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Understanding Involvement in Technology Adoption

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Abstract

Adoption research often draws on frameworks such as the Technology Acceptance Model and the Theory of Planned Behaviour to explain an individual's intention to use information technology (IT). Collectively these models suggest that intention to use an information technology (IT) is determined by attitude, subjective norms and perceived behavioural control. However, prior research on the attitude-behaviour link often returns inconsistent results. To address this inconsistency, this study looks at the role of involvement (i.e. an individual's level of interest in a technology) in explaining intention to use IT, in this case, intention to use a mobile Internet phone. The survey results showed involvement was a stronger predictor of intention to use when compared with other determinants (e.g. perceived enjoyment, perceived behavioural control) while attitude was not significant. The findings therefore suggest the usefulness of involvement in explaining intention to use where attitude may fail to do so.

Keywords

Attitude, Involvement, Technology Adoption, Perceived Enjoyment

INTRODUCTION

Addressing the problem of how to accelerate adoption of a technology has been a key focus of IS research with many studies examining the antecedents of behavioural intentions and use towards IT (Davis et al. 1989; Taylor & Todd 1995a; Venkatesh et al. 2003). One of the earliest models to achieve widespread popularity for understanding technology adoption is the Technology Acceptance Model (TAM). In its basic form, TAM depicts *attitude* (i.e. an individual's evaluation of the overall degree of favourability towards an object) as a key factor that partially mediates the impact of innovation beliefs (i.e. perceived usefulness) on intention to use. However, models such as TAM have not been consistent in explaining the attitude-behaviour link in technology adoption (Taylor & Todd 1995a; Venkatesh et al. 2003).

The aim of this research is to address this inconsistency in attitude-related models of technology adoption by determining whether *involvement* (i.e. the level of interest that an individual has towards a technology) can better explain adoption, where evaluative judgments of favourability (i.e. attitude) may fail. To determine the relative importance of involvement as a predictor of adoption, this research will assess the impact of both attitude and involvement and their antecedents on intention to use. This study will therefore examine an involvement-enhanced adoption model that considers the role of involvement and attitude alongside other well-established determinants of intention to use (such as perceived usefulness, perceived enjoyment, subjective norms, and perceived behavioural control).

To examine the research model a survey will be conducted in the context of intention to use a mobile Internet phone to access the Internet. The mobile Internet phone context is useful for several reasons. First, although widespread diffusion is in the relatively early stages, the technology is affordable, readily available, and most persons are likely to have a reasonable level of knowledge-awareness about the technology or some exposure to the technology even if they have not used the technology personally. Furthermore, the research context is one that is characterised by voluntariness, personal costs to adopters, and a technology that has a large capacity for hedonic value. The research context is therefore unlike the traditional work-related context in which most adoption research has been carried out. These distinctions from prior research further enhance the usefulness of the findings to adoption literature beyond the insights that are provided vis-à-vis involvement.

This paper proceeds as follows. The next section addresses the literature in respect of involvement, attitude and intention to use. This is followed by a discussion of the research model. The research method is then outlined and the study results presented and discussed. The paper concludes with an overview of the research limitations and directions for further work.

LITERATURE REVIEW

The innovation-decision process is essentially an information-gathering and processing procedure that enables an individual to form various beliefs and perceptions about an object, which then impact how a person will respond to that object (Rogers 2003). To better understand the beliefs and perceptions that determine how individuals respond to a technology, vis-à-vis adoption, IS research has drawn on behavioural models such as the Technology Acceptance Model (TAM), the Theory of Planned Behaviour (TPB) and its predecessor, the Theory of Reasoned Action (TRA), and perceived characteristics of an innovation (PCI) to examine IT-related intention to use and use behaviours (Ajzen 1991; Davis et al. 1989; Fishbein & Ajzen 1975; Moore & Benbasat 1991). Of these, the Technology Acceptance Model (TAM), which was specifically designed to assess computer-related behaviours, has been subject to extensive research to validate and extend the model in terms of content and context of application (Davis et al. 1989; Mathieson 1991; Venkatesh & Davis 2000; Venkatesh et al. 2003).

