

# Environmental Protection: Essentials/Antecedents of Digital Book Adoption

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**How to cite this paper:** Wu, C.C., Kirkole, S. and Huang, Y. (2016) Environmental Protection: Essentials/Antecedents of Digital Book Adoption. *Theoretical Economics Letters*, 6, 1115-1127.

<http://dx.doi.org/10.4236/tel.2016.65107>

**Received:** June 22, 2016

**Accepted:** October 11, 2016

**Published:** October 14, 2016

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## Abstract

Encouraging e-book adoption has great contribution towards environmental protection. In this research, we propose, the extension to the more comprehensive new product model, UTAUT, which comprises of four variables *i.e.* social influence, performance expectancy, effort expectancy and facilitating conditions, by incorporating new variable “benevolence trust”. The finding showed that, in presence of the benevolence trust, all the constructs of UTAUT increased significantly and benevolence trust becomes the most important determinants for predicting e-book purchase. Our findings further explore benevolence trust moderates the application of UTAUT for e-book purchase prediction. All these findings can help e-book providers to formulate effective marketing strategies to make consumers overcome their psychological resistance for using e-book.

## Keywords

Benevolence Trust, e-Book, UTAUT

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## 1. Introduction

Environmental protection is a serious global challenge, which is growing fast with the rapidly growing economy since the Industrial Revolution. In recent decades, the growth of consuming scarce natural resources and growing amount of pollution and waste have been leading to global climate change [1]. To stop the environmental exploitation, forest protection has become one of the prime global responsibilities. Elimination of paper consumption via digitalization is one of the great hopes to preserve forests and will significantly reduce the carbon footprint [2].

In 2007, Amazon launched its e-reader, the Kindle [3], which has successfully established its market and the sale of e-books have grown rapidly. It encouraged many people and companies for digital shift *i.e.* switching from paper books to digital books [4]. The

essentials of digitalization of books include technical aspects like multimedia, hyperlinks and other interactive components, etc., which also meet the competitive demands like lower reproduction and distribution costs [5] [6]. Although digital books can contribute substantially towards environmental protection and the digital book companies are putting lots of promotion efforts but still the usage rate is less than expected. This creates need to investigate the issue of digital adoption.

However, there are many challenges faced by digital book adoption. Baron [7] surveyed over 300 university students who were teenagers and young adults, from several countries like US, Slovakia, Japan, and German. She found students still prefer print books over e-books and they have emotional resistance in digital books adoption. Even though people spend lots of time on Internet, they still prefer print books over digital books. The important reason could be the resistance to the significant change in reading habit. Hoeffler [8] argues that the newness of such discontinuous innovations creates uncertainties that can change adoption decisions. Although digital books have some disadvantages such as hard to make the readers focus on reading the material, formats of the articles of e-books are not compatible to the readers, e-book still have many advantages such as saving time, lower manufacturing cost, mobility, convenience, saving space, and longevity [9]. In addition, they consume less energy and inflict less damage to the environment by saving trees. Thus, it is important for us to find ways to make consumers adopt e-book by not only inducing the concept of environmental protection, but also facilitating their interest of adopting the digital books.

Numbers of researches (e.g., [9] [10]) and companies (e.g., Microsoft, Amazon) have tried to explore ways to promote e-books. As the importance of e-book usage, new ways for promoting e-book adoption are still necessary. Due to e-books are still new to many consumers, in this study, we will apply the unified theory of acceptance and use of technology (UTAUT), which is popular model for predicting new product adoption, to be our digital books adoption model. According to Lu *et al.* [11], UTAUT developed by Venkatesh *et al.* [12], can be a more comprehensive model for assessing the likelihood of a technology's success and understanding the drivers of acceptance, as it explains about 70% of the variance in behavioral intention. Besides employing UTAUT, we propose another new way to help motivate consumers' e-book adoption by encouraging e-book providers to develop benevolence trust. Several studies [13] [14] have pointed out that benevolence trust not only drives genuine concerns and care, but also plays a role in forming buyer's believes that the organization acts on the basis of intentions that are beneficial to the buyers in their newly launched products. Hence we will study the impact of the benevolence trust on the UTAUT model and its consequent effect on the e-book adoption, which is measured in terms of increase in e-book adoption intention.

