



Adoption of e-book among college students: The perspective of an integrated TAM



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ABSTRACT

This study explored factors that affect consumer acceptance of e-book use by applying a model that incorporates the Technology Acceptance Model (TAM) as the theoretical basis of the hypotheses. The model differentiated external factors—compatibility, relative advantage, self-efficacy, and subjective norms—from internal factors—perceived ease of use, perceived usefulness, satisfaction with e-book usage, and intention to continue using e-books. The study ($n = 1030$) found statistically significant support for the hypothesized model, indicating that the tested relationships between the revised TAM and user intention to continue using e-books were positive and statistically significant. The study's findings provide potentially significant implications that can be used to develop guidelines and a framework for assessing e-book users' behavior.

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1. Introduction

This study focuses on electronic books (e-books), which can be displayed by tablet computers and e-book readers such as Amazon's Kindle and Barnes and Noble's Nook. The success of the Kindle and the Nook made it almost a foregone conclusion that e-books would migrate to other portable devices such as tablet PCs, altering a market in which e-books were previously accessible only on computers. Global corporations in the information and communication technology (ICT) sector are pursuing competitive edge and greater market share in the e-book and related markets. The burgeoning e-book market also challenges the traditional publishing and print book markets. According to the Association of American Publishers (2013), e-books made up nearly a quarter (22.55%, to be precise) of U.S. trade publishers' book sales in 2012, up from 17% in 2011 and just 3% in 2009.

The popularity of smart phones, tablet PCs, and other digital devices has changed the perception of traditional print publications. Forecasts indicate growing demand for the convenience of digital content, which opens countless revenue possibilities (Weinstein, 2010, p. 1). From the consumer demand perspective, companies that market digital devices and e-books have a vested interest in understanding the behavior of digital device and e-book users.

As a consequence, ICT-related studies are applying a range of theories to make sense of the astonishing speed at which demand for e-books has exploded. Whenever new digital devices and tech-

nologies are adopted and diffused, consumer acceptance is likely the main factor driving this diffusion. Acceptance of e-books merits further examination in the literature as scholars and marketing managers consider the potential for e-books to be adopted in marketing-oriented industries.

Researchers have investigated media, technology, and service acceptance using the Theory of Reasoned Action (TRA, proposed by Ajzen & Fishbein, 1980), the Theory of Planned Behavior (TPB, proposed by Ajzen, 1991), the Technology Acceptance Model (TAM, suggested by Davis, 1989), and the Diffusion of Innovation Theory (DIT, suggested by Rogers, 2003). Empirical studies are needed to identify and measure correlations and relationships among the components of external variables that are commonly deployed in these theories (e.g., compatibility, relative advantage, self-efficacy, and subjective norms) and the components of the TAM in relation to e-book usage behavior. This study used a hybrid model integrating the TRA, the TPB, and the DIT into the TAM and posits a model to examine the effects of the associated acceptance factors on post-behavioral outcomes when using e-books as well as the relationship between the external variables and both satisfaction with e-book use and the intention to continue e-book use.

2. Literature review

2.1. The e-book environment

This study defines an e-book as a book-length publication in digital form, consisting of text, images, or both, and produced on,

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published through, and readable on computers or other electronic devices (Eileen & Musto, 2010). Lam, Lam, Lam, and McNaught (2009) and Carreiro (2010) observe that an e-book integrates the familiar concept of a book with features that can be provided in an electronic environment. E-books feature search and cross-referencing functions, hypertext links, bookmarks, annotations, highlights, multimedia objects, and other interactive tools (Vasileiou & Rowley, 2008).

E-book technology originated in Project Gutenberg, founded by Michael Hart in 1972, an effort to digitize publications with expired copyrights and distribute them widely at no charge. The e-book phenomenon remained specialized, however, until the advent of personal technologies that made e-books easily portable, such as laptop and notebook computers and more recently tablet computers. The market became truly formidable, however, with the introduction of e-book readers, such as the Rocket eBook that was introduced by NuvoMedia in 1998, to be followed by Amazon's Kindle, Bookman's Cybook Orizon and Cybook Opus, Barnes and Noble's Nook, and Sony's Reader Pocket Edition. The burgeoning popularity of tablet computers, which are similar in size to e-readers but are far more versatile, has taken the e-book market to a higher plane. Market-researcher IDC recently estimated 2012 global e-reader shipments at 19.9 million units, down 28% from 27.7 million units in 2011. By contrast, IDC's 2012 tablet forecast is 122.3 million units.

The main advantages of the devices that are driving the e-book market are portability, screen readability in bright sunlight, and long battery life (Shin, 2011, 262). The new devices have brought e-book use to all socioeconomic classes. Marketers interested in leveraging these rapidly growing industries to attract customers must understand how users adopt the technology in order to craft effective messages.

Although there is a rich and rapidly growing body of literature on e-books, very little research has focused on e-book user behavior or user acceptance of e-books. Thus, a theoretical and systematic model is needed to explore e-book user behavior and understand the relationship between this behavior and demand for e-books.