While attitude-behaviour models such as the TAM, TRA, and TPB and their variants have been widely used to examine the beliefs and perceptions of adopters, research shows some inconsistencies in the findings. For example, some researchers have found attitude to be a good predictor of intention to use (Bhattacharjee 2000), while others have found that attitude does not consistently predict adoption intention (Taylor & Todd 1995a). One approach to addressing this inconsistency or low empirical relations between attitude and adoption behaviours is to rely on other variables that may better explain behaviour and/or the attitude-behaviour inconsistencies. One such variable is involvement, which has received much attention in consumer behaviour research.

Involvement

Consumer behaviour research suggests that in the decision process, an individual's involvement with a product can impact behaviour towards that product (Bloch et al. 1986; Cooke & Sheeran 2004; Flynn & Goldsmith 1993; Ram & Jung 1994). A review of the literature identifies a variety terms and conceptualisations advanced for the concept of involvement. For example, Zaichkowsky (1994) defines involvement as "a person's perceived relevance of the object based on inherent needs, values and interests". Andrews et al (1990) describes involvement as an individual internal state of arousal that has intensity, direction and persistence properties. Mittal & Lee defined involvement as the interest a person has in a product. Despite the presence of many different conceptualisations, what comes out of the literature is that involvement captures an individual's perception of the importance or relevance of the object or behaviour. Involvement therefore represents *an individual state of arousal or motivation towards an object that is activated by a person's perception of the relevance or importance of that object* (Andrews et al. 1990; Laurent & Kapferer 1985; Mittal & Lee 1989; Zaichkowsky 1986; Zaichkowsky 1994). Consistent with this definition, involvement may be conceptualised using bipolar dimensions such as boring-interesting and unimportant-important (Zaichkowsky, 1994).

Attitude- on the other hand is generally depicted in IT research and the wider domain of behavioural research as an evaluative judgement of an object or behaviour that is typically captured using dimensions such as positive-negative, good-bad, harmful-beneficial (Ajzen, 2001). Hence attitude may be defined as *a personal factor that reflects a person's positive or negative evaluation of performing a particular behaviour* (Ajzen & Fishbein 1980).

Involvement, as an emotive judgement is therefore considered to be conceptually different from the evaluative judgement embodied in attitude (Mittal 1995; Zaichkowsky 1994). For example, a key attribute that distinguishes attitude (from involvement) is its focus on the object or behaviour which is reflected in an evaluative judgement of the positive-negative nature of that object or behaviour. Involvement, as a motivational concept reflecting interest and importance, focuses on the individual rather than on the object (Ajzen & Fishbein, 1975; Andrews et al. 1990). Attitude therefore has a directive effect while involvement has an arousal (motivational) effect (Andrews et al. 1990; Howard & Sheth 1969).

Despite the inconsistencies in attitude-behaviour research, many researchers continue to regard attitude as a key determinant of behaviour (Ajzen, 2001), expending much effort towards understanding the attitude-behaviour relationship. In so doing, researchers recognise that the situation and other variables (e.g. competing motives, norms, individual factors) that influence behaviour need to be considered, either as independent contributors to behaviour or as moderators of the attitude-behaviour link. This research therefore examines the relative importance of involvement as a determinant of behaviour (in this case, intention to use a mobile Internet device) and whether involvement may better explain behaviour, where attitude's low empirical links to that behaviour.

THE RESEARCH MODEL

This study aims to assess the relative importance of involvement as a determinant of intention to use. As such other key determinants of intention to use are also considered, in this case, attitude, subjective norms, and perceived behavioural control (Ajzen, 1991; Mathieson 1991; Taylor & Todd 1995a). Consistent with the focus

on attitude and involvement, key antecedents of both attitude and involvement are also considered, namely perceived usefulness and perceived ease of use for attitude and perceived usefulness and perceived enjoyment for involvement, as well as salient (direct) links between these antecedents and intention to use. The remainder of this section examines the proposed research model and hypotheses.