## 2. Literature Review and Hypotheses

### 2.1. Benevolence Trust

Ganesan and Hess [15] proposed that, benevolence trust is conceptualized as confi-

dence in the motivation of the other party, in conditions which involve risk or a belief in the benevolent intentions towards other party. Benevolence presents someone altruism and virtue [16]. As proposed by Gefen and Straub [17], benevolence deals with the belief that the trusted party is indeed more empathic about other party, which also improves customer satisfaction and retention [18].

Several researches have proposed that benevolence trust is the most important dimension in trust constructs (e.g., [19]). With benevolence trust, the potential and promise of genuine concern and care will produce feeling of optimism and reduce the fear and anxiety [20]. Further, Wu *et al.* [21] had reported that benevolence trust is the key determinant for online social network continued-use intention. While studying the relationship between employees and managers, benevolence can be the most important dimension among trust constructs [22]. Many studies have suggested that benevolence-based trust is a trust expectation, which is associated with customers' adoption intention [14] [15]. Therefore, we propose the following:

H1: Enhancing the benevolence trust will increase adoption intention for digital books.

## 2.2. UTAUT and Its Origin

For studying individual intentions to elucidate new product adoption, due to the limitation of two popular models, technology acceptance model (TAM) and theory of planned behavior (TPB), Venkatesh *et al.* [12] formulated the unified theory of acceptance and use of technology model (UTAUT) by using four key constructs: social influence, performance expectancy, effort expectancy and facilitating conditions. The UTAUT was developed through reviewing and integrating the constructs of eight models developed by previous research that were used to explain consumer adoption behavior (TAM, TPB and six other models). By a longitudinal study, Venkatesh *et al.* (2003) validated the model and found that in behavior intention it can account for 70% of the variance and in actual behavior around 50% would be accounted [12], far much higher than any other proportion presented by preceding models [23]. Till now, many researchers have used UTAUT to study new product adoption in various fields (e.g., [24]).

## 2.3. Benevolence Trust and Constructs of UTAUT

*Social Influence.* Nysveen *et al.* [25] defined social influence as individual's perception that most people, who are important to them, "think they should or should not perform the behavior in question". Previous studies revealed similar evidences that social influence can determine an individual's adoption behavior [26]. In addition, it is suggested that, social influence has direct positive impact on intention to adopt wireless-Internet services by using mobile technology [27]. Shin [28] demonstrated that social influence plays significant role in increasing intention, by influencing the path from perceived security to intention.

Yet, as long as the company can develop benevolence trust, individuals will have bet-

ter impression and recognition toward the company [29]. To associate with these impression and recognition, word of mouth among community would be created, which would in turn influence the members in community [30]. Consequently, social influence toward individuals will be improved. Therefore, we have

**H2:** For e-book usage, the benevolence trust will increase social influence.

*Performance Expectancy:* According to Venkatesh *et al.* [12], performance expectancy is the extent that individuals believe that the acquiring certain system would help them obtain a real-life benefit. An individual is more likely to constitute a favorable attitude, when the application is perceived to be more efficient and/or result in more positive outcomes [31]. As benevolence is based on the qualities, attributed to the focal partner, which exhibits a sincere concern and care for the partner through sacrificing its own profit motive [32], it can motivate individuals' affect. Bagozzi *et al.* [33] also proposed that affective influence on product evaluation is relatively stronger and more far-reaching, which can diminish the amount of risk evaluation and reduce the complexity of risk judgments [34]. Besides, when the risk in product evaluation and the risk in complexity in making judgment are lower, consumers pay more attention towards product performance [34]. Therefore, we propose,

**H3:** For e-book usage, benevolence trust will increase individuals' perceived performance expectancy.

*Effort Expectancy:* According to Venkatesh *et al.* [12], effort expectancy is defined as, the degree of ease estimation that is associated with the new-product usage by individual users. When people sense less effort is required, their usage intention towards the new product increases. For example, when users have feeling of easy to use, perceived gain would lead to great effect on adoption [35]. Also, according to Agarwal and Karahananna [36], the ease in user-friendly interface determines the intention to adopt the product.

