Behavioral Intention to use Knowledge Sharing Tools: Positive and Negative Affect on Affective Technology Acceptance Model

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ABSTRACT

This study examines the affective aspect of the technology acceptance by extending TAM with positive and negative affect as external construct. This research attempts to study on the Knowledge workers that work in the Multimedia Super Corridor (MSC)-status organizations to understand their behavioral intention to use the knowledge sharing tools (KS tools) in their day-to-day tasks based on several motivators. KS tools in this research includes collaborative and communicative functions such as email, blog and Facebook. This research proposes Affective Technology Acceptance (A.T.A) Model that hypothesizes Positive and Negative Affect (PA and NA) have impact on Perceived Usefulness (PU), Perceived Ease of Use (PEOU) and Behavioral Intention to accept (BI) KS tools among knowledge workers in MSC organizations. Positive Affect (PA) and Negative Affect (NA) are defined as the perception of employees on KS tools that induce positive or negative affective states when they interact and evaluate these tools when execute their tasks.

Keywords: Positive affect, negative affect, TAM, knowledge sharing tools, knowledge workers, Affective Technology Acceptance model

I INTRODUCTION

Knowledge sharing and tools used to share knowledge in organizations have always been viewed essential for decade. Some research works focused on acceptance of ICT whereas some examined behavior in knowledge sharing activities. (Lin & Lee, 2004; Hendriks, 1999) From the emotional dimension, the concepts on affect, mood, and emotions have always used been used interchangeably by researchers. Many inconsistent reports and conflicting findings from past studies that consider affect have resulted in very small number of research undertakings in this area. However, research has shown that reflexes, social judgment, perception, and behavior (Russell, 2003; Forgas and George, 2001) are influenced by affect, mood and emotion which constitute the fundamental aspects of human beings. Study on the impact of affect on job performance (Weiss, Nicholas and Daus, 1999), decision making behavior (Childers, Carr, Peck and Carson, 2001), and attitude change or persuasion (Petty, DeSteno and Rucker, 2001) are some of the works found in the areas of organizational behavior, marketing, social psychology and management. Deep review on the influence of affect on assessment, memory, performance and attention was also carried out (Brave and Nass, 2003). In the recent works reviewed, emotional dimension has started to attract more attention from researchers in the domain of technology acceptance.

In the Information Systems (IS) domain, user evaluation or user acceptance of Information Technology (IT) is considered as volitional behavior (Bagozzi 1982) and has been studied primarily with a cognitive orientation (Davis 1989; Goodhue 1995; Venkatesh, Morris, Davis and Davis 2003). Research in this area has always been heavily influenced by the cognition-attitude-behavior models such as Theory of Reasoned Action and the Theory of Planned Behavior (Ajzen and Fishbein 1980; Fishbein and Ajzen 1975). Even though some works on affect, affectivity, playfulness, enjoyment and emotion have been studied, the affective aspects are less central in most of these studies, with some exceptions, such as studies on emotional usability (Kim, Lee and Choi 2003), aesthetics (Lavie and Tractinsky 2004; Tractinsky, Katz and Ikar 2000), computer playfulness (Webster and Martocchio 1992), flow (Finneran and Zhang 2003; Ghani 1995), and users' holistic experiences of cognitive absorption in technology acceptance (Agarwal and Karahanna 2000). Even when some affective constructs are studied, other important constructs escape scrutiny, and researchers fail to agree on definitions.

Due to these limitations of many current studies, the goals of this paper is to investigate whether affect plays a role in an individual's evaluation, reaction, acceptance and use of IT in different contexts for various purposes. Further, if affect does indeed play a role, the expected outcomes of the research will be able to answer the following questions: what aspects of affect should it be examined; what relationships affect may have with other commonly studied user acceptance constructs; whether the role of affect is due to novelty or short-lived impression or persists over time; and how to design affect-friendly systems that will be more beneficial to users.

II RELATED WORKS

In TAM (Figure 1), the Intention to use is the main determinant of usage behaviour to accept or not to accept a new technology. The Intention to use is determined by the person's attitude toward using a particular technology. Perceived Usefulness and Perceived Ease of Use influence an individual's attitude toward using a particular technology. Perceived Usefulness (PU) is defined as the degree to which a person believes that using a particular system would enhance his or her job performance (Davis, 1989). PU is the key determinant that positively affects users' beliefs and intention to use the technology. Perceived Ease of Use (PEOU) is defined as the degree to which the user uses a particular system is free of effort (Davis, 1989). Past research have shown that Perceived Ease of Use (PEOU) influences intention in two ways: direct and indirect effect through perceived usefulness (Davis, 1989). According to Davis (1989), PEOU has no significant influence on behavioral intention to use because PU mediated its influence. The PEOU does not impact directly on user's behavioral intention because it has an effect on behavioral intention through PU. If users do not have perceptions on the usefulness of new technology, PEOU will not have any effect on intentions.