TAM is by far is one of the most thoroughly examined frameworks in IS research, the results of which provide strong support for the belief-attitude-intentions links proposed by the model (Bhattacharjee 2000; Davis et al. 1989; Mathieson 1991; Taylor & Todd 1995a; Teo et al. 1999; Venkatesh & Davis 2000). More recently TAM has been used to examine the adoption of mobile Internet technologies such as mobile Internet phones and mobile services (Kim et al. 2005; Lu et al. 2005; Teo & Pok 2003). Adapted from the Theory of Reasoned Action to explain computer use behaviours, TAM posits two beliefs that is, perceived usefulness and perceived ease of use, as causally linked to attitude and intention to use. TAM also suggests that perceived usefulness is impacted by perceived ease of use (Venkatesh & Davis 2000). Hence, it is expected that:

- H1: Attitude is positively related to intention to use.
- H2: Perceived usefulness is positively related to intention to use.
- H3: Perceived ease of use is positively related to attitude.
- H4: Perceived usefulness is positively related to attitude.
- H5: Perceived ease of use is positively related to perceived usefulness.

Research also provides strong support for the relationship between perceived enjoyment and behavioural intention (Davis et al. 1992; Teo et al. 1999; van der Heijden 2004). For example, intentions to use a computer were influenced in part by the enjoyment experienced when using the computer (Davis et al. 1992). Perceived enjoyment was also found to be a stronger predictor of intention to use than perceived usefulness for hedonic systems (van der Heijden 2004). Hence,

- H6: Perceived enjoyment is positively related to intention to use.

Involvement

Since involvement is an internal state, as a construct it can be conceptually separated from antecedents (e.g. personal needs, goals and values, and object characteristics) and consequences or outcomes. Involvement has therefore been examined in many roles: as a determinant of emotional and cognitive responses such as online shopping enjoyment (Koufaris 2002), as a mediator of the attitude-behaviour link (Cooke & Sheeran 2004), and as the dependent variable in respect of object characteristics and value goals such as perceived usefulness and hedonic value (Latour et al. 2002; Mittal & Lee 1989). Although involvement has received much attention in the consumer behaviour research, it has received limited attention in IS literature vis-à-vis adoption. Consistent with prior research on involvement (Mittal & Lee 1989; Zaichkowsky 1986), this study will examine involvement as a determinant of intention to use a mobile Internet phone (despite other theoretical treatments).

In this study, involvement is defined as *the level of interest that an individual has towards an object or behaviour*, in this case, using a mobile Internet phone to access the Internet. Prior research suggests that an individual's involvement with a product may impact their behaviour towards that product (Bloch et al. 1986; Cooke & Sheeran 2004; Flynn & Goldsmith 1993). For example, prior research shows that product involvement impacts purchase behaviours (Flynn & Goldsmith 1993) and product use (Mittal & Lee 1989). Ram and Jung (1994) also found that involvement affects time to adoption where, early adopters were found to be more highly involved with the product of interest. As such individuals who are highly interested in using mobile Internet phone are likely to exhibit stronger intentions towards using it. Hence, it is expected that:

- H7: Involvement is positively related to intention to use.

Research also suggests involvement relies in part on antecedent factors related to needs and values, in particular, hedonic and utilitarian values (Kapferer & Laurent 1993; Mittal & Lee 1989; Zaichkowsky 1994). To the extent that an individual believes an object possesses properties that satisfy utilitarian goals and/or hedonic goals, this is likely to impact involvement (Mittal & Lee 1989). Looking at IT research on technology attributes, two perceptions are particularly relevant to hedonic and utilitarian goals: perceived enjoyment that focuses on an individual's belief that the particular object would provide pleasure, that is, hedonic value (Davis et al. 1992) and perceived usefulness of a technology which focuses on expected benefits (i.e. utilitarian value).

Prior research views perceived enjoyment as an indicator of the hedonic value of a technology (Kapferer & Laurent 1993; Laurent & Kapferer 1985; Mittal & Lee 1989). Laurent and Kapferer (1985) also identify the perceived pleasure value of a product as a key factor impacting involvement. With the current emphasis on mobile infotainment, the hedonic aspects of using a mobile Internet phones may be a key determinant of intention to use. The literature also suggests a strong positive relationship between perceived usefulness and involvement

with personal computers (Latour et al. 2002). To the extent that an individual believes a mobile Internet device is useful this is likely to increase involvement. It is therefore suggested that:

H8: Perceived usefulness is positively related to involvement.