We propose that benevolence trust will influence the effort expectancy, since benevolence showing care and "caring is the very bedrock of all successful education" [37]. Wentzel [38] proposed that individual following a "caring" attitude will provide constructive responses. When people discover that they are genuinely cared, they will respond with greater effort as per their potential ability [39]. To sum up, it can be inferred that, due to benevolence trust, consumers will be more willing to explore their potential and put less attention towards their efforts for learning to use the product. In turn, their perceived degree of ease estimation associated with the new-product usage will increase. Hence, we propose that

**H4:** The benevolence trust will lead to increase in consumer's perceived self-effort expectance, in case of digital book adoption.

*Facilitating conditions:* Venkatesh *et al.* [12] have defined, facilitating conditions can be defined as the environmental support has an impact on the individual's evaluation while accepting the new products. For users with confidence of their abilities and knowledge, their higher confidence shows more likely to succeed in achieving the target behavior [12]. Sheng *et al.* [40] show that, greater level of facilitating conditions de-

creases levels of uncertainty and ambiguity.

Benevolence trust indicates that focal partner's genuine concern for the other party's well-being is beyond their own profit motives, which not only reduces uncertainties, but also enhances the perceived trust of using the product [18]. Hence, it can be inferred that as long as benevolence trust is developed, specifically, through more gentle and altruistic approach towards customers, customers will believe the company will be willing to sacrifice their short-term benefits and proactively consider their needs for the product usage and improve the usage conditions *i.e.* improve facilitation conditions for e-book usage. Therefore, we propose that

**H5:** The benevolence trust will lead to increase individuals' perceived facilitating conditions, in case of e-book adoption.

### 3. Method

The purpose of the study was to examine how benevolence trust influences participants' adoption intention and to determine the effect of benevolence trust on the antecedences of e-book adoption *i.e.* social influence, performance expectancy, effort expectancy and facilitating conditions. A 2 (benevolence trust: control versus treatment) between subject design was used with adoption intention as the dependent variable.

#### 3.1. Pretest

A pretest was conducted to corroborate the reliability of the survey. Twenty participants age from 20 to 49, who had no prior experience of using e-books, participated in the pretest. After they finished the survey, they were asked to state their overall opinion about the survey (difficulties, ambiguous questions or terms, etc.). We then improve the wordings of survey questionnaire, which were done by the quantitative research experts.

#### 3.2. Participants, Stimuli and Procedure

Total 423 participants, 91% of them age between from 20 to 29, who had never used e-book were recruited. They belonged to one of the two groups, control versus treatment. Treatment group received a message of benevolence trust manipulation but control group did not. For data collection, we adopted convenience sampling and designed an Internet-based survey. Finally, 207 and 216 valid questionnaires were collected in control group and treatment group, respectively.

By referring to Wu *et al.* [21], the modified virtual text for manipulating benevolence trust was constructed as following

According to the statistical report of the global health study, in 2003, in Nepal, the adult literacy rate is below 50%. The women's social status is even lower and lots of young female adolescents had no education opportunity. In 2003, Company A launched a "hoping to read charitable program" in Siganhadi, a remote area from Nepal capital. To reach this area, the volunteers need to climb the hill by walk for at least five hours. A team of volunteers of the company provides the necessary educa-

tions for those children. Every year, Company A sends 20 volunteers to this area and provides the necessary teaching materials and computers for those volunteers. So far, the company had donated more than 10 million NT dollars to this program and helped more than 500 children in 15 villages in this area, encouraging them to experience the real world through reading. Over a period of 12 years, project participants had reported many touching experiences, such as a young female student, who originally had no education opportunity but now she got the scholarship from a top university in the US.

At the beginning, all the participants read the brief introduction of two book publishers. One is publishing traditional paper books and the other, Company A, is publishing e-books. Next, participants in the treatment group read the benevolence scenario message before they filled up the questionnaire regarding their benevolence trust toward Company A; participants in the control group without reading the scenario message directly filled up the questionnaire regarding their benevolence trust toward the company A. Then, the UTAUT questionnaire was administered, to measure antecedents of adoption intention viz. social influence, performance expectancy, effort expectancy and facilitating conditions. Where, social influence was measured by using five items scale, adapted from Lu *et al.* [27]; performance expectancy and effort expectancy were measured using 4 items scales, respectively, where were adapted from Venkatesh *et al.* [12]. Facilitating conditions variable was measured using three items scale adapted from Thompson *et al.* [41]. Then, they were measured for their adoption intention toward the object adapted from Teo [42]. All the items were measured by using a seven-point scale (1 = strongly disagree; 7 = strongly agree).

