Volume 6, Issue 3
August 2013
ISSN: 1946-1836

JOURNAL OF INFORMATION SYSTEMS APPLIED RESEARCH

Special Issue: Cloud Computing

In this issue:

The **Journal of Information Systems Applied Research** (JISAR) is a double-blind peer-reviewed academic journal published by **EDSIG,** the Education Special Interest Group of AITP, the Association of Information Technology Professionals (Chicago, Illinois). Publishing frequency is currently quarterly. The first date of publication is December 1, 2008.

JISAR is published online (http://jisar.org) in connection with CONISAR, the Conference on Information Systems Applied Research, which is also double-blind peer reviewed. Our sister publication, the Proceedings of CONISAR, features all papers, panels, workshops, and presentations from the conference. (http://conisar.org)

The journal acceptance review process involves a minimum of three double-blind peer reviews, where both the reviewer is not aware of the identities of the authors and the authors are not aware of the identities of the reviewers. The initial reviews happen before the conference. At that point papers are divided into award papers (top 15%), other journal papers (top 30%), unsettled papers, and non-journal papers. The unsettled papers are subjected to a second round of blind peer review to establish whether they will be accepted to the journal or not. Those papers that are deemed of sufficient quality are accepted for publication in the JISAR journal. Currently the target acceptance rate for the journal is about 45%.

Questions should be addressed to the editor at editor@jisar.org or the publisher at publisher@jisar.org.

JOURNAL OF INFORMATION SYSTEMS APPLIED RESEARCH

Editors

JISAR Editorial Board

What Influences Students to Use Dropbox?

D. Scott Hunsinger
hunsingerds@appstate.edu

J. Ken Corley
corleyjk@appstate.edu

Department of Computer Information Systems
Appalachian State University
Boone, NC 28608, USA

Abstract

The popularity of file hosting services is increasing as people are becoming more comfortable storing their files in the "cloud" versus on their local devices. Dropbox currently has over 50 million users and is one of the most popular file hosting services. Dropbox users save their files in a special folder on their computer or other device. These files can then be accessed through another computer or mobile device. No known study has examined the factors influencing students' decision to use the Dropbox file hosting service. This topic is important because end-users can choose among multiple competing file sharing services, many of which are offered for free or for a low cost. This study uses the 'Theory of Planned Behavior' and the construct 'Affect' to better understand student usage of Dropbox.

Keywords: Dropbox, Theory of Planned Behavior, Behavioral Intention, Affect

1. INTRODUCTION

The popularity of file hosting services is increasing as people are becoming more comfortable storing their files in the "cloud" versus on their local devices. Each year, people are creating more and more photos, images, documents, and other files that they need to access from multiple devices such as home PCs, work computers, smartphones, tablets, and other devices (Jesdanun, 2012).

Dropbox is one of the most popular file hosting services. It allows users to save their files in a special folder on their computer or other device. These files can then be accessed through another computer, smartphone, tablet, or similar device ("About Dropbox," 2012).
Multiple factors may influence an end-user's decision to use a file hosting service such as Dropbox. To date, no known study has examined the factors influencing students' decision to use the Dropbox file hosting service. This topic is important because end-users can choose among multiple competing file hosting services, many of which are offered for free or for a low cost.

This paper is organized into several sections, beginning with the Literature Review section, which provides background information about Dropbox and competing products. This section also includes the theory behind the paper, followed by the Hypotheses. The next section is Methodology, which describes the approach in collecting both interview and survey data for this study. In the findings section, the results from the correlation and hierarchical regression analyses are presented. Implications of the findings are provided in the discussion section, which is then followed by the conclusion section.

2. LITERATURE REVIEW

Brief Overview of Dropbox

Dropbox was founded by MIT graduates Drew Houston and Arash Ferdowsi in June 2007 (About Dropbox, 2012). Houston came up with the idea after forgetting to bring his flash drive with him on multiple occasions (Ying, 2009). Dropbox was initially released to the general public in September 2008. The company has received over $250M in venture capital funding from investors including Accel Partners, Amidzad, Sequoia Capital, and Y Combinator (Crunchbase, 2012). The company's value is estimated at $5 to $10 billion (Lacy, 2011).