H9: Perceived enjoyment is positively related to involvement.

Subjective Norms

Subjective norms derive from an individual's perception of the social pressures placed on him/her to perform (or not perform) a particular behaviour (Ajzen & Fishbein 1980). Subjective norms may therefore be a key determinant impacting intention (Ajzen & Fishbein 1980, Taylor & Todd 1995a; Teo & Pok 2003). For example, Teo and Pok (2003) observed a positive relationship between subjective norms and intention to use WAP-enabled phones, while others found the influence of subjective norms on behavioural intentions may vary over time (Venkatesh & Morris 2000). As such mixed results (positive or low significance levels) may be returned for the relationship between intention and subjective norms. Nonetheless, where subjective norm is important, it is expected that:

H10: Subjective norm is positively related to intention to use.

Perceived Behavioural Control

Perceived behavioural control refers to the control that an individual believes he/she has over performing a particular behaviour (Ajzen, 1991). This concept of perceived behavioural control considers the resources and opportunities (e.g. time, money, skills) that enable a person to perform an intended behaviour, as a precursor of intention to use and actual use. Perceived behavioural control is closely related to Bandura's (1977) concepts of self-efficacy and Triandis's (1977) notion of facilitating conditions. Prior research therefore suggests that the more confident an individual is in their ability to perform a behaviour (e.g. use a technology) the greater their behavioural intention (Compeau & Higgins 1995). Similarly, the absence of resources (e.g. time, money) is likely to constrain behavioural intentions (Taylor & Todd 1995a). Hence, the extent to which the necessary skills, resources and opportunities are in place is positively linked to intention to use and actual use (Bhattacharjee, 2000; Mathieson 1991; Taylor & Todd 1995a). For example, perceived behavioural control was shown to be positively related to intention to use WAP-enabled phones (Teo & Pok, 2003). Hence,

H11: Perceived behavioural control is positively related to intention to use.

Figure 1 summarises the research hypotheses vis-à-vis an involvement-enhanced model of technology adoption.

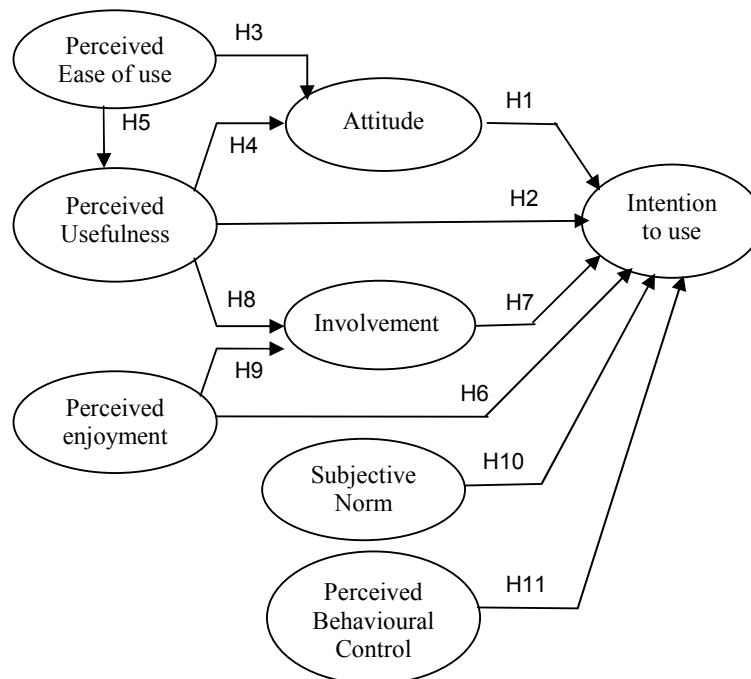


Figure 1. Involvement-Enhanced Model of Technology Adoption

METHODOLOGY

Data for this study were collected by way of a survey administered to the general public by a team of recruiters. Participants were approached (face-to-face) in various locations by the survey recruiters. While participants were selected at random, the recruitment locations were selected based on accessibility and the probability of a reasonable response rate. Consistent with prior research, persons who had some knowledge of mobile Internet phones but had not yet adopted the technology were included in this study. Adopters were not included as prior research suggests significant differences between adopters and non-adopters or experienced versus non-experienced users (Taylor & Todd, 1995b) – this would necessitate a comparative assessment of non-adopter/adopter categories which was outside the scope of this paper. Of the 750 surveys distributed, 308 surveys were returned by non-adopters; 283 (37.3%) of these were useable.

