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Continuing E-book Use: Role of Environmental Consciousness, Personality and Past Usage

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ABSTRACT

Although recent studies shed light on design features preferred by users of e-books, little effort has been made to examine the impact of e-book design and characteristics of the individual user on usage or continued usage of e-books in one conceptual framework. This study examines (1) the role of environmental consciousness and personality (Big-5) on e-book usage, and also, (2) the influence of preference for traditional books and the perceived e-book design on e-book usage intentions. One of the significant findings is that environmental consciousness lowers preference for traditional books, thereby increasing acceptance of e-books, and increasing perceived design evaluation of the e-book. Personality factors impact the preference for traditional books and perceived design evaluation of the e-book in different ways. This study is one of the first to establish the role of environmental consciousness on continuing usage intentions related to e-books.

Keywords (Required)

E-book, Big-5, Personality, Environmental consciousness, TAM, Continuing usage

INTRODUCTION

Even though e-books are like any other technology, their unique characteristics differentiate them from websites or other related Internet technology. Defining e-book, Vassiliou and Rowley (2008) stated that “an e-book is a digital object with textual and/or other content, which arises as a result of integrating the familiar concept of a book with features that can be provided in an electronic environment” (p. 363) and “typically have in-use features such as search and cross reference functions, hypertext links, bookmarks, annotations, highlights, multimedia objects and interactive tools” (p. 363).

It is surprising to note that even while the internet is continually gaining popularity, the usage of e-books is still minimal compared to traditional delivery methods (Nelson and Webb 2007), and could be characterized as ‘fair to poor’ (McKiel 2007). Several studies suggest that users prefer traditional books for reading and study, whereas they prefer e-books for pleasure and navigation (Chen 2003). Users also cited a preference for paper books as one of the prominent reasons for not using e-books (Chu 2003). Levine-Clark (2006) found from the descriptive statistical analysis of a campus-community survey that over 60% of the respondents preferred traditional books over e-books.

Unlike most technology, e-books are, to a large extent, an electronic replication of traditional books, and hence pose a transitional challenge of moving from “paper” to “screen”. E-books also differ from traditional books in several other ways. E-books provide the users with only a limited sense of one’s place in the book - in traditional books the users can sense their place by comparing the thickness and the weight of the pages read to the pages unread (Wilson et al. 2003). A second issue is the discomfort associated with having to read text on screen for an extended period of time (Gunter 2005). Third, the e-books provide reduced ability to highlight and/or bookmark the pages.

E-books are a relatively new phenomenon and correspondingly, there is limited research on the factors associated with e-book usage (Vermon 2006) especially in relation to traditional books (Levine-Clark 2006). Recent studies shed light on design features preferred by e-book users. However, little effort has been made to examine the impact of e-book design, individual and personality factors, and preference for traditional books, in one conceptual framework, and thus, how these combined factors impact usage or continued usage of e-books. More specifically no study has examined simultaneously (1) the role of environmental consciousness and personality on e-book usage,

and (2) the influence of preference for traditional books and the perceived design on e-book usage. A comprehensive approach is critical for understanding the drivers of e-book usage or non-usage.

In the following section we provide a literature review of the studies done on e-book usability.

LITERATURE REVIEW

Table1 provides a brief summary of the past salient research on e-book usage and usability.

Source	Description	Data Collection Methodology	Analysis Method
Abdullah and Gibb 2006	Studies e-book awareness and usage level in a British academic library	Survey of 1372 students	Descriptive statistical analysis
Anuradha and Usha 2006	Studies the use and usability of e-books	Survey of 101 faculty and students at IIS, India	Descriptive statistical analysis
Chen 2003	Examines the historical development, definition, scope, characteristics, constraints, typology, and user preferences associated with e-books	Conceptual paper	-
Chu 2003	Studies the perceptions and beliefs related to the usage of e-books	Survey of 27 students at a library and information science school in the USA	Descriptive statistical analysis
Gunter 2005	Studies the level of awareness, trialing, purchase and borrowing of e-books. Compares the statistics for males-females, and younger-older population.	Survey of members of a large online panel	Descriptive statistical analysis, and mean comparison
Levine-Clark 2006	Studies e-book usage	Survey of the University of Denver community	Descriptive statistical analysis
Levine-Clark 2007	Studies and contrasts the level of awareness and patterns of usage of e-books by scholars in the arts and humanities area with the rest of the university community	Survey of the University of Denver community	Descriptive statistical analysis
Nelson and Webb 2007	Applies the technology acceptance model to study the student perceptions of electronic textbooks	Survey of 133 students	Logistic Regression
Nicholas et al. 2008	Studies the statistics related to e-book usage and perceptions	Online survey of respondents from more than 120 participating universities	Descriptive statistical analysis
Towle et al. 2007	Studies the areas which hinder the further growth of e-book usage	Interview of the publishers	Qualitative analysis