Dropbox has over 50 million users worldwide (Barret, 2011). About one-third of the users are from the United States, while the United Kingdom (6.7%) and Germany (6.5%) represent the next two largest user groups (Ying, 2010).

Dropbox can be accessed through multiple operating systems including Windows, Mac OS, and Linux, as well as mobile devices using Android, iOS, and the Blackberry OS. About two-thirds of Dropbox users use only Windows, while about 20% use only MacOS and 2% use only Linux. The remainder of Dropbox consumers use more than one operating system (Ying, 2010).

Dropbox's Business Model

Dropbox operates on the "Freemium" financial model – offering a free service with an option for users to upgrade (Gannes, 2010). Users of Dropbox can open a free account with 2GB storage. To gain more free storage space, users can refer new customers, earning 500MB of space per new referral up to 32GB of space ("Dropbox Referral Program", 2012).

In July 2012, Dropbox doubled the amount of storage space for paid users (Douglas, 2012). As shown in Table 1 (Dropbox Pricing, 2012), users paying in full for an entire year receive a discount over the monthly pricing.

Table 1: Fees for Dropbox storage space

Amount of Paid Storage Space	Monthly Cost	Yearly Cost
100GB	$9.99	$99.00
200GB	$19.99	$199.00
500GB	$49.99	$499.00

Dropbox's Competitors

In the backup client market, Microsoft's Backup and Restore holds 36.40% of the worldwide market share. Dropbox is the second most common backup product with 14.14% market share. Norton Online Backup (9.10%), Avira Premium Security Suite (6.87%), and Norton 360 (5.89%) lag Dropbox in the backup client market, as well as products from Acronis, Lenovo, Panda, and Paragon (OPSWAT, 2011).

Even though Google Drive, Microsoft SkyDrive, and other products do not fall into the backup client market according to OPSWAT, they also provide a way for users to back up their files through the cloud. Dropbox faces threats from these products as well as similar products from Amazon.com, Apple, and other companies (Jesdanun, 2012) such as Box.net, SugarSync, YouSendIt, and MediaFire.

Features of Dropbox

In addition to functioning as a storage service, Dropbox also offers sharing and synchronization features (Pash, 2008). It also supports revision history and allows deleted files to be recovered (Snell, 2009). In addition, Dropbox provides multi-user version control so that multiple users can edit files without overwriting versions (Snell, 2009). Dropbox also announced a feature in April 2012 to let users automatically upload their videos or photos from a mobile device, tablet, or SD card (Time, 2012). Dropbox has been praised by multiple publications for its ease of use and simple design (Dunn, 2008; Eisenberg, 2009; Mendelson, 2009).

Dropbox Privacy and Security Concerns

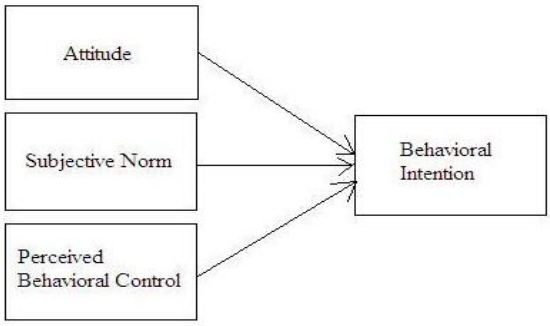
Some researchers have claimed that Dropbox's authentication architecture is insecure (Newton, 2011). Miguel de Icaza, a software expert, claims that Dropbox employees are able to access users' files (de Icaza, 2011). Also, in June 2011, a code update allowed all Dropbox accounts to be accessed without a password for a four hour period (Kincaid, 2011).
In short, there is a high level of trust between users and an organization responsible for providing cloud data storage services. If Dropbox were to fully disclose the details of how they secure customer data they would simultaneously increase the risk of exposing customer data to security breaches. This trust is an inherent problem for all organizations that

provide data storage through cloud computing services.

