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# **Antecedents and Effects of App-user Satisfaction: Empirical Evidence from Greece**

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# **Antecedents and Effects of App-user Satisfaction: Empirical Evidence from Greece**

## **Abstract**

The purpose of this research is to explore the antecedents and effects of mobile app satisfaction. A survey conducted using a “positivism” approach, in which 450 app users participated to answer the research instrument. Emotional Attachment and App design proved to be the most influential antecedents of app satisfaction, whereas Safety of personal data & user identification were important as well. However, app satisfaction has no effect on Intention to upgrade to premium service, showing that the basic revenue stream still derives from advertising and sponsorships. On the other hand, Word of Mouth communication is stimulated by app user satisfaction. This finding shows that satisfaction is the vehicle to spread the value of the app to other users cheaper and with more credibility. This research provides certain implications to digital marketing practitioners and academics in order to make decisions on building strong service brands using a mobile app as a distribution channel.

**Keywords:** App Satisfaction, Digital Marketing, Consumer Behaviour, Electronic Commerce

## 1. Introduction

During the last five years, Digital Transformation has been found at the edge of attention for both academics and practitioners in terms of business survival and growth in the new era of Information Age. Digital transformation or digital revolution suggests the need to incorporate information technologies, processes and digital skills in order to design and provide better services, products and brands that e-customers value the most (Nguyen and Le Minh, 2018). Digital transformation has set a new arena of global competition via internet. Internet users from EU can order products and services from the US or China and vice versa (Parasuraman et al., 2005). E-channel new business development concerns a necessity, since internet users have more than doubled within the last 7 years (Nguyen and Le Minh, 2018). With the increased penetration of smartphones and tablets, e-customers are expected to further increase their orders of products, services or acquire information using mobile devices (Hsiao et al., 2016). A vehicle to provide services of high quality through mobile devices by making orders, transactions and communications with the firm easier is to design and create a user-friendly mobile application (or simply mobile app or app). With regards to user satisfaction in digital contexts, Parasuraman et al. (2005) proved the importance of privacy and safety, along with ease of use among other factors. As end-user satisfaction related to e-banking portals, Pikkarainen, et al. (2006) unveiled content, accuracy, format, ease of use and timeliness as the basic dimensions of end-user satisfaction. As far as mobile social app is concerned, Hsiao et al. (2016) addressed the importance of user satisfaction, social communication with other users and hedonic incentives as antecedents of user engagement. According to Ogara, et al. (2014), user satisfaction is impacted by user experience, medium richness and social presence. In addition, Xu et al. (2015) stressed that app satisfaction, loyalty and hedonic benefits impact Word of Mouth. Dwivedi, et al. (2018) illustrated the need to develop emotional attachment as direct and indirect effects on customer satisfaction. Nguyen and Le Minh (2018) proved that emotional attachment positively moderates service recovery satisfaction. Although there is a wide range of research in the fields of portal, web or e-commerce creation and satisfaction, there is limited research on app design, satisfaction, and app branding (Hsiao et al., 2016; Xu and Prybutok, 2015). This research significantly fills the gap of mobile app marketing, by exploring the antecedents of app satisfaction as well as the effect of app satisfaction on e-customer behaviour. Thus, the basic research objectives concern the detection of the effects of app design, safety, emotional attachment and app utility on app-user satisfaction as well as the exploration of satisfaction on intention to upgrade and Word Of Mouth communication.

## 2. Literature Review

### *Antecedents and Effects of App Satisfaction*

There have been developed many theories on satisfaction such as the theory of confirmation/disconfirmation of Oliver (1977), the satisfaction theory of Locke (1969), Davis' theory of expectations versus performance (1989) and the theory of cognitive dissonance developed by Festinger (1962). The abovementioned theories entail the cognitive, effective and behavioral elements. Olubusola (2015) summed up all these theories stating that satisfaction is the total sum of attitudes (varying from negative to positive) towards products, brands, distribution channels, opinions, jobs, persons, as well as places formed via experience or subjective judgments/perceptions that are generated through a comparison mechanism between experience and expectations. In Computer science or MIS area, Doll et al. (1994) labelled satisfaction as end-user satisfaction to explore user behavior such as system adoption and use. Pikkarainen, et al. (2006) and Liébana-Cabanillas et al. (2013) explored determinants and effects of satisfaction with e-banking. Zeithaml et al. (2002) examined service quality in e-channels as a main antecedent of web site user satisfaction explaining web page engagement. Thus, satisfaction concerns a motive for future behavior that is translated into re-purchase behavior, Word of Mouth Communication, intention to product upgrade and brand switching behavior in Marketing discipline. Whereas in digital channels, some behavioral variables concern web-page engagement in e-commerce or even technology acceptance (Olubusola, 2015).