Vernon 2006	Studies the factors related to e-book adoption by students	Case study involving 23 students using an online textbook	Qualitative analysis
Wilson et al. 2003	Studies how appearance and design features can affect users' sense of engagement (measured in terms of quality, ease of use, likeability, user affect, recognition and recall) and directness (measured in terms of task success and task time) with the electronic textbook	Lab Experiment	Qualitative and Quantitative (mean comparison) data analysis

Table 1. Summary of the Salient Research Papers on e-Books usage

INDIVIDUAL FACTORS AND TECHNOLOGY ACCEPTANCE

Prior research suggests that individual characteristics could potentially affect technology acceptance. Some of the salient studies which have examined the role of individual differences on technology adoption are: cultural differences (Srite and Karahanna 2006), Big-5 personality factors (Devaraj et al. 2008), role with regard to technology and level of education (Agarwal and Prasad 1999), socio-economic status (Hsieh, et al. 2008), and intrinsic motivation (Venkatesh et al. 2002). Recently de Guinea and Markus (2009) argued the role of emotions and habit on continuing IT use. Even though Big-5 personality factors have recently been included in the IS studies (e.g., Devaraj et al. 2008, Bansal et al. 2010, Junglas et al. 2008, Korzaan and Boswell 2008), environmental consciousness has so far received limited attention in the IS literature, particularly in regard to technology adoption.

E-books help to preserve the environment by conserving trees while also providing convenience and flexibility. As the push toward Green-IT gains ground and people become more environmentally aware, the users' environmental consciousness could indeed play a very important role in shaping their beliefs and intentions related to technology usage and their intention to use e-books in particular.

Among several issues raised in the past research, the two consistent and prominent issues related to e-book usage are the (i) users' preference for traditional books (Chu 2003, Gunter 2005), and (ii) the design of the e-book, which is categorized as one of the major reason for using an e-book (e.g., Abdullah and Gibb 2006, Chu 2003, Levine-Clark 2006, Vernon 2006). Reflecting that the e-book users generally do not prefer to read extensively from a computer screen, Gunter (2005) states that the users "feel more comfortable reading from the page" (p. 521). Many users find e-books hard to read (Chu 2003). Abdullah and Gibb (2006), in their survey of e-book users, found that design features such as search capability and a hyperlinked index and table of contents are the primary factors cited as reasons for using e-books. We categorize preference for traditional books as an e-book usage *reducer* and *perceived positive design of the e-book* as an e-book usage *enhancer* respectively.

In this paper we study the antecedents of these two factors i.e. preference for traditional books and the design of the e-book, along with their role in impacting beliefs and intentions related to e-book usage. This is in line with the theoretical structure of Technology acceptance model (TAM) that external variables such as system features and characteristics provide the bridge between internal beliefs and intentions and the various individual differences (Davis et al. 1989). The study examines the role of perceived design, as opposed to objective design, since it is the perceived design which has the primary impact on the user (Song and Zahedi 2005). The study uses Goldberg's (1992) Big 5 personality inventory since it is known to be universal (Bansal et al. 2010, Digman 1990).

