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Examination of Hedonism in TAM Research

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Abstract

Davis' Technology Acceptance Model (TAM) remains a dominant model that is used extensively for addressing issues of user acceptance (Davis, 1989). Recently, hedonic[1] nature of information systems was proposed as a boundary condition for TAM (van der Heijden, 2004). This paper attempts to review and evaluate the existing TAM research in light of this new boundary condition. This is accomplished by reviewing 41 articles published in six premier journals. It is argued that two types of mismatches, i.e. 'errors of inclusion' and 'errors of exclusion' could occur if the nature of system is not considered. The implications of these errors on the cumulative results of TAM research stream and directions for future research are discussed.

Keywords: TAM, Hedonism, Intrinsic motivation, review

Introduction

Firms invest heavily in new information systems. To reap benefits from these systems, they must be accepted and used by individuals. Consequently, user acceptance of information systems is one of the important research streams in the field of IS. Predominantly, Technology Acceptance Model (TAM) has been used to predict and explain acceptance of information systems (Davis 1989, Davis et. al. 1989).

For an idea to develop into a theory, it has to go through multiple validations since true test of a theory lies in its falsifiability (Lee 1991). However, validity of a model requires that its boundary conditions are satisfied. Voluntariness of the system is an important condition of TAM research and researchers have extended the original TAM to include this concept (Venkatesh and Davis 2000; Venkatesh et al. 2003). Another recent boundary condition proposed for the original TAM is hedonic nature of information systems (van der Heijden, 2004). van der Heijden (2004) argued that depending on the nature of the system, intrinsic motivators like perceived enjoyment may be more significant than extrinsic motivators like perceived usefulness. This implies that in order to propose actionable ideas to system developers, it is important to consider the type of the system. Overlooking this fact may bias the implications towards usefulness of the system, even if beliefs based on intrinsic motivators like enjoyment are, in fact, more important. This might undermine the cumulative results of TAM studies over the past decade. Therefore, it is important to reevaluate the existing cumulative results of TAM stream in light of this new boundary condition. Hence, there are three main goals of this paper – (i) to review the empirical research in user acceptance of information systems based on TAM, (ii) to evaluate if the systems considered had hedonic nature, and (iii) whether appropriate intrinsic motivators are considered when the systems are hedonic in nature.

The rest of the paper is divided into four main parts. After this introduction, the next part examines the basics of TAM and the significance of hedonism in TAM research. The following part explains the review methodology used in this paper. Then, the next part presents the findings of this study. The last part concludes with a brief discussion of the potential contributions and implications of this paper.

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[1] The term hedonic derives from the word *hedonism*, which denotes that pleasure or happiness is the chief good in life (Merriam-Webster, 2006 accessed http://www.m-w.com)

Technology Acceptance Model and Hedonic Information Systems

TAM is an adaptation of Theory of Reasoned Action (Ajzen and Fishbein 1980) that has been specifically tailored for predicting and explaining user acceptance of information systems. In its original form, user acceptance is explained by two beliefs: perceived usefulness (PU) and perceived ease of use (PEOU) (Davis 1989, Davis et al. 1989). Perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis 1989, p. 320). Perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis 1989, p. 320).

To this basic model, numbers of extensions are proposed (see Venkatesh et al. 2003 for review of TAM research). One of the important additions is intrinsic motivation to use computer systems. As noted by (van der Heijden, 2004), perceived usefulness in the original model draws attention to an outcome outside the user-system interaction, i.e. improving job performance. However, individuals might accept systems based simply on the user-system interaction without any consideration to the outcome of the interaction. This has been acknowledged by inclusion of intrinsic motivators in TAM research. For example, Davis et al. (1992) add perceived enjoyment as a third belief into the TAM. It is defined as "the extent to which the activity of using the computer is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated" (Davis et al. 1992, p.1113).

Drawing a parallel to consumer behavior literature, van der Heijden (2004) proposed that the information systems could be classified as either utilitarian or hedonic. Hedonic is derived from the word 'hedonism', which means pleasure or happiness. Utilitarian systems provide value external to the interaction between user and system (e.g., improved performance). In contrast, hedonic systems provide self-fulfilling value to the user and are designed to be an end in itself (van der Heijden 2004). Since these two types of systems have different functions, i.e. productive use for utilitarian systems and prolonged use for hedonic systems, it is proposed and empirically proven that extrinsic motivators like perceived usefulness would play greater role for utilitarian systems and intrinsic motivators like perceived enjoyment would play greater role for hedonic systems (van der Heijden 2004). The above discussion suggests that if the system under consideration has hedonic characteristics, then it is important to consider intrinsic motivators in addition to the dominant belief of perceived usefulness. Hence, hedonic nature of an information system is an important boundary condition in TAM.

