Because It's Good for My Feeling of Self-worth: Testing the Expanded Theory of Planned Behavior to Predict Greek Users' Intention to Review Mobile Apps

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Abstract. Mobile apps, just like traditional products (e.g. books, electronic goods) and services (e.g. hotels) sold and marketed online, are increasingly being subjected to after-use evaluations. While the factors influencing people's intention to write reviews for product and services have been increasingly understood, the mechanisms behind people's willingness to review mobile apps, which often can be used without any cost, are not yet fully explored. Using the Theory of Planned Behavior and a set of functions for writing reviews identified in previous studies, a model was tested with survey data from 214 Greek mobile app users to identify the factors that influenced their intention to write reviews for mobile apps. Results of a hierarchical regression analysis shows that app review writing intention is influenced by a positive attitude towards the act, perceived behavioral control, descriptive social norms, and ego-defensive function.

Keywords: Mobile app reviews · Theory of Planned Behavior
Online review writing functions

1 Introduction

In a post-Web 2.0 era, consumers have increasingly gained the ability to be involved in the commodity production process, which is realized partly by providing them with the chance to say something about their experience with a product. Aptly termed as online reviews, customers' assessment of their interaction with a certain product has been known to either increase or decrease other people's inclination to use that product.

Online reviews are also significantly affecting the market for mobile apps. Often when people have no prior experience with or information about a certain app, their decision to download it could be hinged on some factors visible to them at the moment of download decision. User reviews are often used as one of the bases for a download decision.

In the literature on online reviews, it has been noted that several factors influence people's proclivity to provide reviews for specific products or services. For instance, people have both rational (e.g. knowledge sharing) and emotional (e.g. making friends) motivations for writing reviews [14]. Additionally, when one subscribes to the Theory

of Planned Behavior (TPB) [1], it can also be argued that people's willingness to provide reviews for certain apps could be influenced by factors such as their evaluation of the review writing act (attitude), their perceived ability to perform the act (behavioral control), and what they expect people within their networks expect them do (subjective norm).

As studies into the predictors of people's intention to write reviews for mobile apps are virtually non-existent, this research aimed at determining the factors that prompt people to publish narratives of their experiences with certain mobile apps. The hypotheses proposed for the study were tested using data collected from 214 mobile users from Greece through an online survey.

2   Theoretical Framework

Online reviews of products and services are regarded important sources of information for customers who are still in the process of deciding whether or not to purchase or acquire a specific product or service. As a form of user-generated contents, online reviews benefit not only customers but also companies that either sell or produce a product or provide a service. For online companies or vendors, online reviews can be a low-cost form of advertisement (especially if consumer reviews are positive) and an effective quality control approach, as reviews can provide companies with insights into customers' reactions and levels of satisfaction [10]. Such benefits could explain why online companies are incentivizing, in one way or another, customers who write reviews for products or services acquired.

Although the factors that motivate people to write online reviews, in general, have already been identified in previous studies [e.g. 11, 23], the relative newness of mobile apps as commodities for mass consumption, unlike more established products (e.g. books, electronic goods) and services (e.g. hotels, restaurants), implies that the factors influencing users' motivations to write reviews for certain apps are not yet adequately understood. Additionally, the fact that some apps can be downloaded for free, while others can be purchased for a relatively low price, would also signify that the mechanisms governing people's decision to review a mobile app could be different, especially if the app to be reviewed does not have a high price tag.

In this study, a model for the determinants of users' intention to write mobile app reviews was tested using Ajzen's [1] Theory of Planned Behavior (TPB). However, questions pertaining to the sufficiency of the model [8] to explain variance in people's behavioral intention has prompted calls for the inclusion of context-relevant variables. For instance, in a study into the factors influencing the use of ICT in classrooms [19] and instant messaging [15], TPB was employed alongside factors such as perceived usefulness and perceived ease of use.

2.1   The Effects of TPB Factors: Attitude, Subjective Norm, and Perceived Behavioral Control

The central proposition of TPB is that an individual's actual behavior is a function of his or her intention to perform the behavior, which, in turn, is predicated on three

factors, namely attitude towards the behavior, subjective norm, and perceived behavioral control [1]. Attitude refers to the 'degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question' [1, p. 188], while subjective norm is defined as the person's perception of 'social pressure to perform or not to perform the behavior' [1, p. 188]. Perceived behavioral control refers to the 'ease or difficulty of performing the behavior' [1, p. 188].