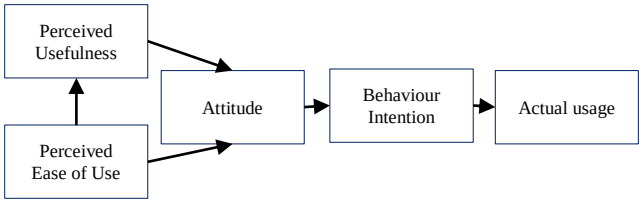

Figure 1. Technology Acceptance Model

All social sciences share a pursuit to try to explain and predict individual's behaviours where these behaviours are influenced by both cognitive processes and emotional or affective markers. Most behavioral theories ignore and sideline role of affect due to affective related factors in user technology acceptance are less consistent, clear and conclusive from both theoretical and empirical perspectives. Affect can range from very specific and acute emotions such as anger or fear; to broader and longer term moods such as cheerfulness and depression. Affect refers to one's feeling state or how one feels when performing some tasks (George and Jones, 1996; Loiacono and Djamasbi, 2010). Affect is also defined as one's moods and emotions (Fredrickson, 2003). Russell (2003), Fredrickson (2003), Lazarus (1991), Moore and Isen (1990) refer to affect as mood, emotion, and feelings. Bagozzi *et al.* (1999) and Liljander *et al.* (2002) said that affect is conceived as an umbrella concept for a set of specific mental processes which includes emotions, moods and attitudes. Meanwhile, Kelly and Barsade (2001) group affect into five general factors that form different types of affect structure. These are dispositional affect, mood, acute emotions, emotional intelligence and sentiments.

Zhang and Li (2007) investigated the impacts of affective evaluations of IT on IT use decisions. In their work, two object-based affective evaluation constructs: perception on IT's capability to induce positive affect (PC-PA) and perception of the IT's capability to induce negative affect (PC-NA). Their study showed that PC-PA and PC-NA are distinct concepts that have different effects on perceived usefulness (PU), perceived ease of use (PEOU), and attitude toward using the IT (ATB). These effects hold true during both initial use and continued use. PC-PA influences PU, PEOU and ATB but becomes less important to PU over time, and PC-NA only influences PEOU but becomes more important to PEOU over time. In this study, they focus on affective evaluations and their impacts. Zhang and Li (2007) concluded that affect plays an important role in the user interactions with IT.

III PROPOSED AFFECTIVE TECHNOLOGY ACCEPTANCE (A.T.A) MODEL

In this research, **PA** and **NA** are defined as the perception on KS tools' characteristics in terms of features and functions to induce positive or negative affective states (Zhang and Li, 2007; Zhang, 2013). PA and NA were adapted from Zhang and Li (2007) where they defined PA and NA as the perception of an IT's Capability to induce positive or negative affect. It is an individual's perception or evaluation that an IT has the features and functions to induce positive or negative affect in him or her. In this study, the external stimulus is KS tools used by the knowledge workers in the MSC-status organizations in Malaysia. The respondents were asked to indicate the extent of how he/she feels on the usefulness, ease of use and intention to use the KS tools in eight (8) different point in times in the instrument. The adopted PANAS scale (Watson and Tellegen, 1985) is to capture a respondent's affective state by reflecting how one feels back in time to observe the influence of affect on one's behaviour. The different affective states of the knowledge workers were self-reported on the survey form. The measurement scale for PA and NA is adopted from Technology Affect Scale (Perlusz, 2004) where Perlusz (2004) adapted the 10-item scale from Watson and Tellegen (1985). The scale was validated using two groups of undergraduate students who were exposed to different types of affects before interacting with mobile

technologies. The Technology Affect Scale is found to be consistent and valid in his experiments.

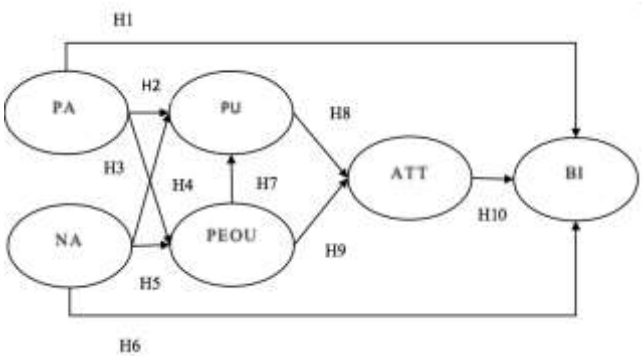

Figure 2.: Affective Technology Acceptance Model

Figure 2 exhibits the proposed model hypothesized that the perceived KS tools' affective quality can induce PA and NA that is able to influence the intention to use and accept the tools.