### 3.3. Manipulation Checks

We firstly examined participants' perceive differences from manipulation of benevolence trust. By using the t-test analysis, the data of these two groups (treatment versus control) was compared. The paired-sample t-test revealed a positive effect with regard to the benevolence trust ( $M_{\text{treatment}} = 4.5709$ ,  $M_{\text{control}} = 4.1362$ ,  $t = 4.712$ ,  $p < 0.001$ ;  $M_{\text{treatment}} = 4.5709 > 4$ ,  $p < 0.001$ ,  $M_{\text{control}} = 4.1362 > 4$ ,  $p > 0.05$ ); hence, our manipulation of benevolence trust was successful.

### 3.4. Results

*Reliability analysis* All constructs in this study demonstrated acceptable reliability (the Cronbach's alpha for each construct was between 0.64 and 0.92).

#### 3.4.1. Hypotheses Test

As **Table 1** shows, the results also revealed that with the notable increase of benevolence trust, social influence ( $M_{\text{treatment}} = 4.7338$ ,  $M_{\text{control}} = 4.4589$ ,  $t = 2.762$ ,  $p = 0.006$ ), performance expectancy ( $M_{\text{treatment}} = 4.9861$ ,  $M_{\text{control}} = 4.7343$ ,  $t = 2.365$ ,  $p = 0.019$ ), effort expectancy ( $M_{\text{treatment}} = 5.2731$ ,  $M_{\text{control}} = 5.0181$ ,  $t = 2.363$ ,  $p = 0.019$ ), and facilitating condition ( $M_{\text{treatment}} = 4.6968$ ,  $M_{\text{control}} = 4.5314$ ,  $t = 2.224$ ,  $p = 0.027$ ) also increases significantly. These results support our hypothesis, H2, H3, H4 and H5. However, this

**Table 1.** Mean and variance of benevolence trust, constructs of UTAUT and adoption intention.

	Control Group	Treatment Group	Difference ( $M_{\text{treatment}} - M_{\text{control}}$ )
Benevolence Trust	4.1362 (0.999)	4.5709 (1.021)	0.44826***
Performance Expectancy	4.7343 (1.130)	4.9861 (1.086)	0.25966*
Effort Expectancy	5.0181 (1.146)	5.2731 (0.994)	0.26449*
Social Influence	4.4589 (1.09)	4.7338 (1.016)	0.29348**
Facilitating Conditions	4.5314 (0.861)	4.6968 (0.875)	0.19203*
Adoption Intention	4.3696 (1.392)	4.5069 (1.264)	0.18357

\*Comparison of means, significant at  $p < 0.05$ .

study did not support that participants' notable increase of benevolence trust will significantly increase their adoption intention ( $M_{\text{treatment}} = 4.5069$ ,  $M_{\text{control}} = 4.3696$ ,  $t = 1.429$ ,  $p = 0.155$ ). The adoption intention in the treatment group is higher than the adoption intention in the control group, but the difference is not significant. Therefore, H1 is not supported. Whereas, the regression analyses for both groups show that benevolence trust is positively associated with adoption intention ( $\beta = 0.690$ ,  $p < 0.001$  for control group and  $\beta = 0.651$ ,  $p < 0.001$  for treatment group). Hence, the benevolence trust still is positively associated with consumers' adoption intention of digital books.

After examining the hypotheses, we would like to perform regression analyses to examine how UTAUT can explain consumer intentions of e-book adoption. Next, we would perform another regression analyses to explore the relative importance of benevolence trust and each construct of UTAUT toward e-book adoption intention.

### 3.4.2. Regression Analysis of Constructs of UTAUT and Adoption Intentions

To verify the impact of the predictors of UTAUT on adoption intentions, the regression analysis was employed. The independent variables were social influence, performance expectancy, effort expectancy and facilitating conditions and the dependent variable was adoption intention. From **Table 2**, for control group, the R-square was 0.42. The coefficient of each construct would be, social influence  $\beta = 0.554$  ( $p < 0.001$ ), performance expectancy  $\beta = 0.173$  ( $p > 0.05$ ), facilitating conditions  $\beta = 0.119$  ( $p > 0.05$ ) and then effort expectancy  $\beta = 0.107$  ( $p > 0.05$ ). In the control group, social influence was significantly associated with adoption intention but there was no significant effect of the performance expectancy, effort expectancy and facility conditions on the adoption intention.