In a several studies into the effects of these three TPB factors on the intention to use a technology, it has been shown that attitude, perceived behavioral control, and subjective norm contribute to people's decision to use specific types of technology such as instant messaging [15] and mobile devices for learning [5]. Additionally, the three TPB factors have also been found to be significant predictors of computer-mediated behaviors such as online shopping [12].

Nonetheless, Ajzen's [1] 'subjective norm' concept might be limited by its focus on a person's expectation of how his or her relevant contacts expect him or her to behave. This point prompts the decision to re-conceptualize the role of social influence in people's decision to write reviews by taking into account the impact of two types of social norms, namely injunctive social norms and descriptive social norms. While injunctive social norms refer to expectations of what other people approve (hence, conceptually similar to subjective norm), descriptive social norms refer to beliefs in the acceptability of an act because it is something typically performed by others [6]. Both injunctive [4, 21] and descriptive [2] social norms have been found to influence people's decision to share various types of personal information online.

Results of previous studies into the effects of TPB variables on behavioral intention, therefore, precipitated the first set of research hypotheses.

Hypothesis 1: Mobile users' positive attitude towards writing reviews for mobile apps positively influences their intention to write app reviews.
Hypothesis 2: (a) Injunctive social norms and (b) descriptive social norms positively influence mobile app users' intention to write app reviews.
Hypothesis 3: Perceived behavioral control positively influences mobile app users' intention to write app reviews.

2.2   The Functions of Writing Reviews

Daugherty et al. [9], using Katz's functional theory, claim that people's decision to create user-generated contents, such as online reviews, is predicated on four functions, namely (a) utilitarian, (b) knowledge, (c) ego-defensive, and (d) value-expressive. From a utilitarian standpoint, UCG creation is motivated by the availability of incentives; whereas, from a knowledge standpoint, UCG creation is prompted by people's need to understand their environment and themselves. The ego-defensive function of UCG creation is hinged on people's need to reduce self-doubt, increase their sense of belongingness, and minimize feelings of guilt for not contributing; while the value-expressive function of UCG creation is triggered by a feeling of gratification for being able to create something and by a degree of validation of who they are upon engagement in the creation act [9].

Ambiguity in the operationalization of the 'knowledge function', however, spurred the decision within this study to drop the concept from the model and to replace it with 'social function', which is approximately similar to the notion that writing online reviews provides reviewers with social benefits (e.g. writing reviews allows a person to meet others) [11]. Additionally, the 'value-expressive' concept is further extended (and referred to as 'emotional expression') to refer to people's desire to voice out the feelings that emerged from either their positive or negative experience of using a product. In the current study, the authors argue that this function enables product users not only the possibility to fully express themselves but also to inform others of their subjective experiences of using a certain product. In a way, hence, emotional expression also assumes the function of knowledge sharing from one consumer to another.

In a previous study, economic incentives (or the utilitarian function), social benefits, concern for other consumers, and positive self-enhancement (or ego-defensive) have been found to increase online word-of-mouth behavior [11]. Hence, it can also be hypothesized that the four functions of writing reviews could influence mobile app users' intention to write reviews for certain mobile apps. The second set of research hypotheses is presented below.

Hypothesis 4: The utilitarian function of writing reviews positively influences mobile app users' intention to write reviews for mobile apps.

Hypothesis 5: The social function of writing reviews positively influences mobile app users' intention to write reviews for mobile apps.

Hypothesis 6: The ego-defensive function of writing reviews positively influences mobile app users' intention to write reviews for mobile apps.

Hypothesis 7: The emotional expression function of writing reviews positively influences mobile app users' intention to write reviews for mobile apps.

3 Methods

3.1 Research Design and Procedure

An online survey was implemented to collect the necessary data to test the hypotheses proposed for the study. A link to the electronic questionnaire was sent to Greek mobile app users, who were approached through social networking sites, e-mails, and online discussion platforms.

A snowball sampling approach was used to reach as many survey respondents as possible. Despite the limitation of this sampling strategy (e.g. non-representativeness of the sample), it enables the researchers to collect data within a short timeframe and with less financial costs. After a ten-day collection period, completed questionnaires from 214 respondents were collected.

3.2 Survey Respondents

Of the 214 Greek respondents whose data were used for analysis, 123 (57%) were females. Majority of the respondents (n = 129, 60%) fall under the age cluster '25 to

34', with another 20% of the total number of respondents belonging to the age cluster '18 to 24'. Exactly 80% (n = 172) of the respondents have obtained higher education (e.g. a four-year bachelor's or a master's degree). Moreover, 67% (n = 143) of 214 respondents are primary users of social networking apps.