H1: PA will have positive effect on BI
H2: PA will have positive effect on PU
H3: PA will have positive effect on PEOU
H4: NA will have negative effect on PU
H5: NA will negative effect on PEOU
H6: NA will have negative effect on BI
H7: PEOU will have positive effect on PU
H8: PU will have positive effect on ATT
H9: PEOU will have positive effect on ATT
H10: ATT will have positive effect on BI

IV RESEARCH METHODOLOGY

The target population for this research is the knowledge workers from MSC-status organizations in Malaysia. The knowledge workers in this samples are anyone who works for living on the tasks that primarily deal with information or require to develop and use knowledge to solve problems. About 2500 MSC-status organizations from the MSC directory(http://www.mscmalaysia.my/company_directory) are invited to participate in this research. Invitations were sent out to these organizations and from the organizations that accepted the invitation, a total of 2505 survey forms were distributed, 302 forms were received and 295 of them were usable forms. From the self-administered questionnaire received, a response rate of 11.87% was achieved. Seven (7) survey forms were discarded because the respondents did not respond 80% of the questions on the survey form. This study uses stratify sampling approach. The respondents evaluate a list of knowledge sharing tools (KS tools) that they use in their day-to-day activities for tasks given to them

V ANALYSIS OF RESULTS

The proposed model and hypothesis testing was conducted using partial lease squares (PLS) software: SmartPLS 3.0. The analysis carried out in this paper follow strictly Hair et al. (2012) on the measurement model and structural model of the A.T.A research model in this research. In this research, a sample size of 295 is sufficient to simultaneously examine the predictive accuracy of constructs and path coefficients of relationships in the models. This section analyzes measurement model that consists of reflective and formative models.

Reflective constructs in the proposed model are Perceived Usefulness (PU_I), Perceived Ease of Use (PEOU_H), Attribute toward use of KS tools (ATT_G), and Behavioural intention to use KS tools (BI_J). Composite reliability varies between 0 and 1 with higher values indicating higher levels of reliability. Composite reliability of 0.60 - 0.70 is acceptable while values between 0.70 – 0.90 can be regarded as satisfactory (Nunally and Bernstein, 1994). However, if composite reliability (Table 1) has a value higher than 0.95, this indicates that all indicators are measuring same phenomenon of a construct and therefore unlikely to be a valid measure of the construct.

Table 1. Composite reliability

Constructs	Composite reliability (CR)
Perceived Usefulness (PU_I)	0.95
Perceived Ease of Use (PEOU_H)	0.93
Attitude toward use of KS tools (ATT_G)	0.93
Behavioral Intention to use KS tools (BI_J)	0.94

Discriminant validity is the extent to which a construct is truly distinct from other constructs by empirical standards. This means a construct is unique and captures phenomena not represented by other constructs in a model. In Table 2, Average Variance Extracted (AVE) are examined. Two measures of discriminant validity are used in the analysis; they are Cross loading and Fornell-Larcker criterion.

Table 2. Average Variance Extracted (AVE)

Constructs	AVE
PU_I	0.71
PEOU_H	0.59
ATT_G	0.64
BI_J	0.68

Table 3 exhibits discriminant validity for reflective constructs. The results indicate that all constructs' AVE have high correlation compared to others. Thus, the results fulfilled the Fornell-Larcker discriminant validity.

Table 3. Discriminant Validity

Reflective Constructs	ATT_G	BI_J	PU_I	PEOU_H
ATT_G	**0.799**			
BI_J	0.717	**0.826**		
PU_I	0.756	0.717	**0.843**	
PEOU_H	0.601	0.506	0.545	**0.782**

The significance of relationships is examined next. An analysis of the relative importance of relationships is crucial for interpreting the results and drawing conclusions. If path coefficient is larger than the other path on a dependent construct, its effect on the endogenous latent variable is greater. These coefficients represent the estimated change in the endogenous construct for a unit of change in the exogenous construct. As for effects, direct effect is the effect of one construct on another one. Indirect effect is the effect of one construct on another construct via one or more mediating constructs. Total effect is the sum of direct and indirect effects. If a path is significant, the hypothesis is supported which indicate that responses provide significant support to the hypothesis. In the analysis, it is found that one (1) hypothesis is not being supported (Table 4).

Table 4. Hypothesis Testing Decision

Path	Decision
ATT_G -> BI_J	Supported
NA_BI -> BI_J	Supported
NA_PEOU -> PEOU_H	Supported
NA_PU -> PU_I	Not Supported
PA_BI -> BI_J	Supported
PA_PEOU -> PEOU_H	Supported
PA_PU -> PU_I	Supported
PU_I -> ATT_G	Supported
PEOU_H -> ATT_G	Supported
PEOU_H -> PU_I	Supported

VI DISCUSSION

KS tools have been grouped into several major groups for the analysis purposes. In the demographics analysis, several observations have been found. From the aspect of KS tools usage, KS tools that have low usage frequency include Social Media, Web Meeting, Digital Repository, and Messaging System. Many related works reviewed from the past indicated that Web 2.0 technology and systems have been very successfully to provide knowledge sharing capability. However, this was not found in the study. However, KS tools that have high usage frequency such as Discussion Forum was found to have attracted a lot of knowledge workers. A close examination found that Email is the most extensively used KS tools in the MSC-status organizations to communicate and collaborate.