Study Variables

Construct measures were adapted from prior research and reworded to focus on using mobile Internet phones to access the Internet; in all cases 9-point Likert-type scales were used. Perceived usefulness (5 items), perceived ease of use (4 items), attitude (4 items) and intention to use (3 items) were measured using scales adapted from the TAM literature (Davis et al. 1989; Davis et al. 1992; Taylor & Todd 1995a). Perceived enjoyment (3 items) was adapted from Agarwal and Karahanna (2000) and involvement (8 items) measured using the revised personal involvement index (Zaichkowsky 1994). Participants were then asked to respond based on their perceptions of using a mobile phone to access the Internet for tasks such as browsing, getting information from the Internet, email, and conducting mobile transactions. Demographic data on prior computer and Internet use as well as gender and age were also collected (See Table 1).

Table 1: Sample Demographics

Gender (8 missing)	
Male	93 (33.8%)
Female	182 (66.2%)
Age Group (5 missing)	
< 18 years	18 (6.5%)
18-34 years	165 (59.4%)
35-44 years	89 (32.0%)
45 years +	6 (2.2%)
Have used a computer (Yes)	223 (78.8%)
Have used the Internet (Yes)	202 (71.4%)

FINDINGS AND DISCUSSION

PLS-Graph version 3.00, a structural equation modelling approach, was used to assess the measurement models and the structural models. The bootstrapping procedure as implemented in PLS-Graph 3.00 was used to evaluate the significance of the hypothesised relationships.

The Measurement Model.

The measurement models were assessed in terms of convergence and discriminant validity. The results showed all items exhibited high factor loadings (greater than 0.70), ranging from 0.806 to 0.952. Internal consistency was assessed using composite reliability coefficients; these ranged from 0.908 to 0.965 in line with the standards for convergence. Average variance extracted ranged from 0.712 to 0.904 satisfying this criterion also. Finally, the square root of the average variance extracted for each construct exceeded the construct inter-correlations satisfying the criteria for discriminant validity.

The Structural Model

The results (Table 2) shows that the research model accounted for 49% of the variance observed for intention to use. However, it is not the overall variance explained that is of greater interest, but the relative role of involvement vis-à-vis the other variables that explain intention to use. Here, the results provide strong support for the link between involvement and intention to use supporting hypothesis H7. Support was also provided for

the links between perceived enjoyment and perceived behavioural control, and intention to use, supporting hypotheses H6 and H11. Hypotheses H1 and H10 regarding attitude and subjective norms as determinants of intention to use were not supported.

Turning to the determinants of attitude, the results provided strong support for perceived usefulness as a determinant of attitude (i.e. H4 was supported) confirming prior research. Perceived ease of use was also shown to have a positive influence on perceived usefulness supporting hypotheses H5. However, hypothesis H3 regarding the link between perceived ease of use and attitude was not supported. In respect of involvement, the results provided strong support for both perceived usefulness and perceived enjoyment as antecedents of involvement; hypotheses H8 and H9 were supported.

Contrary to expectations, perceived usefulness did not exhibit a significant (direct) impact on intention to use, within the research context. This may be due to factors such as the availability of alternatives (e.g. computer-based Internet access) and attributes such as small screen size, low storage capacity and processing power of mobile phones that may limit perceived usefulness of mobile Internet devices; further research is needed to investigate this conjecture. Although perceived usefulness did not exert a significant direct impact on intention to use in this study, its impact on intention to use through involvement was significant.

