connect with their patients [4]. The earliest studies on SNS for cancer patients, which involved a thematic analysis of messages posted on forum and SNS, received limited attention in cancer-related research despite the potential of SNS to deliver messages to large audiences [5].

2.2 The Benefits of Social Network Sites in Healthcare

SNS has the potential to increase the number of interactions that take place on its sites, interactions which are supported through more shared, tailored, and broadly-available information [14]. SNS can improve the availability of health information, as users create and share medical information online [16]. The

exchange of information without space and time limitations can be possible through SNS [6, 9,17]. Information can be provided for those who do not access it through traditional methods, an example being younger people using SNS [18, 19, 20, 21].

SNS has the potential to support peer-to-peer relationships between health professionals and patients, as a means of enhancing their interpersonal communication [14]. This can increase cooperation and communication, through which professionals can share experiences regarding care and treatment, while can also share information about the common problems they face. Better health decisions can be made as a result. Furthermore, SNS can be used to improve and promote the knowledge of stakeholders [9].

2.3 Patient 2.0 Empowerment

E-patients popularly used online resources, including online forums or social networking platforms, to teach each other about treatments and conditions. Recent research has focused on how information technology can empower patients to be more consistent in their cancer care. Previous studies have explored the potential empowering impacts of participating in online support groups for patients [22].

Patient 2.0 Empowerment involves the active participation of people in their own health pathways, through the use of information and communication technologies [23]. Empowered patients are considered to be successful in managing their conditions, maintaining their health functioning, collaborating with their healthcare providers, and accessing appropriate and high-quality care [24]. Patient empowerment entails redistributing power between patients and physicians that patients, so that patients are more in control of their healthcare and their encounters with healthcare professionals [25].

2.4 The Task Person Technology Fit Model

The current understanding of how social networks operate within healthcare settings is limited, because of the scarcity of studies in the area. Both research and theory have suggested that social networks play a critical role in determining diverse health-related outcomes. Social Network Theory (SNT) has turned out to be useful for describing many real world phenomena but it leaves less room for the ability for individuals to impact their success and much emphasis of SNT rests within the structure of individual networks. One may for example find an isolated person with SNT, but given the context, this may not be necessarily a problem [26]. Although SNT is used in previous studies, it cannot provide a complete and reliable picture of the social network effects in healthcare. The purpose of this research is not the structure of individuals' networks and the goal is to find out the factors that affect breast cancer patients' performance in using SNS.

The relationship between self-efficacy and behaviour has been considered in previous research in

the field of HIS [27, 28, 29]. Meanwhile, the previous literature shows that large amounts of research rarely included task characteristics and the research mainly focused on technology characteristics [29, 30]. A key goal in the development of the TPTF theory was the idea that task person technology fit, when decomposed to its more detailed components, could be the basis for evaluating whether information services are meeting individuals' needs.

Mew [31] developed a model combining fit among self-efficacy, task and technology characteristics to examine relationships regarding how these factors affect the performance of individuals. Such performance could involve skills that empower individuals to present higher levels of performance, use more sophisticated systems and engage in more challenging tasks. Figure 1 shows TPTF model adapted from Mew [31].

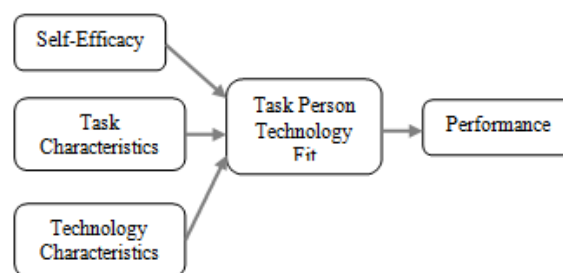


Figure 1: Task Person Technology Fit Model

According to Mew [31], within the TPTF model, "self-efficacy is extended by examining how skills might empower persons to handle more complex tasks, and motivate them to use more sophisticated systems or more advanced features for the same system. The TPTF model is extended by examining how the interactions among technology, tasks and skills might affect individuals' performance.