Personality

Extraversion

Extraversion includes facets such as being assertive, sociable, and demonstrative (Goldberg 1992). It is associated with high energy and self-efficacy for participating in self-managed work groups (Thoms et al. 1996), traits one would need to successfully maneuver and work around new technology. People high in this trait care not only about

their image but also about the social consequences of their behavior (Devaraj et al. 2008). To keep up their image they also have higher desire to perform well in their job. Since usage of technology is generally associated with performance (Brynjolfsson and Yang 1996) it could be argued that extroverts would have a lower preference for traditional books and would also favorably evaluate the perceived navigational and visual design of an e-book. Hence,

H1. Extraversion will be (a) negatively associated with preference for traditional books, and (b) positively associated with the perceived navigational and visual design of e-books.

Agreeableness

Agreeableness is associated with terms such as compliance, modesty, and straightforwardness (Goldberg 1992). It is a strong predictor of performance especially in a team setting which involves considerable interaction (Costa et al. 1991). Since there is no interpersonal relationship involved, and moreover, since individuals high in this trait are generally modest and compliant in nature, these individuals would tend to prefer traditional books over e-books. Agreeableness is also associated with dimensions such as altruism and tender-mindedness. These are guided by feelings, particularly those of sympathy in making judgments and forming attitudes (Costa et al. 1991). Their sympathetic nature would enable an individual with high agreeableness to have a more favorable evaluation of the e-book's design. Hence,

H2. Agreeableness will be positively associated with (a) preference for traditional books, and (b) perceived navigational and visual design of e-books.

Emotional instability

Emotional instability or neuroticism is described with terms such as being anxious, stressed, volatile, and fearful (Goldberg 1992). Korzaan and Boswell (2008) found that neuroticism increases computer anxiety. In line with these results, we argue that those who are fearful and anxious would prefer traditional books and would be less appreciative of the navigational and visual design of the e-book. Devaraj et al. (2008) stated that "Neurotic personalities are likely to view technological advances in their work as threatening and stressful" (p. 97). They are also likely to demonstrate low self-efficacy across a wide variety of tasks (Thoms et al. 2006). Individuals high in this trait would likely prefer traditional books, and would have a less favorable evaluation of the e-book's design as well. Hence,

H3. Emotional instability will be (a) positively associated with preference for traditional books, and (b) negatively associated with the perceived navigational and visual design of e-books.

Conscientiousness

Conscientiousness is a trait that is associated with characteristics such as being organized, dependable, thorough, and exacting (Goldberg 1992). Individuals high in this trait have a high degree of intrinsic motivation at work and are strongly geared toward delivering high levels of job performance (Barrick and Mount 2000). They have a need for achievement, order and persistence (Costa et al. 1991). Since usage of technology is generally associated with improved performance (Brynjolfsson and Yang 1996), it could be argued that such people would have a lower preference for traditional books. Since they are also exacting in nature, they would be less appreciative of the navigational and visual design of the e-book. Hence,

H4. Conscientiousness will be (a) negatively associated with preference for traditional books, and (b) negatively associated with the perceived navigational and visual design of e-books.

Intellect

Intellect is a trait described by terms such as intelligent, perceptive, curious, imaginative, creative, knowledgeable, and intellectual (Goldberg 1992). These individuals are rational and open to new ideas and possibilities. They are

curious, broadminded and creative, and hence would be more comfortable with the technology. Devaraj et al. (2008) and Korzaan and Boswell (2008) both argued that intellect will be associated with higher adoption of technology. “Individuals who measure high on this trait tend to be more accepting, less judgmental, have a higher tolerance for, and in many cases embracing, new things” (Korzaan and Boswell 2008, p. 17). Korzaan and Boswell (2008) found that the trait is negatively associated with computer anxiety. In a similar vein, it could be argued that owing to their tendency to embrace new things the trait would be associated negatively with a preference for traditional books, and positively associated with the perceived navigational and visual design of the e-book. Hence,

H5. Intellect will be (a) negatively associated with preference for traditional books, and (b) positively associated with the perceived navigational and visual design of e-books.