In case of treatment group, from **Table 2**, the R-square was also 0.42. The coefficient of each construct would be, social influence  $\beta = 0.253$  ( $p < 0.05$ ), performance expectancy  $\beta = 0.237$  ( $p < 0.05$ ), facilitating conditions  $\beta = 0.133$  ( $p > 0.05$ ) and then effort expectancy  $\beta = 0.263$  ( $p < 0.05$ ). The results show that when the benevolence trust was enhanced, there was significant positive effect of social influence, performance expectancy and effort expectancy on adoption intention, but this significance did not exist for facilitating conditions.

Interestingly, without the manipulation of benevolence trust, only one independent

**Table 2.** Coefficients ( $\beta$ ) of regression analysis of constructs of UTAUT and adoption intention.

	Control group	Treatment group
Performance Expectancy	0.173	0.237*
Effort Expectancy	0.107	0.263*
Social Influence	0.554***	0.253*
Facilitating Conditions	0.119	0.133
	$R^2 = 0.42$	$R^2 = 0.42$

\*\*\* $p < 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$ .

variable of the UTAUT model *i.e.* social influence had significant positive effect on adoption intention; but when the benevolence trust is enhanced, three independent variables in the UTAUT model, social influence, performance expectancy and effort expectancy, showed significant positive effect on adoption intention. In other word, only when benevolence trust is enhanced, the UTAUT model can be employed to predict the e-book adoption intention more effectively. The finding of this study adds more insights to effective implementation of UTAUT for e-book adoption intention.

### 3.4.3. Relative Importance of Benevolence Trust and Each Construct of UTAUT towards Adoption Intention

To examine the relative importance of benevolence trust and each construct of UTAUT towards adoption intentions, another multiple regression analyses were conducted. The independent variables were benevolence trust and four key constructs of UTAUT, and the dependent variable was adoption intention. From **Table 3**, for control group, the R-square was 0.42. The coefficient of benevolence trust would be,  $\beta = 0.139$  ( $p > 0.05$ ) and the coefficient of each construct would be, social influence  $\beta = 0.486$  ( $p < 0.001$ ), performance expectancy  $\beta = 0.152$  ( $p > 0.05$ ), facilitating conditions  $\beta = 0.080$  ( $p > 0.05$ ) and effort expectancy  $\beta = 0.132$  ( $p > 0.05$ ). Only social influence was significantly associated with adoption intention.

In case of treatment group, from **Table 3**, the R-square was 0.40. The coefficient of benevolence trust would be,  $\beta = 0.314$  ( $p < 0.001$ ) and the coefficient of each construct would be, social influence  $\beta = 0.190$  ( $p > 0.05$ ), performance expectancy  $\beta = 0.224$ , ( $p < 0.05$ ), facilitating conditions  $\beta = 0.061$  ( $p > 0.05$ ) and then effort expectancy  $\beta = 0.175$  ( $p > 0.05$ ). The results show that, only benevolence trust and performance expectancy were significantly associated with adoption intention.

These regression analyses provide another interesting finding. Without enhancing benevolence trust, the most important determinant of e-book purchase is social influence. However, when benevolence trust is enhanced, the benevolence trust becomes the most important determinant toward e-book adoption intention. This finding provides another insight for predicting e-book purchase.

**Table 3.** Coefficients ( $\beta$ ) of regression analysis of constructs of UTAUT and benevolence trust toward adoption intention.

	Control group	Treatment group
Performance Expectancy	0.152	0.224*
Effort Expectancy	0.132	0.175
Social Influence	0.486***	0.190
Facilitating Conditions	0.080	0.061
Benevolence Trust	0.139	0.314***
	$R^2 = 0.42$	$R^2 = 0.40$

\*\*\* $p < 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$ .

## 4. Conclusions

Drawing from the knowledge around topics of benevolence trust, and the constructs of UTAUT, this study describes the effect of benevolence trust on e-book adoption intention. Our research results also provide the following theoretical and managerial implications.