3.0 METHODOLOGY

Based on the research model and hypotheses, we included the following variables in this study: self-efficacy, task characteristics, technology characteristics, TPTF, and performance. A 5-point Likert scale was adopted for the evaluation. self-efficacy was adopted from the literature [32,33]. Task characteristics, technology characteristics, TPTF were based on the variables used by [31, 34]. Performance was adopted from the literature [35]. In order to achieve conceptual clarity, variables and constructs have been carefully defined at the theoretical level. The instruments for this study have been designed through the use of prior literature and instruments, in order to ground variables as detailed in (section 3.1). The content validity of the questionnaire, within the context of this research study, has been evaluated by three experts with research experience in quantitative

methods and health informatics. Once feedback was received, the instrument was subjected and revised through an additional review.

Based on purposive sampling, 178 breast cancer patients who had experience of using cancer support groups on Facebook, and who represented Malay, Chinese and Indian ethnic groups, were included in the study. Official letters from the university and the research proposal were sent to healthcare centres for permission to conduct data collection. The study was conducted in two hospitals and four cancer support groups in Peninsular Malaysia between January and August 2014. Smart PLS 2.0 M3 was used to analyse two main stages: (1) assessment of the measurement model, including Cronbach's coefficient alpha, composite reliability, discriminant and convergent validities (2) the assessment of the structural model.

The framework used by Coltman et al. [37] to construct measurement which begins with a theoretical justification for describing the nature of the focal constructs, and empirical tests that support the causal direction between constructs and their measures, has been utilized in this study. This framework could assist researchers in the design and validation of formative and reflective measurement models. In total, there are five reflective constructs in this study which are self-efficacy, task characteristics, technology characteristics, TPTF and performance.

3.1 The Definitions of Constructs

The following are the definitions related to TPTF in this study:

- Self-efficacy is defined as a key issue related to whether individuals are confident in their ability to interact within an online-community [32, 33]. According to Mew [31] within the TPTF model, self-efficacy might empower individuals to motivate other to use more advanced features of SNS, and handle more complex tasks.

- Task characteristics can be defined as actions performed by users in regards to inserting, using or retrieving information from SNS, in order to meet their needs. The task characteristic questions within the current work have been taken from a number of studies [31, 34], and have been modified to fit the current research study.

- Technology characteristics refer to four dimensions including SNS functionality, SNS integration, information quality and ease of use [31, 34].

- Task Person Technology Fit considers fit in relation to task, technology and self-efficacy [31, 36]. A better fit between these factors causes a better performance regarding the use of SNS.

- Performance is described as behavior and outcome related to using SNS. The behavioral aspect refers to what an individual does within a situation. The outcome aspect refers to the consequence or results of the individual's behavior [37]. Informational support is the outcome of using SNS, defined as the type of support that can be obtained through online interaction in social networks [38, 39, 40,41].

3.2 The Research Hypotheses

The hypotheses of this study consider whether combinations of self-efficacy, task and technology characteristics cause a fit that leads to increased performance. TPTF model defines that when the characteristics of individuals' self-efficacy, tasks and characteristics of the technology integrate well together, the individuals' performance will be high. Therefore, the following hypotheses were examined:

H1: Self-efficacy of cancer patients in using SNS has a significant effect on TPTF.

H2: Task Characteristics of cancer patients in using SNS has a significant effect on TPTF.

H3: Technology Characteristics of SNS has a significant effect on TPTF.

H4: TPTF has a significant effect on cancer patients' performance in using SNS.

4.0 RESULTS

4.1 The Demographic Information of Respondents

This study collected data from 178 respondents of two hospitals and four cancer support groups in Peninsular Malaysia. Table 1 shows the demographic details of the respondents.