Environmental consciousness

Those who are high on the environmental consciousness factor are more willing to take measures to prevent the exploitation of the environment, and actively look for means to contribute toward environmental sustainability. People with high environmental consciousness are more likely to engage in pro-environmental behavior (Kim and Choi 2005). Chu (2003) found that *save trees* was one of the reasons associated with using e-books. Hence, it could be argued that the individuals high on environmental consciousness would demonstrate a lower preference for traditional books, and would also evaluate the perceived navigational and visual design of the e-book favorably. Hence,

H6. Environmental consciousness will be (a) negatively associated with preference for traditional books, and (b) positively associated with the perceived navigational and visual design of e-books

Prior e-book usage

Past use is known to be a positive determinant of user evaluations. “[O]nce IS use becomes routine - *performed frequently in a stable environment* - past use is likely to be a good proxy for habit and a reliable predictor of future use” (Kim and Malhotra 2005, p. 746). Habit is a repeated behavioral pattern that automatically occurs without one’s conscious awareness (Triandis 1977). Extending the above reasoning it could be argued that past usage would generate habitual tendencies, which would lead one to develop favorable evaluations of the design of the e-book and would, at the same time, develop compatibility with e-books. Hence,

H7. Prior e-book usage will be (a) negatively associated with preference for traditional books and (b) positively associated with the perceived navigational and visual design of e-books.

Perceived System Design and Preferences

Preference for traditional books

E-book literature suggests that preference for traditional books could arise because of a liking for paper books, and also because of discomfort associated with reading from computer screen. Similar but opposite in nature to a preference-for-traditional-book is a compatibility with e-books. In studying the technology adoption by physicians, Chau and Hu (2001) argued that compatibility greatly impacts the attitude towards using e technology. They argued that significant incompatibility often require considerable effort on the part of the users who, as a result, are likely to perceive the technology to be not easy to use. Compatibility has been identified as an essential factor for innovation adoption (Rogers 1995). Moore and Benbasat (1991) and Taylor and Todd (1995) also reported a strong relationship between compatibility and relative advantage. Those who prefer traditional books more are arguably less compatible with e-books, and vice versa. Hence,

H8. Preference for traditional books will be negatively associated with the ease of using e-books.

H9. Preference for traditional books will be negatively associated with the perceived usefulness of e-books.

Perceived Navigational and Visual Design

High quality navigational design is known to assist the user in the effective use of a system by providing a sense of heightened self-efficacy, and thus increasing the perceived ease of use (Song and Zahedi 2005). Similarly, increased information visualization and use of color (Hu et al. 1999) also play a role in increasing the perceived ease of use. Wilson et al. (2003) confirmed that the design of the e-book significantly impacts the usability measured in terms of errors made and time taken to complete the task.

H10. Perceived navigational and visual design will be positively associated with the perceived ease of use in using e-books.