2.2. A revised TAM and DIT

The TRA—assuming that beliefs affect behavior—provides a well-known model for predicting the intention to perform a behavior based on an individual's attitudinal and normative beliefs (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). The TPB was proposed as an extension of the TRA to accommodate new ways to identify variables, in particular by adding perceived behavioral control to the theory (Ajzen, 1991). Both theories have been widely used to evaluate a range of ICT-related consumer behavior.

The TAM was originally developed by extending the TRA and many studies have used this model, which incorporates the consumer perspective. The TAM expands the set of external variables posited by the TPB, providing a useful analytical framework for determining the relationship between perceived ease of use, usefulness, and other external variables (Malhotra & Galletta, 2005; Venkatesh & Davis, 2000). This framework should apply to e-book usage as well. On the other hand, technological characteristics, interactivity, quality, accessibility, a range of user variables, perceived values, playfulness, involvement, and self-efficacy could serve as external variables or mediators for explaining ICT use (Agarwal & Karahanna, 2000; Davis, 1989; Gefen & Straub, 2000; Igbaria, Guimaraes, & Davis, 1995; Karahanna, Straub, & Chervany, 1999; Lin & Lu, 2000; Venkatesh & Davis, 2000). Studies have also suggested that social and cultural influences and individual propensity merit attention (Compeau, Higgins, & Huff, 1999; Malhotra & Galletta, 2005; Moore & Benbasat, 1991; Straub, Keil, & Brenner, 1997).

While explaining the process of ICT acceptance, the TAM further indicates that user intention regarding technology acceptance is determined by perceived ease of use (PEOU) and perceived usefulness (PU). Many argue that PEOU and PU are effective concepts that can be used to predict the use of ICT; an extension of the TAM known as the TAM2 has been suggested as a supplemental model but some say it over-emphasizes user decisions (Agarwal & Karahanna, 2000; Bruner & Kumar, 2005; Gefen & Straub, 2000; Igbaria et al., 1995; Liao & Tsou, 2009; Lin & Lu, 2000; Venkatesh & Davis, 2000). PEOU and PU are the two most important determinants of ICT usage behavior in both the TAM and the TAM2. The TAM2 incorporates both cognitive instrumental processes and social influence processes. Several studies have explored whether the TAM's belief variables are mediators of the external variables (Porter & Donthu, 2006; Venkatesh & Brown, 2001).

The DIT has generated important concepts and meaningful empirical results that apply to the study of technology valuation, new product and service adoption, and implementation of technology (Jin, 2013a). According to Agarwal (2000), the DIT holds that users decide to adopt or reject an innovation based on their beliefs about the innovation. The DIT includes five significant innovation characteristics: relative advantage, compatibility, complexity, triability, and observability to explain end-user innovation adoption and the decision-making process. Previous studies have integrated the DIT into the TAM to investigate technology acceptance behavior (Chang & Tung, 2008; Wu & Wang, 2005). This study extends the TAM by combining the TRA and the TPB and adding, as external variables, compatibility and relative advantage (DIT characteristics), self-efficacy, and subjective norms. It then incorporates satisfaction with e-book use (SAT-E) and intention to continue using e-books (ICU-E) to complete the theoretical model. Under the TAM, the causal psychological mechanism involved in accepting technology is as follows: PEOU → PU → AU (attitude towards use) → ICU-E. This study posits a revised version of this process: external variables → PEOU → PU → SAT-E → ICU-E.

3. Conceptual model and hypothesis

3.1. External variables and components of the TAM

See Fig. 1 for the model. The two DIT characteristics suggested by Rogers (2003) that have been applied in this study are “compatibility,” the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters (p. 240), and “relative advantage,” the degree to which an innovation is perceived to be better than the ideas it supersedes (p. 229). Agarwal and Prasad (1997) found that prior experience with similar technologies was positively associated with ease-of-use beliefs about an ICT innovation. Compatibility and relative advantage had a significant positive and direct effect on PEOU, PU, and intention to use ICT-related products and services (Chang & Tung, 2008; Chau & Hu, 2001; Hardgrave, Davis, & Riemenschneider, 2003; Wu & Wang, 2005). In particular, relative advantage is closely related to users' adaptation and also shows a significant positive correlation with ICT adaptation (Al-Gahtani, 2003).

Self-efficacy, defined as the judgment of one's ability to execute a behavior pattern (Bandura, 1997, 240), has been used to explain mass media user behavior such as accepting ICT (Davis, 1989). Previous studies have confirmed that self-efficacy predicts technology adoption and use (Mathieson, Peacock, & Chin, 2001; Nysveen, Pedersen, & Thorbjørnsen, 2005; Wang, Wand, Lin, & Tang, 2003). It has served as a theoretical framework in communication studies through its association with work-related performance, which may depend on the relationship between self-efficacy and adaptability to new technology as well as mass media user behavior

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