Methodology

To identify studies done on user acceptance using TAM, Thomson's ISI Social Sciences Citation Index was used. The search was limited to established, premier journals like MIS Quarterly, Information Systems Research, Journal of Management Information Systems, Management Science, Decision Sciences and Information and Management. This set of journals has been previously used to identify TAM related studies (Legris et al. 2003). Several keyword searches have been conducted to get an initial list of studies dealing with user acceptance of information systems based on TAM. Some of the keywords used are 'technology acceptance', 'perceived usefulness', 'TAM'. These initial searches resulted in over 100 articles. From this list, a total of 41 were deemed appropriate for this study. The appropriateness of articles was decided based on the following criteria - (i) TAM is used in an empirical study, (ii) the basic tenets of original TAM (i.e. beliefs PU and PEOU) are included, and (iii) research methodology and results are described. Since one of the objectives of this paper is to identify proportion of the studies that may have inadvertently placed emphasis on perceived usefulness at the expense of intrinsic motivators, it was critical that the information system used, and the context in which it is used, are defined clearly to evaluate if the system had hedonic characteristics[2]. Finally, considering the prolific nature of TAM related research and the number of journals considered in this study, only studies published in the last ten years (1996-2005) were included. Table 1 provides a list of all the articles identified in this study. For each article, the system or task context, whether hedonic characteristics exist or not, and whether intrinsic motivators are considered or not, are recorded as shown in Table 1.

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[2] In the context of the study, if the system had characteristics that would make system-user interaction enjoyable or usage that is hedonic in nature.

Table 1. Review of TAM Studies

Author(s)	System or Task Context	Hedonic characteristics exist?	Intrinsic motivators considered? If yes, what construct?	Comments
Agarwal and Prasad (1999)	PC's with GUI operating system	No	No	
Agarwal and Karahanna (2000)	WWW	Yes	Yes, Cognitive Absorption	Cognitive absorption considered as an antecedent to PU and PEOU. Direct affect on Intention not proposed.
Amoako-Gyampah and Salam (2004)	ERP	No	No	
Chau and Hu (2002)	Telemedicine technology acceptance by physicians	No	No	
Chen et al. (2002)	Virtual store, Online shopping	Yes	No	
Deng et al. (2005)	Spreadsheet, Graphics etc	Yes	No	
Devaraj et al. (2002)	Electronic commerce, Online shopping	Yes	No	
Dishaw and Strong (1999)	Software maintenance support tools	No	No	
Gefen and Straub (1997)	E-mail use	No	No	
Gefen et al. (2003)	Online shopping experience	Yes	No	
Hong et al. (2001)	Digital Libraries	No	No	
Hsu and Lu (2004)	Online games	Yes	Yes, 'Flow' considered	PU not significant.
Hu et al. (1999)	Telemedicine technology	No	No	
Hu et al. (2003)	Powerpoint tool used by teachers	No	No	
Igbaria et al. (1997)	Personal computing in small firms	No	No	
Jackson et al. (1997)	Several organizational information systems	Yes	Yes, Intrinsic involvement	Intrinsic involvement plays a significant role in shaping perceptions
Karahanna et al. (1999)	Windows 3.1 software package	No	No	
Koufaris (2002)	Online shopping	Yes	Yes. 'Flow' considered.	Both shopping enjoyment and perceived usefulness are strong determinants of intention.
Lucas and Spitler (2000)	Workstations	No	No	

Author(s)	System or Task Context	Hedonic characteristics exist?	Intrinsic motivators considered? If yes, what construct?	Comments
Moon and Kim (2001)	WWW	Yes	Yes, perceived playfulness (PP)	PP's effect stronger on attitude than PU
Ong et al. (2004)	e-learning systems	Unclear[3]	No	
Plouffe et al. (2001)	Smart card-based electronic payment system	No	No	
Saade and Bahli (2005)	Internet Learning System	Yes	Yes, Enjoyment considered as part of Cognitive Absorption	Direct effect on intention is not considered
Shang et al. (2005)	Online Shopping	Yes	Yes, Cognitive Absorption considered	Cognitive Absorption more important than PU
Shih (2004a)	Internet / Intranet in work context	No	No	
Shih (2004b)	e-shopping	Yes	No	
Straub et al. (1997)	E-mail	Yes	No	
Szajna (1996)	E-mail	No	No	
van der Heijden (2003)	Web portal	Yes	Yes, perceived enjoyment	PE stronger predictor of attitude than PU, not on intention
van der Heijden (2004)	Movie website	Yes	Yes, perceived enjoyment	PE stronger than PU
Venkatesh (1999)	Virtual workplace systems / Training	Yes	Yes, intrinsic motivator included	Results favor the use of intrinsic motivators during training.
Venkatesh and Brown (2001)	PC's at home	Yes	Yes, hedonic dimension included	Both hedonic and utilitarian outcomes important in determining PC use.
Venkatesh and Davis (2000)	Four different organizational systems – Windows based, DOS based etc	No	No	
Venkatesh and Morris (2000)	Data and Information retrieval systems	No	No	

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[3] When 'unclear', benefit of doubt is given to the authors and treated as 'No'.