Theory of Planned Behavior

The Theory of Planned Behavior (Ajzen, 1991) can be used to examine the factors that influence a user's decision to use Dropbox. This theory uses three constructs to predict Behavioral Intention: Attitude towards the Behavior, Subjective Norms, and Perceived Behavioral Control. Behavioral Intention has been shown to be a strong predictor of actual behavior, which is difficult to measure in some domains. Attitude towards the behavior is defined as the degree to which a person has a favorable or unfavorable evaluation of the behavior in question (Ajzen, 1991). Attitude examines a person's beliefs concerning a behavior of interest. Subjective Norm refers to the person's perception of the social pressures to perform or not perform the behavior (Ajzen, 1991). Perceived Behavioral Control deals with the perceived ease or difficulty of performing the behavior (Ajzen, 1991). The Theory of Planned Behavior (TPB) expands a previous theory, the Theory of Reasoned Action (Fishbein and Ajzen, 1975), by including Perceived Behavioral Control as a third predictor of Behavioral Intention. The TPB is illustrated in Figure 1.

Figure 1: Theory of Planned Behavior (after Ajzen, 1991)



Ajzen (2001) has acknowledged that the TPB does not directly measure a person's feelings or emotions about a behavior of interest. Therefore, we have included an additional construct, Affect, as a fourth predictor of Behavioral Intention in order to determine whether feelings significantly influence the usage of Dropbox. We adopt the current preference for definition of 'affect' as "general moods (happiness, sadness) and specific emotions (fear, anger, envy), states that contain degrees of valence as well as arousal" (Ajzen & Fishbein 2000, Giner-Sorolla 1999, Schwarz & Clore 1996, Tesser & Martin 1996).

3. HYPOTHESES

Hypothesis 1: Attitude toward the Behavior is significantly and positively correlated with the intent to use Dropbox.

Hypothesis 2: Subjective Norm is significantly and positively correlated with the intent to use Dropbox.

Hypothesis 3: Perceived Behavioral Control is significantly and positively correlated with the intent to use Dropbox.

Hypothesis 4: Affect is significantly and positively correlated with the intent to use Dropbox.

4. METHODOLOGY

Both qualitative and quantitative approaches were used to capture data for this study. Undergraduates at a large southeastern university were recruited as participants for this study. First, ten volunteers were recruited to participate in short interviews. The purpose of the interviews was to solicit background information from students concerning their usage of Dropbox. These interviews were open-ended to allow students to elaborate on the reasons they may or may not use Dropbox or similar applications.

Data collected during the interview process were used to guide the construction of the survey instrument. The survey followed Ajzen's suggestions (Ajzen, 2001) for using the Theory of Planned Behavior. Survey items used to measure the 'Affect' construct were also included. Undergraduate business students enrolled during the 2012 summer session were asked to participate in the survey. While 196 students began the survey, 184 completed all questions.

The online survey was hosted by SurveyMonkey.com and the survey data were securely stored and downloaded from the SurveyMonkey.com web site. The data were then analyzed using the software programs Excel 2010 and SPSS 20.0. Tables 3 and 4 on the following page provide the results from the correlation analysis and hierarchical regression analysis.

Measures

Attitude

Attitude toward using Dropbox was directly measured using three statements. Participants were asked to indicate their level of agreement on a 7-point likert scale with each of the following statements:

(ATT1) Using Dropbox is a good idea.
(ATT2) Using Dropbox is a positive idea.
(ATT3) Using Dropbox is a helpful idea.

Subjective Norm

Three statements were also used to measure the construct of Subjective Norm. Again, participants were asked to indicate their level of agreement on a 7-point likert scale with each of the following statements:

(SN1) My professors influence me in my decision whether to use Dropbox.
(SN2) My friends influence me in my decision whether to use Dropbox.
(SN3) Other people important to me influence me in my decision whether to use Dropbox.

Perceived Behavioral Control

Three statements were used to measure Perceived Behavioral Control. Likewise, participants were asked to indicate their level of agreement on a 7-point likert scale with each of the following statements:

(PBC1) I have the ability to use Dropbox.
(PBC2) I possess enough knowledge to use Dropbox.
(PBC3) I have the resources to use Dropbox.

Affect

The additional construct 'Affect' was measured using three statements. Participants were asked to indicate their level of agreement on a 7-point likert scale with each of the following statements:

(AFF1) I would love/hate to use Dropbox.
(AFF2) I would be excited about/be bored using Dropbox.
(AFF3) I would be happy/unhappy using Dropbox.