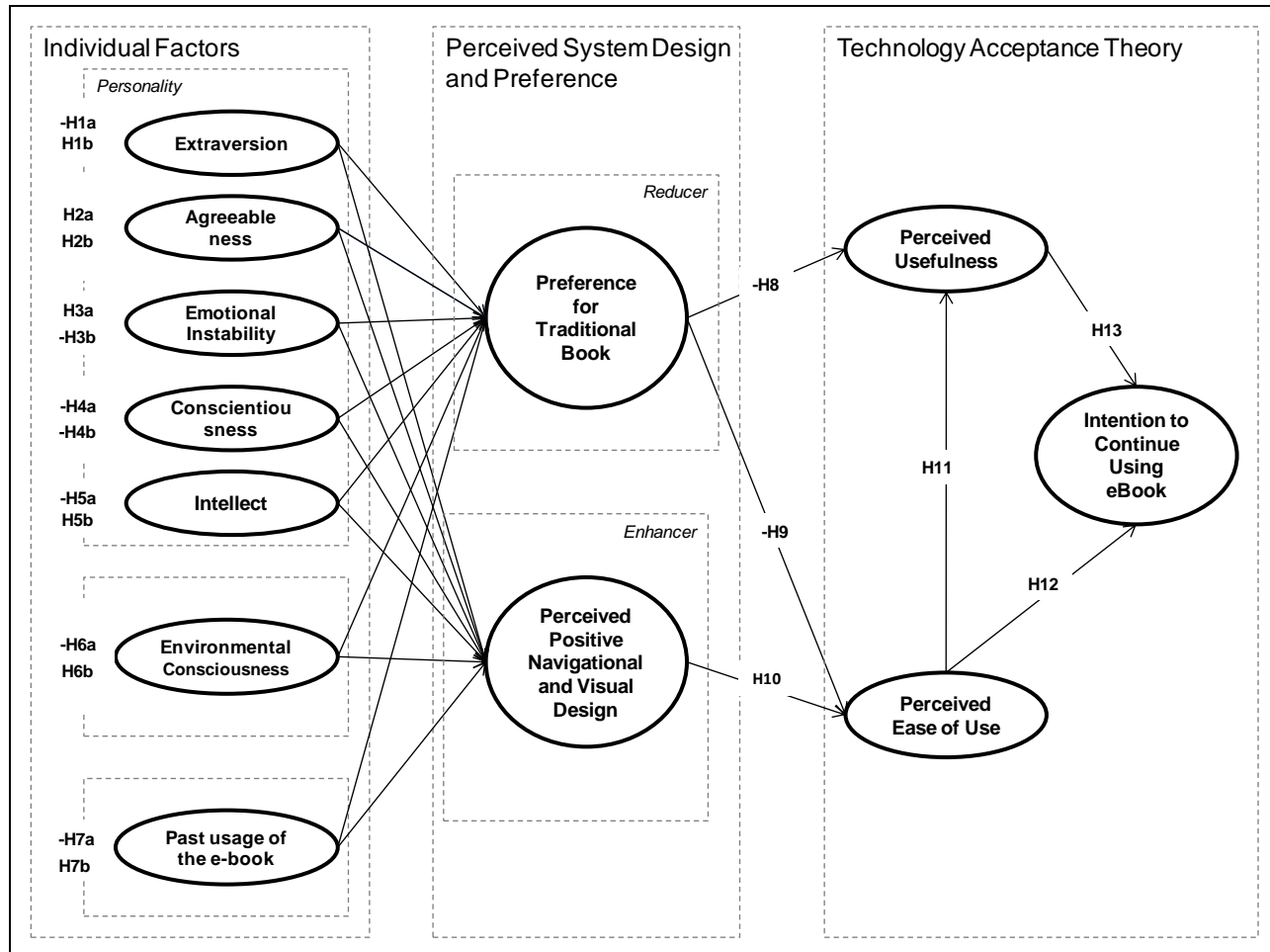


Figure 1. The Research Model

Technology Acceptance Constructs

The links are well researched and established, hence it is believed that the links will hold true for the e-book context as well.

- H11. Perceived ease of use will be positively associated with the perceived usefulness of e-books.
- H12. Perceived ease of use will be positively associated with the intention to continue using e-books.
- H13. Perceived usefulness will be positively associated with the intention to continue using e-books.

The research model is shown in Figure1.

METHODOLOGY

The data for this study was collected from actual e-book users. Participants were students studying in a Midwestern university. The participants were enrolled in an advanced statistics course which required the usage of an e-book. In total 115 (out of 123) usable observations were collected. Out of that group, 53 students had used the same e-book in their previous semester in the introductory statistics class. The average age of the participants was 20.90 years (std dev=4.42 years) ranging from 18 to 44 years. There were 57 male and 58 female participants.

Instrument

The survey instrument was adapted from established scales (Table 2) from the literature. We modified the existing scales to semantic differential in order to minimize the common method bias (Song and Zahedi 2005). We also modified the usefulness and ease of use items for the e-book context. The continuing e-book usage intentions were measured in relation to the paper book as well as the e-book. Similarly, the preference for traditional books was measured by judging users' liking for a paper book as well as their discomfort in reading from a computer screen. The study measured environmental consciousness in the form of environmental paradigm, using the revised NEP (new environmental paradigm scale) developed by Dunlap et al. (2000). Arguing in favor of *environmental paradigm*, instead of *environmental concerns* as the appropriate measure, Dunlap et al. (2000) observed that environmental concerns are narrow and specific in approach such as concern regarding water pollution, resource conversation etc. however environmental paradigm is broader and emphasizes an "ecological worldview".