In the outcomes of the formative construct analysis, PA and NA for PU, PEOU and BI satisfy all the tests as according to Hair et al (2012). Only an item that measures NA for PEOU was found to be not significant. However, based on the instrument adapted, the NA item was retained.

In the hypothesis testing, a total of ten (10) paths have been tested. The data collected supported nine (9) of the ten (10) paths in the proposed model. Only one (1) path was not been supported: NA_PU -> PU_I deduce that negative affect has no impact on Perceived Usefulness of KS tools. This contrast to the findings in the existing works. Zhang and Li (2007) stated that negative affective state has more apparent and easier to measure as compare to positive affect element in many studies. And negative affect always impacts the performance of the knowledge workers and usage of a technology. However, the outcome of this research produces a new finding where it states that negative affect does not impact the Perceived Usefulness of the KS tools. This can be deduced by conclude that when KS tools are perceived to be useful, they remain useful regardless of the affective state of an individual at that point of time.

As for constructs in TAM, the outcomes align to many past research works presented by Davis (Davis, 1989) and Vankatesh (Venkatesh et al., 2003). The findings from the research model can be concluded that Attitude toward KS tools usage has strong influence on Behavioural Intention Usage of KS tools. Perceived Usefulness of KS tools strongly influence the Attitude of the knowledge workers to use the tools. Perceived Ease of Use has positive influence on the Attitude of knowledge workers on the tools usage. And Perceived Ease of Use has strong positive impact on Perceived Usefulness of KS tools. As for PA and NA, they are hypothesized to have either negative or positive impact on PU, PEOU and BI in the A.T.A model.

In the Affective Technology Acceptance Model (A.T.A), Negative Affect has strong impact on Behavioural Intention Usage of KS tools. As knowledge workers use the KS tools to do their day-to-day jobs, this is the extent of they feel after interacting and using these tools provided to them. This could derive that if a tool has strong negative influences on BI, it will deter or slow down the widespread of the tools among the knowledge workers in the organizations. Negative affect also has strong negative influence on PEOU and PU of the KS

tools too. It is apparent that knowledge workers view negative affect is an important element where such negative element can impact on the Behavioural Intention of KS tools usage.

The Positive Affect is hypothesized to have positive impact on PEOU, PU and BI. In the outcomes of the analysis, PA has been found to have positive significant influence on these three (3) constructs. The business operators have to maximize the positive affect to influence the PEOU, PU and BI of the KS tools since the outcomes of the analysis highlight that such positive affective state can help to improve and increate the intention of the knowledge workers to use the KS tools.

Table 5. Path Coefficient

Hypothesis	Path coefficient	t value	P value
ATT_G -> BI_J	0.40	6.05	0.00
NA_BI -> BI_J	-0.10	2.03	0.04
NA_PEOU -> PEOU_H	-0.14	2.30	0.02
NA_PU -> PU_I	-0.07	0.95	0.34
PA_BI -> BI_J	0.13	2.77	0.01
PA_PEOU -> PEOU_H	0.23	4.47	0.00
PA_PU -> PU_I	0.10	1.84	0.07
PU_I -> ATT_G	0.61	15.00	0.00
PEOU_H -> ATT_G	0.27	5.53	0.00
PEOU_H -> PU_I	0.32	4.34	0.00

From the predictive capability of the constructs, Attitude and Behavioural Intention of KS tools usage are the strongest among other constructs. This is followed by PU and PEOU of KS Tools. PU can predict as accurate as 45% of the usefulness of the tools whereas PEOU can predict as much as 36% of the KS tools' ease of use (Table 5). This means that antecedents for PU and PEOU, PA and NA, as external factors for TAM model, are very important. The stronger PA is, the more likely that the positive affect is able to help improving their attitude hence result in stronger intention to use the tools.

VII CONCLUSION

As a conclusion, this research has highlighted that positive and negative affect in the view of the knowledge workers can either negatively or positively influence the Behavioural Intention usage of KS tools in the MSC-status organizations. As business operators are able to maximize the positive energy and minimize the negative energy among the knowledge workers, the stronger their behavioural intention to use KS tools will be.

A number of future research topics that can be considered include knowledge workers in SME on various industries. Next, different new knowledge sharing tools used by knowledge workers can be used to be tested on A.T.A model in order to validate and improve the model.

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