Behavioral Intention

To measure behavioral intentions participants were asked to indicate, using a 7-point Likert scale, their level of agreement with the following three statements:

(BI1) I intend to use Dropbox in the next three months.
(BI2) I plan to use Dropbox in the next three months.
(BI3) I anticipate I will use Dropbox in the next three months.

Listed below in Table 2 are the results for Cronbach Alpha for each construct. Each construct is acceptable as the Cronbach Alpha is greater than .70 for each as recommended by Santos (1999).

Table 2: Cronbach Alpha for each Construct

Construct	Value
Attitude	.965*
Subjective Norm	.820*
Perceived Behavioral Control	.929*
Affect	.892*
Behavioral Intention	.957*

Demographics

As previously noted, undergraduates at a large southeastern university were recruited as participants for this study. A total of 196 participants (46.9% males and 53.1% females) began the research survey. A majority of the participants were business majors (25.5% Accounting, 13.3% Computer Information Systems, 5.1% Economics, 5.1% Entrepreneurship, 6.1% Finance and Banking, 4.1% Hospitality and Management, 6.1% International Business, 18.4% Management, 9.2% Marketing, 4.1% Risk Management and Insurance and each of the remaining majors represented approximately 3% of the sample).

Table 3: Class of Participants

Class	Percentage
Senior	55.1%
Junior	25.5%
Sophomore	11.2%
Freshman	8.2%

As shown in Table 3, slightly more than half of the respondents are seniors.

5. FINDINGS

Hierarchical regression was employed in this study because it allows for specification of the order of entry of the variables based upon theory and previous studies. This approach also allowed the authors to observe the change in R^2 as each independent variable was added into the model. Therefore, the researchers were able to determine whether or not additional variables were significant as they were entered into the equation.

Table 4: Correlation Matrix

	ATT	SN	PBC	AFF
BI	.511*	.424*	.434*	.594*
ATT		.272*	.652*	.749*
SN			.357*	.243*
PBC				.431*

ATT - Attitude; SN - Subjective Norm; PBC - Perceived Behavioral Control; AFF - Affect

* Correlation is significant at the 0.01 level

Table 5: Hierarchical Regression Analysis

Predictors (Constants)	R	Adjusted R^2	Sig. F Change
ATT	.511	.253	.000
ATT, SN	.591	.334	.001
ATT, SN, PBC	.594	.331	.469
ATT, SN, PBC, AFF	.671	.425	.000

(Dependent Variable = Behavioral Intention)
ATT - Attitude; SN - Subjective Norm; PBC - Perceived Behavioral Control; AFF – Affect

The Durbin-Watson test was used to identify any problem caused by autocorrelation. The results (d = 1.91) fell within the expected range of 1.5 – 2.5 (Tabachnick and Fidell, 2000).

Hypothesis 1 is supported. The correlation between Attitude and Behavioral Intention = +.511. Attitude was entered first into the hierarchical regression equation and explained 25.3% of the variance in Behavioral Intention. It is therefore concluded that Attitude is significantly and positively correlated with the intent of students to use Dropbox.

Hypothesis 2 is supported. The correlation between Subjective Norm and Behavioral Intention = +.424. Subjective Norm was entered second into the hierarchical regression equation and the total variance in intentions explained increased to 33.4%. Therefore, data indicates Subjective Norm is significantly and positively correlated with the intent of students to use Dropbox.

Hypothesis 3 is NOT supported. The correlation between Perceived Behavioral Control and Behavioral Intention = +.434. Perceived Behavioral Control was entered third into the hierarchical regression equation and the total variance in intentions explained did not increase. Therefore, the data indicates Perceived Behavioral Control is NOT significantly and positively correlated with the intent of students to use Dropbox.

Hypothesis 4 is supported. The correlation between Affect and Behavioral Intention is +.594. Affect was entered in last into the hierarchical regression equation and the total variance in Behavioral Intention explained increased to 42.5%. Therefore, the results indicate Affect is significantly and positively correlated with the intent of students to use Dropbox.

6. DISCUSSION

Considering the strong support in the Theory of Planned Behavior literature indicating a significant relationship between Perceived Behavioral Control and Behavioral Intention, it was initially surprising to note this significant relationship did not show up in this study. However, in Fishbein and Ajzen's (1975) earlier work their Theory of Reasoned Action included Attitude and Subjective Norm, while excluding Perceived Behavioral Control as a predictor of Behavioral Intention.

