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**Comparing Cognitive, Affective,
and Conative Elements of Two
Competing Applications**

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Comparing Cognitive, Affective, and Conative Elements of Two Competing Applications

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*Two roads diverged in a yellow wood,
And sorry I could not travel both
And be one traveler, long I stood
And looked down one as far as I could
To where it bent in the undergrowth;*

....

Robert Frost (1874-1963)

Life is full of choices. The above poem by Robert Frost describes a traveler facing two diverging roads from which he has to choose one way to go. Information Technology (IT) users also have choices in using one or more software products. For instance, nowadays users face many alternative products such as operating systems (e.g. Linux, MacOS and Microsoft Windows), office software packages (e.g. Microsoft Office, IBM SmartSuite and StarOffice), and graphic software (Photoshop and Corel Draw). However, the research in the information systems (IS) field has neglected the choices of applications which users may go for (Chan, Teo, Yang, & Li, 2004; Szajna, 1994). For instance, the user acceptance models in IS research such as technology acceptance model (TAM), theory of reasoned action (TRA) and theory of planned behavior (TPB) have been widely used to predict a single application usage or usage in a functional area without consideration of alternatives (Mathieson, 1991; Taylor & Todd, 1995; for review see Venkatesh, Morris, Davis, & Davis, 2003).

Many researchers have long recognized the importance of studying choice behavior. They explain that the accuracy of predicting behavior with the presence of behavior alternatives is higher than without them (Jaccard, 1981; Sheppard, Hartwick, & Warshaw, 1988; Szajna, 1994; Woodside & Clokey, 1974). Researchers in the field of psychology

and marketing have also shown concern over behavioral studies that do not consider the effects of the rival product when they examine the intention of a specific product (Davis & Warshaw, 1991; Sheppard, et al., 1988; Warshaw & Droge, 1986). A study which examines an intention to drink a Pepsi cola, for instance, may implicitly evoke the subjects to compare with other colas such as Coca cola and Dr. Pepper. When answering the questionnaires regarding the intention to drink one of these products, subjects may compare their positive and negative evaluations with other alternatives. They conclude that measuring user intention of a very specific product may yield inaccurate conclusion (Davis & Warshaw, 1991; Sheppard, et al., 1988; Warshaw & Droge, 1986). Though researchers in these fields have long documented the issue, in user acceptance literature, very few studies have examined this issue.

The motivations of this paper are as follows. Firstly, insight from social psychology and marketing researchers shows higher accuracy for studies that predict behavioral alternatives (Jaccard, 1981; Szajna, 1994; Woodside & Clokey, 1974). Secondly, researchers show concern over the possibility of inaccurate conclusions drawn from studies which predict the acceptance of a specific product (Davis & Warshaw, 1991; Sheppard, et al., 1988; Warshaw & Droge, 1986). Thirdly, studies on acceptance of software alternatives are rare. Fourthly, different software vendors provide many similar products from many software ranges, and lastly, in the most realistic phenomena, users do have a preferred choice in the application they use.

This paper is organized in the following way. The theory section focuses on the importance of studying alternatives application, and on the user acceptance theory which traditionally have been applied to explain an intention of adopting an application. Subsequently, it looks at how the model is used to examine alternative products in two studies. Next, this study reviews the extended competitive vulnerability model (ECVM) which researchers in the marketing field apply to explain competing cognitive, affective, and conative elements of two products. We also look at the instant messaging literature. The research model and methodology section lists the hypothesized relationships for two competing applications, the instrument used and the administration of the instrument to 310 users. The result of the study shows support for the proposed model drawn from TAM and ECVM. The discussion and conclusion section presents the contributions of this paper with regard to research and practice, as well as possible topics for future research.

Theoretical Background

The Importance of Studying Alternatives

With the exceptions of the studies by Szajna (1994) and Chan et al. (2004), intention-based research in the information systems field has been widely applied to examine one particular application without considering its alternatives (e.g. Mathieson, 1991; Taylor & Todd, 1995; Venkatesh, et al., 2003). Researchers in the field of marketing and psychology showed concern over studies that do not explicitly specify the alternatives, but implicitly evoke a set of alternatives (Davis & Warshaw, 1991; Sheppard, et al., 1988; Warshaw & Droge, 1986). Even though these studies do not explicitly specify the alternatives, they suggest (hint) to the subjects to think about other alternatives. For instance, a study that examines the intention to use Internet Explorer may implicitly evoke the subjects to think about its rival, Netscape. Subsequently, when answering the questionnaires regarding the intention to use Internet Explorer, subjects may compare their evaluations with other alternatives. Therefore, measuring user intention of a specific product alone may yield an incomplete picture.

In their meta-analyses of TRA, Sheppard et al. (1988) found that studies with implicit alternatives (i.e. studies on a specific product, such as Pepsi) have stronger intention and behavior relationships than those without implicit choices (i.e. a general group of products, such as coke). Specifically, the frequency-weighted average correlation was only 0.47 for those without implicit choice and was almost 0.80 for those with implicit choice. Therefore, their result demonstrated the better accuracy of predicting behaviors even with implicit alternatives. In the next section, we briefly summarize studies which apply the technology acceptance model, specifically we focus on two studies which examine alternatives application.

Technology Acceptance Model (TAM)

In the Information Systems (IS) field, the two well-known and salient cognitive evaluations of computer usage are perceived ease of use (PEOU) and perceived usefulness (PU). Researchers in the IS field hypothesize these two cognitive beliefs as the direct determinants of behavior intention (BI) in a parsimonious model named technology acceptance model (TAM) (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989). TAM originates from the social psychology theory of reasoned action (TRA) (Fishbein & Ajzen, 1975; Ajzen, 1991). PU refers to "the degree to which a person believes that using a particular system would enhance his or her job performance". The definition of PEOU is "the degree to which a person believes that using a particular system would be free of efforts" (Davis, 1989). Many researchers have tested these constructs and their questionnaire items rigorously for validity and reliability (e.g. Adams, Nelson, and Todd, 1992; Chin and Todd, 1995; Davis, 1989; Davis et al., 1989; Hendrickson, 1993; Mathieson, 1991; Moore and Benbasat, 1991; Rose and Straub, 1998; Szajna, 1996; Venkatesh and Davis, 2000).

However, most of the TAM studies traditionally examined applications with more focused functions such as an email, text editor, personal computer, and spreadsheet systems. Only few studies have examined alternative applications. The exception are studies by Szajna (1994) and Chan et al. (2004). In Szajna (1994), she replaced the TAM's behavioral intention with the subject's choice of a database management system. To assess the predictive validity of PU and PEOU on database choice, she asked the subjects to rate PU and PEOU for different competing database technologies. She hypothesized the highest rated PU and PEOU to be the predictors of the database choice. The result supported her hypotheses showing that PU and PEOU could predict choice with an accuracy rate of 70 percent.

Chan et al. (2004) examined two competing software products also by using the TAM. In their study, they hypothesized that perceived usefulness is only important for the preferred product, but not for the less preferred product. To validate this hypothesis, they conducted a survey asking the respondents about their perceptions and behavioral intention of using two browsers: Internet Explorer and Netscape. The result showed strong support for their hypothesis. The result also demonstrated that intention to use the less preferred software is strongly related to attitude but not related to perceived usefulness. These studies showed that looking at intentions with explicit alternatives yields more interesting results than examining studies with no alternative. In the next section, a model which directly measures the effects of the rival application is introduced.

Extended Competitive Vulnerability Model

The extended competitive vulnerability model (ECVM) proposed that both the direct and competitive effects should be included when analyzing choices in competing products