3.3   Measurements

The different research constructs were measured using previously validated scales. The 'attitude' construct was measured with five items (e.g. 'Writing a review for a mobile app is….good/bad, pleasant/unpleasant') on a semantic differential scale originally formulated by Daugherty et al. [9] and Moon and Kim [16]. Injunctive (e.g. 'My close social contacts approve of me writing mobile app reviews.') and descriptive (e.g. 'A lot of people around me write mobile app reviews.') social norms were measured with four and three items by White et al. [22], respectively. Five items, mostly from Netemeyer, Burton, and Johnston [17], were used to measure 'perceived behavioral control' (e.g. 'If I wanted to, I could easily write a review for a mobile app.').

Five items (e.g. 'Submitting an online review for a mobile app benefits me personally.') by Daugherty et al. [9] were used to measure 'utilitarian function', while four items (e.g. 'writing an online review for a mobile app makes me feel part of a community') by Clary et al. [7] measured 'social function'. Additionally, three items (e.g. 'Writing an online review for a mobile app makes me feel important.') by Clary et al. [7] were selected for 'ego-defensive function', while four newly formulated items (e.g. 'Writing a review provides me with the opportunity to express my opinion about the app.') were used to measure 'emotional expression function'. Finally, three newly formulated items were used to measure 'intention to write reviews for mobile apps'.

3.4   Measurement Validity and Reliability

To determine the validity of the constructs, an exploratory factor analysis, using principal component analysis (PCA), was performed with the 35 items measuring the nine constructs. For this analysis, the Kaiser-Meyer Olkin Measure of Sampling Adequacy value is .850 (higher than the recommended value of .60) [13], while the Bartlett's Test of Sphericity X^2 (561) = 3,885.75 is significant ($p < .001$), which means that the correlation among the 35 items is high enough for PCA. However, analysis revealed that only eight factors (instead of nine) had eigenvalues higher than 1. Inspection of the rotated component matrix indicated that items measuring 'social function' loaded with items measuring both 'injunctive' and 'descriptive' social norms. Hence, the 'social function' construct, considering its questionable validity, was removed from further analysis.

A second exploratory factor analysis was subsequently executed with the remaining 31 items intending to measure 8 constructs. Kaiser-Meyer Olkin Measure of Sampling Adequacy value is .827, while the Bartlett's Test of Sphericity X^2 (435) = 3,331.31 is also significant ($p < .001$). The analysis resulted in seven factors (instead of eight) having eigenvalues higher than 1. Items measuring 'injunctive social norms' had problematic loadings, as they loaded with 'intention' items. Hence, 'injunctive social norms' was also excluded from analysis.

A third exploratory factor analysis without the items for 'injunctive social norms' was performed (Kaiser-Meyer Olkin Measure of Sampling Adequacy = .815; Bartlett's Test of Sphericity X^2 (351) = 2,897.36, $p < .001$), which resulted in seven factors having eigenvalues higher than 1. With the removal of 'injunctive social norms' and 'social function' from the research model, hypotheses 2a and 5, respectively, will not be tested.

Cronbach alpha's values of the seven constructs were calculated to determine their reliability. The reliability for all constructs ranges from acceptable to good, as alpha values for the seven constructs are higher than .70. Table 1 presents the Cronbach's alpha, mean, and standard deviation (SD) values for the seven constructs.

Table 1. Cronbach's alpha, mean, and standard deviation (SD) values for the seven constructs

Construct	No. of items	Cronbach's α	Mean	SD
Intention to write reviews (INT)	3	.76	2.76	0.75
Attitude (ATT)	4	.76	3.35	0.71
Descriptive social norms (DES)	3	.74	2.54	0.69
Perceived behavioral control (PBC)	5	.73	3.58	0.64
Utilitarian function (UTI)	5	.87	2.45	0.84
Ego-defensive function (EGO)	3	.89	2.03	0.88
Emotional expression function (EMO)	4	.87	3.93	0.70

4   Results

4.1   Test for Multicollinearity

To determine if there are multicollinearity issues among the dependent variables, a correlation analysis was executed using all the research constructs. Correlation analysis reveals that there are no multicollinearity issues as correlation values among the constructs are remarkably lower than .70, the minimum for high correlation [3].