### 4.1. Theoretical Implications

The usage of e-book provides many benefits for environmental protection such as saving tree, reduction in air pollution, etc. However, adopting e-book encountered some emotional resistances to change due to consumers' habits and emotional aspects associated with use of paper books from childhood for long. Consumers face some discomfort like adopting new behavior to read on screen, giving up the past traditional way of reading paper book by turning pages by hands. Hoeffler [8] specifically proposed that the novelty of such discontinuous innovations will obstruct consumer adoption intentions. The invention of e-book is a typical example. The low usage rate of e-book can be led to call for more research focused on the resistance (e.g., [4]). However, previous research on promoting e-book usage, had never considered the importance of developing consumers' benevolence trust toward e-book providers. Therefore, in this research, by integrating benevolence trust, and the constructs of UTAUT, we explore the new insight of e-book adoption. This study suggests that the individual level of trust in benevolence will improve the consumer's perception of social influence, performance expectancy, effort expectancy and facilitating conditions and has positive effects on e-book adoption intention. Also, when benevolence trust is enhanced, benevolence trust becomes the most important determinant for e-book adoption intention. All these findings are important for e-book adoption. Also, our finding provides input to increase scope of UTAUT; the enhancement of benevolence trust will change the relative importance of the constructs of UTAUT, while predicting e-book adoption. Also, this research identifies the limitation of using UTAUT in e-book adoption; only when the benevolence trust is enhanced, more constructs of UTAUT can significantly impact individuals' adoption intention.

## 4.2. Managerial Implications

The important findings of this study suggest that e-book companies can focus on enhancing their benevolence trust among consumers. Once benevolence trust is enhanced, it becomes the key determinant for e-book adoption. These findings do provide new managerial implications for e-book providers. In general, to develop benevolence trust, providing money, in-kind sponsorship, volunteer work, expertise provision, charitable activities, and environmental caring programs can be helpful. However, more importantly, company must be willing to make short-term sacrifices and take sincere care of customers' interests and the whole environment.

Next, our study proposed that benevolence trust can increase consumers' perception of social influence, performance expectancy and effort expectancy. As long as benevolence trust is developed, consumers pay more attention on these variables. In turn, consumers' expectation increases. Under this condition, company's R&D will become more important. When consumers higher their expectancies of performance towards the provider, company must put more effort to improve the product performance and usage environment to make product become more user friendly. All of them are worth noting issues for managers.

## 4.3. Limitations and Future Research

The study provides further and new insights regarding the marketing of e-book by exploring the importance and role of benevolence trust for e-book adoption. This study, however, still possess several weaknesses and limitations that could be further explored in the future study.

The first limitation is related to the R-square of regression analysis. Most of regression analyses could explain only about 42% of the variance in adoption intention. There may have other factors that could affect psychological responses and adoption intentions towards e-books. Nonetheless, to predict the adoption intention of e-book, this study mainly focused on benevolence trust and constructs of UTAUT. Future research is needed to explore other possible influential factors for e-book adoption, such as level of altruism, knowledge of environment protection, product functions (e.g., utilitarian versus hedonic), etc. Under this condition, the prediction result may be improved.

The second limitation of this research is majority of participants' age is between 20 and 29, *i.e.* young people. It is because comparing with elderly people, in general, more young persons were early adopters for a new technology and had less resistance to a new technology. While choosing digital book over the traditional paper book, young persons can be easier to overcome their emotional and psychological barriers but it can be more difficult for elderly individuals. However, elderly persons are equally important segments of the readers. Hence we suggest that further research is required to investigate more even and diversified samples in all age groups, which will help facilitate e-book adoption in various segments.

Finally, this research only studies the importance of benevolence trust and role it plays for e-book adoption. We do not deeply involve the development of benevolence

trust. To develop benevolence trust, the involved range will be broad and fine; no matter inside or outside, every company activity will affect the benevolence trust. Also, when the industry differs, the approach can be different. Therefore, to study how to build benevolence trust can be an important future research direction.

However, even though there are some limitations, this study still provides new insight into the effect of benevolence trust on e-book adoption. It also explores the role of benevolence trust while adopting e-books. As e-books can save trees and transportation costs and reduce pollution of shipping, the adoption of e-books is very helpful for environment sustainability. For an e-book provider, through caring and genuine concerns toward the customers and environment, not only consumers' barriers for using e-books can be mitigated, the environment can also be protected. Thus, our findings shed light on the use of e-books as well as the effect of environmental protection. They can be useful for theoretical, managerial and social implications.

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