Construct	Source
Personality	Fraj and Martinez 2006, Goldberg 1992
Environmental Consciousness	Dunlap et al. 2000
Perceived Navigational and Visual Design of e-book	Self developed
Preference for Traditional Books	Self developed
Perceived Usefulness	Davis 1989
Perceived Ease of Use	Davis 1989
Behavioral Intentions to Continue Using e-books	Self developed

Table 2. Instrument Source

Measurement and Structural Model

We first measured reliability using Cronbach-alpha (ranging from .77-.93), AVE (ranging from .51-.83) and CFR (ranging from .76-.92). To examine the discriminant and convergent validity we then carried out EFA (in 2 levels), and CFA. We also compared the construct correlations with the square root of AVE. In all we found adequate support for the discriminant and convergent validity of the constructs. We tested the dataset for the presence of common method variance, using the Harman's single factor test (Podsakoff et al. 2003). The first factor explained only 19.3% of the variance, suggesting that the common method variance does not pose a serious problem. The data was analyzed with a structural equations modeling approach using Mplus 4.1. Fit indices for the measurement and the estimated model are stated in Table 3.

	Measurement Model	Estimated model
Chi-Sq/Df	1.52	1.66
P value	.0000	.0000
CFI	0.89	0.86
TLI	0.87	0.84
RMSEA	0.07	0.08
SRMR	0.07	0.09
WRMR	0.95	1.29

Table 3. Fit Indices

Results

The results are summarized in Figure 2. This study demonstrates that environmental consciousness positively impacts the perceived navigational and visual design of the e-book and significantly lowers the preference for the traditional books. This is a significant finding reflecting the impact of environmental consciousness on e-book usage intentions. Similarly, past usage lowers the preference for traditional books, thereby increasing compatibility with e-books, and develops favorable attitudes toward the e-book's visual and navigational design.

Perceived positive visual and navigational design is positively associated with perceived ease of use. We also found that a preference for traditional books lowers both the perceived usefulness of the e-book, as well as the perceived ease of using the e-books. The path coefficients suggest that perceived usefulness has a stronger impact on continued usage intentions as opposed to perceived ease of use.

In terms of personality, the role of emotional instability was supported as hypothesized. Consciousness lowers the preference for traditional books, and agreeableness enhances the preference for traditional books, also as hypothesized. Extraversion and intellect do not appear to have any significant impact on preference for traditional books or on the perceived navigational and visual design of the e-book. Prior research has argued that intellect is a double-edged sword which makes the user feel both equally good and bad at the same time, and hence its influence on affective reactions is often ambiguous (DeNeve and Cooper 1998; Judge et al. 2002). Similarly, Devaraj et al. (2008) didn't find any significant correlation between intellect and technology usefulness. Future research should delve deeper into the role of these two constructs in technology preference and usage. Similarly, conscientiousness was not found to have any significant impact on perceived design. We argued that agreeableness would be positively associated with perceived design, but contrary to the hypothesis we found that agreeableness was negatively associated with perceived design.

The Technology Acceptance constructs are all significant in the way hypothesized. Perceived ease of use positively impacts perceived usefulness. Perceived usefulness and perceived ease of use both are significant predictors of behavioral intentions related to continued e-book usage as well.