Furthermore, the tolerance level and the variance inflation factor (VIF) values were also calculated to fully ensure that, indeed, multicollinearity issues are not present. Tolerance level values for the six predictors ranged between .73 and .91 (higher than the prescribed limit of .10 for high correlation to exist), while the VIF values for the construct ranged between 1.08 and 1.37 (lower than the prescribed value of 10 to indicate multicollinearity) [3]. The absence of multicollinearity clearly denotes that the six predictors can be included in the regression analysis. Table 2 shows the inter-correlations among the seven research constructs.

4.2   Hypotheses Testing

A hierarchical regression analysis, which enabled the sequential determination of the five predictors [3] on the intention to write reviews for mobile apps was performed to test the final set of research hypotheses (1, 2a, 3, 4, 6, and 7). In the first block, the TPB factors – attitude, perceived behavioral control, and descriptive social norms (instead of

Table 2. Inter-correlations among the 7 seven research constructs

	INT	ATT	DES	PBC	UTI	EGO	EMO
INT	1						
ATT	.42**	1					
DES	.36**	.23**	1				
PBC	.41**	.33**	.23**	1			
UTI	.23**	.22**	.23**	.07	1		
EGO	.38**	.29**	.22**	.11	.24**	1	
EMO	.24**	.30**	.16*	.46**	.07	.17*	1

**p < .01; *p < .05.

subjective norm or injunctive social norms as the construct has poor validity) – were entered resulting in an adjusted R^2 of .29 ($F_{3, 210} = 31.31$, $p < .001$).

In the second block, the three functions with high validity were entered (utilitarian, ego-defensive, and emotional expression), which resulted in an increase in the adjusted R^2 (.34; $F_{3, 207} = 19.94$, $p < .001$). The adjusted R^2 value for the final model indicates that 34% of the variance for Greek mobile app users' intention to write mobile app reviews could be explained by the six predictors included in the analysis.

The final model further indicates that four of the six hypothesized predictors of mobile review app writing intention have significant effects on the dependent variable of interest. The four variables include the three TPB variables, namely attitude ($b = .22$, $p < .01$), perceived behavioral control ($b = .28$, $p < .001$), and descriptive social norms ($b = .18$, $p < .01$), and one functional predictor – ego-defensive ($b = .24$, $p < .001$). These results mean that hypotheses 1, 2a, 3, and 6 are supported, whereas hypotheses 4 and 7 could not be supported.

Table 3 presents the unstandardized and the standardized coefficients of the different predictors of Greek mobile app users' intention to write reviews for mobile apps.

Table 3. Unstandardized and standardized coefficients of the different predictors of Greek mobile app users' intention to write reviews for mobile apps

	B	Std. error	β	Adj. R^2 (ΔR^2)
(Constant)	.04	.29		
Attitude	.30	.07	.28***	.30
Descriptive social norms	.25	.07	.23***	(.31)
Perceived behavioral control	.31	.07	.26***	
(Constant)	−.08	.31		
Attitude	.23	.07	.22**	.35
Descriptive social norms	.20	.06	.18**	(.06)
Perceived behavioral control	.32	.08	.28***	
Utilitarian function	.06	.05	.06	
Ego-defensive function	.20	.05	.24***	
Emotional expression function	−.03	.07	−.02	

***p < .001; **p < .01; *p < .05.

5   Discussion and Future Research Directions

5.1   Discussion of Results

A review of the literature on the factors influencing people's word-of-mouth intention in the offline setting and an empirical study into the determinants of people's decision to write electronic reviews [11] clearly demonstrate how diverse people's motivations are for verbalizing their views and feelings for products and services they have used. Online reviews, as a specific form of word-of-mouth, benefit not only a general population of consumers (e.g. reviews as primary sources of necessary information) but also companies that sell or produce commodities being reviewed (e.g. reviews as low-cost advertisements).

The benefits app creators can derive from app user ratings and review could sufficiently explain why those creators are incentivizing app users to either rate or review apps they have downloaded (e.g. gaming apps promising game points to users who will decide to rate or review those apps). From a business standpoint, then, it helps to understand which factors would prompt people to write reviews for mobile apps. The fact that a multitude of mobile apps can be downloaded for free (hence, emotions arising from instances when apps will not meet prior expectations might be less intense), prompts the question on whether or not the mechanism behind people's propensity to write reviews for paid products and services would also translate into the context of reviewing mobile apps.

Results of an online survey with 214 Greek mobile app users show that their inclination to write reviews for mobile apps are predicated on their beliefs that they are capable (either because they have the know-how and the time) of writing reviews. Although writing reviews does not require a specialized expertise, the act can only be performed when one (a) has basic knowledge of how to post a review, (b) has an adequate understanding of the product's pros and cons, (c) has elementary knowledge of writing in a specific language, and (d) the time to write the review. The likelihood that an individual will write a review for a mobile app is higher when he or she could meet some of the prerequisites just mentioned.