In this particular study, the results may also be an indication of a unique relationship between the Dropbox product and its users. In this study "affect" relates to an individual's emotional response towards Dropbox. Given (a) the inherent trust that must exist between Dropbox

and their customers, (b) the positive emotions associated with securely storing personal data with Dropbox versus the negative emotion of losing data during a computer failure, and (c) positive emotions of related to storing precious family momentos such as baby pictures and video of wedding; Perhaps things outside the volitional control of the user could be of lesser importance than a user's emotional response toward using Dropbox.

Through the use of interviews and results gathered from the survey, this study has provided a better understanding of the factors which influence students to use Dropbox. This is important for a number of reasons. First, this study indicates that Dropbox has a number of benefits for students. One of the interviewees stated, that Dropbox "...provides the convenience of having my files wherever I have Internet, not to mention the fact that you can use it on your phone."

Another student stated, "I started using Dropbox in the beginning of the Spring semester. I loved it. When I forgot to print out my homework from my computer at home, I was able to pull it up using DropBox. Your work stays with you at all times and can't lose it like when using a jump drive. Students who learn it as freshmen and are required to use it then, would definitely continue to use it throughout college. I know I will!" Several respondents implied that they were required by their professor to use Dropbox for a course.

This research could be extended to include other groups such as working professionals. Future research could also integrate other theories such as the Technology Acceptance Model or UTAUT. With a larger sample size, Structural Equation Modeling (SEM) could also be used to analyze the data.

7. CONCLUSION

Dropbox has quickly become one of the most popular file hosting services since its release in September 2008. This study discovered that two of the three predictors from the Theory of Planned Behavior (Attitude and Subjective Norm) are significantly and positively correlated with a person's intentions to use Dropbox. The results of our study suggest that Perceived Behavioral Control is not a significant predictor of Behavioral Intention in this domain. However, the findings indicate that Affect, a construct not measured in the Theory of Planned Behavior, significantly influences intention. Future research in this area should further examine the role of Affect since it was a significant predictor in this study.

8. REFERENCES

"About Dropbox". (2012). Retrieved July 13, 2012 from https://www.dropbox.com/about.

Ajzen, I. (1991). The Theory of Planned Behavior. Organizational Behavior and Human Decision Processes, 50, 179-211.

Ajzen I, Fishbein M. (2000). Attitudes and the Attitude-Behavior Relation: Reasoned and Automatic Processes. In European Review of Social Psychology, ed. W Stroebe, M Hewstone. Chichester, England: Wiley.

Ajzen, I. (2001). Nature and Operation of Attitudes. Annual Review of Psychology, 52, 27-58.

Barret, V. (October 18, 2011). "Dropbox: The Inside Story of Tech's Hottest Startup". Forbes. http://www.forbes.com/sites/victoriabarret/2011/10/19/dropbox-the-inside-story-of-techs-hottest-startup. Retrieved July 13, 2012.

Clore, G. C. (1994). Why Emotions are Felt. The Nature of Emotion: Fundamental Questions. P. Ekman and R. J. Davidson. New York, Oxford University Press: 103-111.

Clore, G. L. and K. Gasper (2000). Feeling is Believing: Some Affective Influences on Belief. Emotions and Beliefs: How Feelings Influence Thoughts. N. H. Frijda, S. Bem, A. Manstead and K. Oatley. Cambridge, Cambridge University Press: 10-44.

Crunchbase. 2012. "Dropbox". Retrieved May 30, 2012 from http://www.crunchbase.com/company/dropbox.

De Icaza, M. (2011). "Dropbox Lack of Security". Retrieved July 13, 2012 from http://tirania.org/blog/archive/2011/Apr-19.html.

Douglas, A-C. "New Dropbox Pro Plans!" Retrieved July 13, 2012 from

http://blog.dropbox.com/index.php/new-dropbox-pro-plans/.

"Dropbox Gets Automatic Photo Uploads, Offers 3 GB Incentive" (April 27, 2012). TIME. Retrieved July 13, 2012 from http://techland.time.com/2012/04/27/dropbox-gets-automatic-photo-uploads-offers-3-gb-incentive).

"Dropbox Pricing". Retrieved July 13, 2012 from https://www.dropbox.com/pricing.