Regarding perceived enjoyment, the results provided strong support for the role of perceived enjoyment vis-à-vis intention to use, supporting hypothesis H6. The dominance of perceived enjoyment as an adoption driver when compared with perceived usefulness is consistent with prior research which suggests that earlier adopters of some technologies may place more emphasis on hedonic attributes than on utilitarian outcomes (Brown & Venkatesh 2003). It should also be noted that the mobile Internet phone is often considered a hedonic technology (especially if use is personal rather than work-related). The outcome is therefore consistent with prior research which showed that perceived enjoyment was a stronger predictor of intention to use than perceived usefulness (van der Heijden, 2004). Taken altogether, the results regarding perceived usefulness and perceived enjoyment suggest the respondents were influenced more by beliefs that using mobile Internet phones has greater hedonic value compared with utilitarian value. This may be consistent with the wide deployment and greater popularity of entertainment services when compared with other mobile commerce services.

Table 2. Model Results

Hypotheses	Path
H1: Attitude → Intention to Use	0.067
H2: Perceived Usefulness → Intention to use	-0.024
H3: Perceived Ease of Use → Attitude	-0.059
H4: Perceived Usefulness → Attitude	0.564***
H5: Perceived Ease of Use → Perceived Usefulness	0.525***
H6: Perceived Enjoyment → Intention to use	0.236***
H7: Involvement → Intention to Use	0.378***
H8: Perceived Usefulness → Involvement	0.303***
H9: Perceived Enjoyment → Involvement	0.491***
H10: Subjective norm → Intention to use	0.051
H11: Perceived Behavioural Control → Intention to use	0.127*
R-Squared (Variance Explained)	
Perceived Usefulness	27.6%
Attitude	28.7%
Involvement	54.6%
Intention to Use	49.0%

* $p \leq 0.01$, ** $p \leq 0.005$, *** $p \leq 0.001$

In summary, the results suggest involvement was the stronger predictor of intention to use when compared to the other antecedents. This was followed by perceived enjoyment and perceived behavioural control. The results therefore provided strong support for considering involvement as a probable predictor of technology adoption (Ajzen 2001; Cooke & Sheeran 2004), where attitude may appear to fail.

LIMITATIONS AND FUTURE RESEARCH

Although non-work volitional settings characterise much of the research done with mobile device adoption (Kim et al. 2005; Teo & Pok 2003) and reduces the confounding impact of factors such as voluntariness (Moore & Benbasat 1991), limitations concerning extendibility to other technologies and work-related contexts may arise. These may limit generalisability of the current research findings. As such, it is important, having illustrated the importance of involvement as a determinant of intention to use (in this case, a mobile Internet device), to examine the research model in other contexts, since different contexts and situations (e.g. hedonic vs. utilitarian technologies, other technologies/systems, voluntary vs. mandatory use) may return different results in respect of the relative importance of involvement, attitude and other determinants of intention to use. For example, this study is consistent with prior research that shows perceived enjoyment to be a dominant determinant in respect of hedonic systems (van der Heijden, 2004); however, this may not be the case for work-related systems or where use may be mandated.

Secondly, the study did not set out to examine a comprehensive model of intention to use. As such, factors such as compatibility and experience which may also impact intention to use were not considered (Agarwal, 2000; Brown & Venkatesh 2003; Taylor & Todd 1995a). The study also did not account for the impact of alternative technologies such as fixed-line internet access. For example, prior research suggests that choice between two or more alternatives (Ajzen & Fishbein 1980; Davis & Warshaw 1991) may impact intentions. Future research may therefore consider alternative models that address these limitations.

CONCLUSION

Addressing the problem of how to accelerate adoption of a technology has been a key focus of IS research with many studies examining the antecedents of behavioural intentions and use towards IT (Davis et al. 1989; Taylor & Todd 1995a; Venkatesh et al. 2003). One of the components of adoption behaviour is attitude (Ajzen & Fishbein 1980). However prior research within and outside the IS arena has often returned inconsistent or low empirical relations between attitude and behaviour. To address this limitation, researchers often rely on other variables to explain behaviour. In this study, the notion of involvement is examined with a view to determining whether involvement may assist behavioural prediction. The findings showed involvement was a strong predictor of intention to use, followed by perceived enjoyment and perceived behavioural control. Neither attitude nor subjective norms exerted a significant impact on behavioural intention. The results therefore suggest the potential of involvement in future adoption research.

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