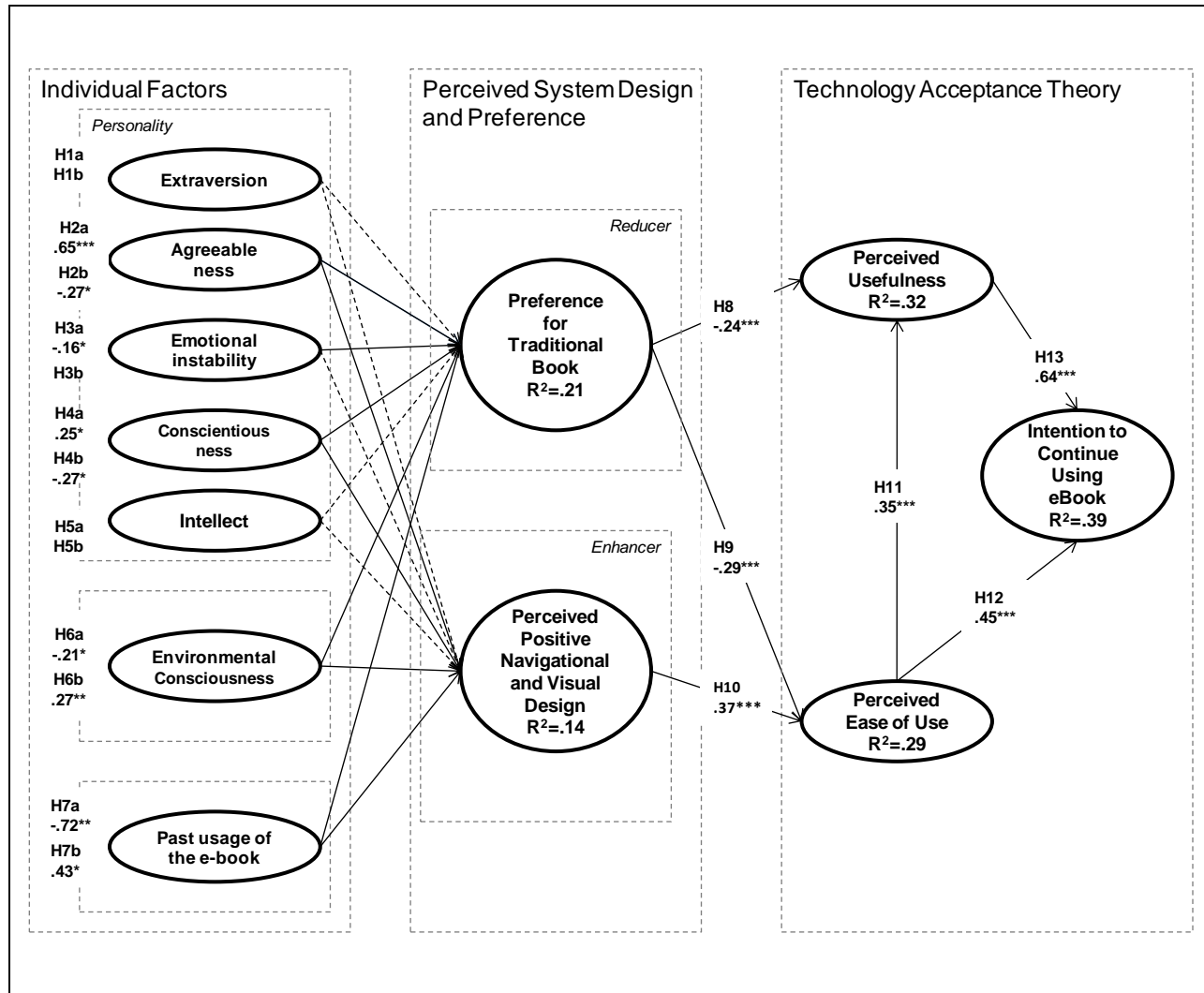


Figure 2. The Estimated Model

DISCUSSION

Overall, the results suggest that the comprehensive model provided an adequate explanation about the e-book usage accounting for a reasonable proportion of the variance in intention. In striving to develop a comprehensive model for e-book usage intentions, this paper contributes in several key ways.

First, this study sheds light on the nature and role of environmental consciousness on e-book usage. We theorize and empirically show that environmental consciousness impacts the preference for traditional books as well as the perceived navigational and visual design of e-books. These findings have implications for the emerging role of environmental consciousness in the study of technology adoption and IS in general. Second, the study extends the past work on personality and IT adoption to the domain of e-books. Third, it empirically demonstrates that the perceived system characteristics and system related preferences are indeed bridged between individual factors and TAM related constructs. This way it validates the claim by Davis (1989) related to the “bridging” role of system characteristics, and also extends the claim to perceived system characteristics and preferences. Finally, this study provides empirical evidence on the role of past usage in changing the preference of the users away from traditional books and generating a positive attitude toward the e-book’s visual and navigational design.

This study describes a concrete set of factors that e-book publishers and e-book instructors alike might manipulate to facilitate greater e-book usage and classroom learning. The instructors should note that the usefulness

of the e-book is a direct predictor of the e-book's continuing usage intentions. The publishers should note that making the e-book easy to use enhances its usefulness as well as the associated usage intentions. The publishers should also note that giving away trial e-books, would actually enhance e-book usage intentions.

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