Table 1. The Demographic Details of Respondents

		Frequency (N=178)	Percentage (%)
Age	18-24	2	1
	25- 34	33	18
	35- 44	67	38
	45- 54	42	24
	55-64	34	19
Race	Malay	58	33
	Chinese	95	53
	Indian	25	14
Education	High school		
	Diploma	55	31
	College	40	22
	Certificate	45	25
	Bachelor's degree	33	19
Master degree	5	3	
Working status	Working	93	52
	Not working	85	48
Stage of cancer	Stage1	14	8
	Stage 2-3	155	87
	Stage 4	9	5
Marital status	Married	165	93
	Single	13	7
The Times of Using SNS	Daily	87	48
	Weekly	64	35
	Monthly	27	15

Out of 178 respondents 38 per cent are aged 35 to 44, 24 per cent are aged 45-54, 19 per cent are aged 55 to 64, 18 per cent are aged 25 to 34, and 1 per cent are aged 18-24. The majority of respondents, 53 per cent are Chinese, 33 per cent are Malay, and 14 per cent are Indian. 31 per cent of the respondents have high school education, while 22 per cent have a diploma level, 25 per cent have a college certificate level, 19 per cent have a bachelor's degree, and 3 per cent have a master's degree. The numbers of respondents who are working is 4 per cent higher than the number of respondents who are not working. The majority of respondents, or 87 per cent, are in stages 2 or 3 of breast cancer, 5 per cent are in stage 4, and only 8 per cent are in the early stage of breast cancer. Also, 93 per cent of the respondents are married, and 7 per cent are single. Only 15 per cent of the respondents used SNS monthly, and while 48 per cent used SNS daily, and remainder used SNS on a weekly.

4.2 The Reliability of Survey

The reliability of the survey was assessed through the use of Cronbach's Alpha and Composite reliability tests. Table 2 shows that the Cronbach's Alpha for this study ranges from 0.8492 to 0.9409, and the Composite Reliability ranges from 0.8885 to 0.9183. The above results consequently have the recommended value of 0.70, indicating that the items used represent the constructs are reliable.

Table 2 The Results of Reliability Test

Constructs	Cronbach's Alpha	Composite Reliability
Self-Efficacy	0.8635	0.9014
Task Characteristics	0.8492	0.8885
Technology Characteristics	0.9409	0.9463
Task Person	0.8567	0.9127
Technology Fit	0.8960	0.9183

4.3 Convergent Validity

Convergent validity is the extent to which a measure correlates positively with alternative of the second construct. A value greater than 0.5 shows the items possess a sufficient convergence for investigating the relevant constructs [42]. Table 3 illustrates the results of Average Variance Extracted (AVE).

Table 3 The Results of Convergent Validity

Constructs	AVE
Self-Efficacy	0.6469
Task Characteristics	0.5713
Technology Characteristics	0.7000
Task Person	0.7775
Technology Fit	0.7400
Performance	0.7400

Table 3 shows that the AVE is greater than 0.5 for all constructs, so the value is considered to indicate a good convergent validity.

4.4 Discriminant validity

The discriminate validity of these measures was also tested by evaluating AVE, and comparing the square root of its value to the latent variable's inter-correlations with other latent variables [43]. Table 4 shows the results of Fornell-Larcker's Criterion Test for the main constructs. As presented in Table 4, the square root of AVE is greater than the latent variable inter-correlations with other latent variables.

4.5 Assessment of Structural Model

Once the construct measures are reliable and valid, the structural model is assessed. This involves examining the model's predictive capabilities and the relationships between the constructs [43].