Author(s)	System or Task Context	Hedonic characteristics exist?	Intrinsic motivators considered? If yes, what construct?	Comments
Venkatesh et al. (2002)	Virtual workplace systems / Training	Yes	Yes, Intrinsic motivation	Intrinsic motivation didn't have a direct affect on intention. It had an indirect affect.
Venkatesh et al. (2003)	Applications for customer service and financial services	No	No	
Vijaysarathy (2004)	Internet / Online shopping	Yes	No	
Wixom and Todd (2005)	Data Warehousing software tool	No	No	
Wu and Wang (2005)	Online banking, shopping etc	Yes	No	
Yu et al. (2005)	t-commerce	Yes	Yes, perceived enjoyment	PE stronger than PU in experienced users
Zain et al. (2005)	Overall organizational IT systems	Unclear	No	

Results

To understand the impact of hedonic nature of systems as a boundary condition to user acceptance research, a review of empirical studies using TAM was conducted. Analysis of articles listed in Table 1 implies that there could be two types of mismatches. First, hedonic characteristics could exist for the system studied but intrinsic motivators were not considered – referred to as 'error of exclusion'. Second, hedonic characteristics do not exist for the system but intrinsic motivators were considered – referred to as 'error of inclusion'. Instances of error of exclusions are severe, as these reflect the situations in which the new boundary condition (i.e. hedonic nature of information system) of TAM was violated. These scenarios are succinctly shown in Table 2.

Table 2. Classification of TAM Studies

		Intrinsic motivators considered?	
		No	Yes
Hedonic characteristics of system exist?	No	20 [I]	0 [II] (Inclusion)
	Yes	8 [III] (Exclusion)	13 [IV]

Roman letters are used in the four quadrants to enable simpler presentation.

The numbers in each of the quadrant reflects the number of studies that fall in that particular category. The number of studies that fall in No-No and Yes-Yes categories (a total of 33 out of 41) have constructs that reflect the nature of the system under consideration. This implies that the majority of published research (~80%) satisfies the new boundary condition of TAM.

As labeled, the number in quadrant II indicates the number of studies that reflect 'error of inclusion' and number in quadrant III indicates the number of studies that reflect 'error of exclusion'. There were no studies that fell in the 'error of inclusion' category. This implies that researchers did not include constructs that could potentially have lower predictive validity (as intrinsic motivators would be less important compared to extrinsic motivators for utilitarian systems) and hence, did not sacrifice the parsimony of TAM model.

Eight out of forty-one studies examined fell in 'error of exclusion' category (~ 20%). Typically, most of these studies relate to internet or websites. The web could serve both utilitarian and hedonic purposes, depending on the nature of the websites (van der Heijden 2004). The studies on online shopping relate to situations which could involve hedonic characteristics, i.e. graphics, colors of the website that make the interaction enjoyable, or the shopping experience by itself (irrespective of the outcome). Situations like these imply that users might accept systems based on the intrinsic beliefs (like perceived enjoyment), and not including these beliefs in TAM related studies (errors of exclusion) would not only lower the predictive validity of the respective research models, but also will provide implications to designers that would be biased towards perceived usefulness where in fact other beliefs might be salient. It is important to note that for most of the studies in Yes-Yes category, intrinsic motivators have at least as much predictive validity as extrinsic motivators.

Discussion

This paper contributes to the research on TAM by reviewing existing TAM literature in light of a new boundary condition i.e. hedonic nature of an information system. More importantly, it provides an exploratory analysis on the errors of inclusion (less severe) and errors of exclusion - proportion of TAM studies that might have incorrectly placed emphasis on perceived usefulness at the expense of intrinsic motivators like perceived enjoyment.

As a result of this boundary condition, the results of reevaluation of TAM studies imply that we need to be careful in interpreting the implications of some of the previous TAM studies (about 20%). For researchers, the implication is that careful attention needs to be paid to the nature of system and the context in which it is used. Venkatesh et al. (2003) identified that relatively simpler technologies studied as one of the limitations of previous research on TAM. One of the implications of this paper is that careful attention needs to be paid not only to the *type* of the system, but also *nature* of the system. Even though all of the studies identified contributed towards building and confirming the theoretical tenets of TAM, the cumulative impact of these studies is undermined when viewed in light of the new boundary condition of the nature of information systems. Considering this, future attempts to replicate and extend TAM stream of research with emerging technologies should pay more attention to the assumptions and boundary conditions and understanding the boundary condition of hedonic nature of information systems is a step in this direction.

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