A plethora of research into attitude-behavioral intention relationship has also shown that people will engage in an action that is positively viewed. In fact, it has been noted that behavioral intentions are higher when they are anchored on attitude (an autonomous belief in something) than on subjective norm (socially influenced belief in a thing) [18]. This particular result strongly suggests that mobile app users will have to be fully convinced of the positive features of writing a mobile app review before they will decide to engage in the act of writing.

As writing reviews is a social act that could be performed without serious demands for secrecy and confidentiality, people might be highly predisposed to write reviews just because others within their immediate environment are doing it. People have a strong tendency to mimic behaviors by others [20], and this could explain why descriptive social norms have been found to increase people's intention to perform a specific action. The performance of an action by a certain number of individuals may give an indication of the worth, value, and acceptability of an act, and this might provide an individual with a reason to engage in a similar action. Hence, people who

are aware that others within their social networks write reviews for mobile apps might also be encouraged to review apps they have already used.

Results also show that Greek mobile app users will be inclined to write reviews for mobile apps if they are convinced of the ego-defensive function that the act of review writing extends. This result somehow corresponds to what a previous study has found – that self-enhancement needs (e.g. feeling good about being able to tell others about one's success) have a strong impact on consumers' willingness to write reviews [11].

The absence of statistical support for the effects of utilitarian and emotional expression functions on mobile app review writing has a couple of implications. First, mobile app users' decision to write a review might have resulted from their calculation of the value of the compensation they are bound to receive in exchange for the effort and time they have to invest in writing a review. It is highly likely that the apps they have used do not offer attractive incentives for review writing.

Second, mobile app users' decision to write reviews might be strongly hinged on the intensity of emotions they have upon using a specific app. This point means that it might require a very high level of satisfaction and joy for mobile users to write reviews, just as users have to be extremely disappointed or must have a nightmarish experience with an app to invest time to review it. A disappointing experience with mobile apps that can be downloaded for free may not suffice to instigate users to publicly vent out their frustrations with those apps as users can just decide to uninstall those apps.

5.2 Implications and Future Research Directions

Results of this survey have a number of implications for mobile app designers. First, the finding that Greek mobile app users would be willing to write a mobile app review if people within their social networks are doing the same signifies that app developers should persistently explore ways to capitalize on the potential of social influence to motivate users to review apps they have used.

Second, the critical role that perceived behavioral control plays in nudging people to write reviews for mobile apps suggests that app designers should ensure that the act of review writing is something that will not cause people much time and effort to perform. However, it should be noted that if the act, indeed, would require some time investment from app users, attractive incentives should be offered to them. This point is proposed in relation to the premise that the statistically insignificant effect of utilitarian function on app review writing intention might be due to the absence or the unattractiveness of rewards or incentives for review writing.

Third, the effect of attitude towards review writing on people's intention to write reviews implies that mobile app developers have to look into strategies that would prompt their users to regard the act of reviewing apps in a positive way. Influencing app users' attitude towards app review writing might mean that mobile app developing should identity strategies to increase the salience of the functions of app review writing.

Results of the current study must be interpreted with caution. The cross-sectional nature of the study would limit any claim pertaining to the real causal relationships between the predictors and the dependent variable of interest. Future studies, hence, should consider resorting to an experimental approach to test the possible effects of

variables such as incentives and levels of satisfaction (or dissatisfaction) on people's intention to write reviews for mobile apps.

The current study's reliance on a relatively small sample of Greek mobile users invited using a non-random sampling approach (e.g. snowball sampling) also means that the results may not entirely reflect the mechanisms behind app review writing among a wider population of Greek mobile app users. More importantly, the use of data from a specific cultural or national cluster would also signify that the results will not totally apply to mobile users from other cultural or national clusters. This point will certainly open up avenues for research into the factors influencing mobile app review writing intentions in a cross-cultural context.

Furthermore, as the current study opted not to take a more nuanced view on app review writing intention across various types of mobile apps (e.g. paid apps vs free apps), the results might be remarkably different in a study that focuses on the determinants of mobile app review writing intention within the context of mobile apps that people have to pay for. One can only surmise that the impact of emotional expression function on users' review writing intention, for instance, would be stronger when they have to review an app they have paid for compared to an app that was downloaded for free.

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