Table 5 The Results of Structural Model

Hypotheses	t value	Path coefficients	Result
H1: Self-Efficacy → TPTF	1.981	0.172	Supported
H2: Task Characteristics → TPTF	2.987	0.310	Supported
H3: Technology Characteristics → TPTF	2.618	0.359	Supported
H4: TPTF → Performance	10.754	0.642	Supported

Table 4 The Results of Fornell-Larcker's Criterion Test

	Performance	Self-Efficacy	Task Characteristics	Technology Characteristics	Task Person Technology Fit
Performance	0.8602				
Self-Efficacy	0.770825	0.8043			
Task Characteristics	0.619178	0.679554	0.7558		
Technology Characteristics	0.634305	0.634775	0.615885	0.8367	
Task Person Technology Fit	0.641858	0.610925	0.648487	0.659453	0.8602

As can be seen in Table 5, self-efficacy ($\beta=0.172$, t value=1.981), task characteristics ($\beta=0.310$, t value=2.987), and technology characteristics ($\beta=0.359$, t value=2.618) have all shown a significant relationship with task person technology fit and could explain 54 per cent of the variance. Meanwhile, the task person technology fit ($\beta=0.642$, t value=10.754) has a significant relationship with performance. In conclusion, the research model as a whole explains 41 per cent of the variance in breast cancer patients' performance in using SNS.

5. 0 DISCUSSION

Since using SNS seems to be significant trend among individuals with cancer, there is a need to conduct additional research in order to understand factors that can potentially impact cancer patients' performance in using SNS. Early research 1996 to 2007 included mainly descriptive studies of online discussion forums. Later researchers began analyse SNS. Therefore, future research should determine how SNS can influence the behaviour of cancer patients [5]. SNS's impact on users can be estimated through their performance in using the sites [12]. There is still a lack of studies consider the impact of participating in breast cancer support groups [13]. The study focused on breast cancer because it remains one of the most common cancers in Malaysia; close to 1 in 19 Malaysian women are estimated to develop invasive breast cancer in their lifetime [1]. This prevalence rate makes breast cancer one of the most highly visible health topics in all forms of media, including Facebook. The factors that affect the performance of cancer patients in SNS usage were investigated using a survey of 178 respondents in two hospitals and four cancer support groups in Peninsular Malaysia.

The hypotheses of this study consider whether combinations of self-efficacy, task and technology characteristics cause a fit that leads to increased performance in using SNS. This study's findings provide evidence supporting hypotheses stating that self-efficacy, task characteristics and technology characteristics have significant and positive impact on TPTF, and that TPTF has a significant and positive

impact on cancer patients' performance in using SNS. The relationships that relate to task technology fit, and influence the performance in SNS, is well documented within Health Information System (HIS) research [44, 45]. However, there is still lack of research regarding how self-efficacy, task and technology characteristics can be fitted to have an effect on cancer patients' performance in using SNS.

The findings of this study have presented factors that relate to the performance of cancer patients in using SNS, which will enable healthcare providers to generate ideas about how an effective SNS intervention for cancer patients can be conducted. The findings have resulted in practical and theoretical contributions, which may help online cancer support groups to obtain a more comprehensive perspective of the way SNS affect the performance of cancer patients when using SNS.

6.0 CONCLUSION

The factors affecting the performance of cancer patients in using SNS has been investigated through 178 respondents in Peninsular Malaysia. The results have shown that cancer patients' performance in using SNS has been determined directly by fit between self-efficacy, task and technology characteristics. While contributing to both theoretical and practical fields, the study has some limitations that should be dealt through future studies. Firstly, gathering data from the whole population of cancer patients using SNS was not possible, and data collection was undertaken using 178 respondents. The reason was that some of the cancer patients were not keen to share their experiences regarding their use of SNS. Therefore, this shows that this study's sample size is a strong representation of SNS users, which could be generalized to the entire population.

Future research should validate and test this study's findings using a broader sample size, in order to increase the generalizability of the study in a more empirical way. Cross-cultural research with a broader geographical sample distribution may provide new contributions to future research. Additionally, the data collection for this research was conducted during a seven month period, based on the

boundary of the research time. Therefore, future studies may perform the study over a broader period of time in order to attain a better understanding of cancer patients' performance in using SNS.

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