"Dropbox Referral Program". Retrieved July 13, 2012 from https://www.dropbox.com/referrals.

Dunn, S. "Dropbox File Sync Service". Retrieved July 13, 2012 from http://www.washingtonpost.com/wp-dyn/content/article/2008/08/01/AR2008080100260.html.

Eisenberg, A. (2009). "Digital Storage Options for Workers on the Go". Retrieved July 13, 2012 from http://www.nytimes.com/2009/01/18/business/18novel.html?_r=1.

Fishbein, M. and Ajzen, I. (1975). Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research. Reading, MA: Addison-Wesley.

Frijda, N. H. (1994). Varieties of Affect: Emotions, Episodes, Moods, and Sentiments. The Nature of Emotion: Fundamental Questions. P. Ekman and R. J. Davidson. New York, Oxford University Press: 59-67.

Gannes, L. "Case Studies in Freemium: Pandora, Dropbox, Evernote, Automattic and MailChimp". Retrieved July 13, 2012 from http://gigaom.com/2010/03/26/case-studies-in-freemium-pandora-dropbox-evernote-automattic-and-mailchimp/.

Giner-Sorolla R. 1999. Affect in Attitude: Immediate and Deliberative Perspectives. In Dual-Process Theories in Social Psychology, ed. Chaiken, S and Trope, Y., pp. 441-61. New York: Guilford.

Jesdanun, A. (2012). "Review. Using Files Made Easy with Online Storage". Retrieved May 30, 2012 from http://www.businessweek.com/ap/2012-05-02/review-using-files-made-easy-with-online-storage.

Kincaid, J. (2011). "Dropbox Security Bug Made Passwords Optional for Four Hours". Retrieved July 13, 2012 from http://techcrunch.com/2011/06/20/dropbox-security-bug-made-passwords-optional-for-four-hours/.

Lacy, S. (2011). "Dropbox Raising Massive Round at a $5B-Plus Valuation". Retrieved July 13, 2012 from http://techcrunch.com/2011/07/12/dropbox-raising-massive-round-at-a-5b-plus-valuation.

Mendelson, E. (2009). "Dropbox". Retrieved July 13, 2012 from http://www.pcmag.com/article2/a/0,2817,2343861,00.asp.

Newhagen, J. E. and Reeves, B. (1991). Emotion and memory responses to negative political advertising. Television and political advertising. F. Biocca. Hillsdale, N.J., L. Erlbaum Associates: 197-220.

Newton, D. "Dropbox Authentication: Insecure by Design". Retrieved July 13, 2012 from http://dereknewton.com/2011/04/dropbox-authentication-static-host-ids/.

OPSWAT. (2011). "Security Industry Market Share Analysis: Antivirus and Backup Client Market Share Report". Retrieved July 13, 2012 from http://www.opswat.com/sites/default/files/OPSWAT-market-share-report-december-2011.pdf.

Pash, A. "Dropbox Syncs and Backs Up Files Between Computers Instantaneously". Retrieved July 13, 2012 from http://lifehacker.com/397778/dropbox-syncs-and-backs-up-files-between-computers-instantaneously.

Santos, J. R. (1999). "Cronbach's Alpha: A Tool for Assessing the Reliability of Scales." Journal of Extension, 37(2).

Schwarz, N., and Clore, G.L. (1996). Feelings and Phenomenal Experiences. In Social Psychology: Handbook of Basic Principles, ed. ET Higgins, AW Kruglanski, pp. 433-65. New York: Guilford.

Snell, J. "Throw Your Stuff in Dropbox". Retrieved July 13, 2012 from http://www.macworld.com/article/1138810/mwvodcast93.html.

Tabachnick, B. G. and Fidell, L. S., Using Multivariate Statistics (4th ed.). Allyn and Bacon, Needham Heights, MA, 2000.

Terry, D.J., Hogg M.A. (1996). Group norms and the attitude-behavior relationship: a role for group identification. Pers. Soc. Psychol. Bull. 22:776-93.

Ying, J. (2009). "Meet the Team! (Part 1)" Retrieved July 13, 2012 from http://blog.dropbox.com/?p=23.

Ying, J. (2010). "Dropbox Around the World!". Retrieved July 13, 2012 from http://blog.dropbox.com/?p=339.