Parasuraman et al. (2005) developed the E-S-QUAL scale in order to measure quality of e-services after and before use of e-commerce platforms. They unveiled customer satisfaction as a predominant factor of perceived quality that develops engagement and e-customer loyalty. But what satisfies customers in e-commerce can be categorized into efficiency, fulfillment, system availability and privacy (Kim et al., 2006). Efficiency in e-commerce entails the ease and speed of access to products and services, whereas fulfillment concerns the confirmation or disconfirmation of expectations by using the platform. As for system availability it suggests the unproblematic function of the platform. Finally, privacy concerns the safety by using the e-commerce portal. Safety policies have a major impact of intention to use the e-commerce portal, since it provides value to customers. Pikkarainen, et al. (2006) explored the determinants of end-user computing satisfaction related to e-banking portals. Using a SEM methodology, he unveiled content, accuracy, format, ease of use and timeliness as the basic dimensions of end-user satisfaction. Hence, successful e-banking portals should be well designed with accurate and to the point content. The format of information and reports extracted should be well designed in terms of aesthetics and practical use. Finally, e-banking should promote ease of use as well as reliability in terms of time needed to perform transactions or acquire information.

As far as app-user satisfaction is concerned, Hsiao et al. (2016) explored satisfaction, habit and customer value as main antecedents of continuance usage of mobile social apps using a SEM methodology to analyze survey data and produce a valid and statistically significant model. They concluded that continuous use of social mobile applications is facilitated by user satisfaction, social communication with other users and hedonic incentives. Ogara, et al. (2014) unveiled the drivers of social presence and user satisfaction with regards to Mobile Instant Messaging (MiM) using data derived from questionnaires and analyzed data using PLS methodology. These authors illustrated that user satisfaction is impacted by user experience, medium richness and social presence. Furthermore, Xu et al. (2015) indicated the satisfaction perspective of mobile application recommendations as a form of behavior. These authors used and extended the Value, Satisfaction and Loyalty Framework (VSF) to include

utilitarian benefits, hedonic benefits, monetary and non-monetary sacrifices. They found that app satisfaction, loyalty and hedonic benefits impact Word of Mouth.

Furthermore, in digital marketing literature, emotional attachment is found to be critical in terms of e-channel engagement and loyalty. Dwivedi, et al. (2018), examined the impact of users' emotional attachment on consumer-based brand equity (CBBE) of social media platforms as brands, by using quantitative data of 340 users of social media. The basic findings of the previous research suggest that emotional attachment exerts both direct and indirect effects on customer satisfaction, perceived quality and brand loyalty as basic constituents of brand equity. Nguyen and Le Minh (2018) examined the effects of the emotional attachment with the Chinese Online Shopping brands on the Service Recovery satisfaction. Their findings illustrated that emotional attachment positively moderates service recovery satisfaction. They further indicated that the emotional attachment effects on satisfaction is stronger than relationship and service recovery satisfaction.

Summarising, user satisfaction effects and antecedents concern a multi-dimensional phenomenon that depends on the digital context of the research (e-commerce, web, app, product, service). With regards to the user satisfaction related to mobile applications, there is limited research. However, the common constituents of user satisfaction in digital marketing suggest a thoughtful app design that promotes ease of use, safety, emotional attachment by delivering excessive utility to its users. Moreover, user satisfaction suggests a basic antecedent of favorable e-customer behaviour. By using Intention to upgrade and Word of Mouth communication, we aim to provide implications on whether app satisfaction promotes revenue boosting or referrals to other consumers/users.

Thus, we conceptualize on the following hypotheses:

*H<sub>1</sub>: App design is positively related to App satisfaction*

*H<sub>2</sub>: Safety is positively related to App satisfaction*

*H<sub>3</sub>: Emotional attachment is positively related to App satisfaction*

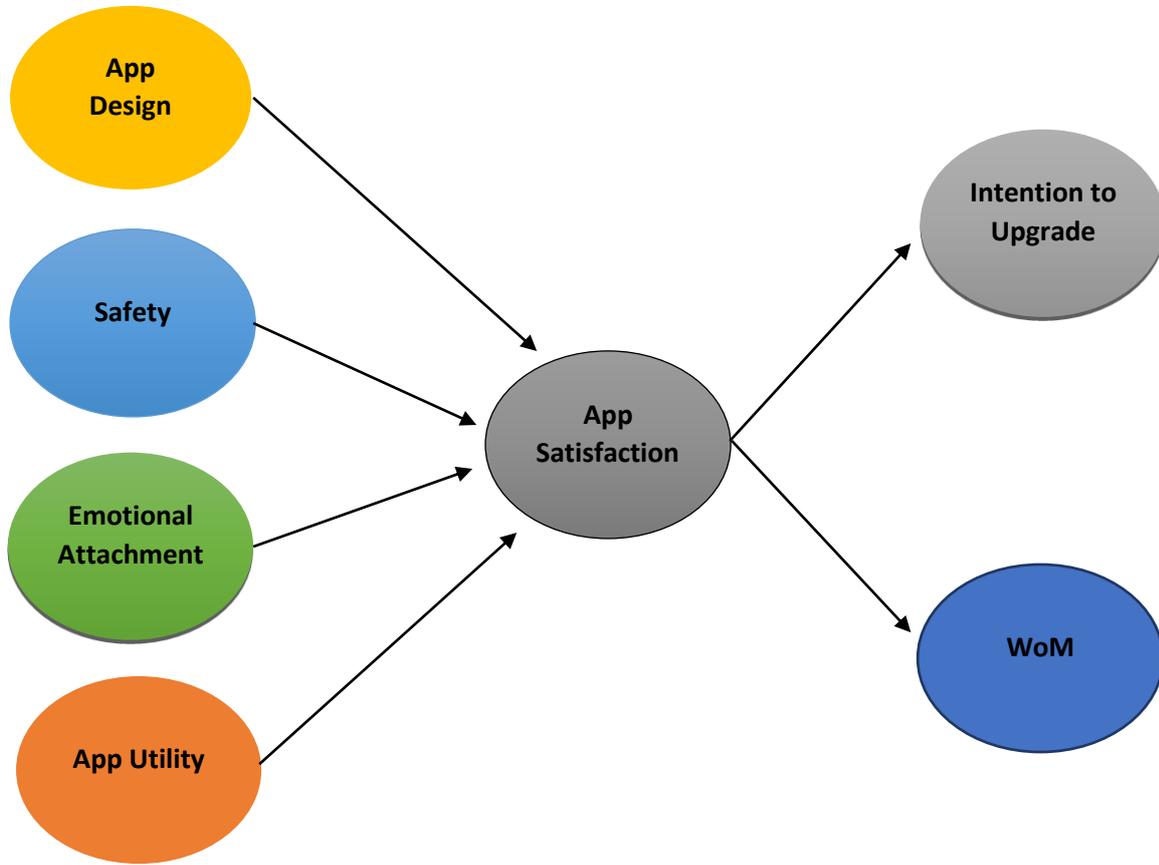
*H<sub>4</sub>: App Utility is positively related to App satisfaction*

*H<sub>5</sub>: App Satisfaction is positively related to Intention to upgrade to premium service*

*H<sub>6</sub>: App Satisfaction is positively related to (positive) Word of Mouth (WoM)*

Figure 1 that follows illustrates the conceptual framework of this empirical research.

**Figure 1: Conceptual Framework**



### **3. Methodology**

The primary objective of the current research is to explore the antecedents and effects of app-user satisfaction. App design, safety, emotional attachment and app utility were considered. With regards to the effects of app user satisfaction, Intention to upgrade to premium service as well as WoM communication were incorporated as the basic effects of app satisfaction. The basic hypotheses suggest that app design, safety, emotional attachment and app utility have a positive direct effect on app satisfaction, whereas satisfaction positively impacts intention to upgrade to premium service and WoM. A survey method was used to answer hypotheses and reach objectives. The research instrument was that of a questionnaire. As for the data collection method, a snowball method was primarily used to send questionnaires to users requesting both their participation and to forward the research tool to other smartphone holders. One further method used was the posting of the questionnaire in various Facebook groups of users. Regarding the sampling method and the data collection, a convenience sampling method facilitated the process. This method proved to be the most efficient in terms of effective reach of primary population of the survey (mobile internet users, smartphone users etc.). In total, 450 questionnaires administered via email, requesting e-mail users to forward the questionnaires to other users. Furthermore, various questionnaire links were

posted to Facebook groups requesting participants also to forward this link. The valid completed questionnaires suggested the 44% of the total, which is normal to similar surveys.

As far as the research instrument is concerned, we used the 8 adjusted items of the privacy/safety scale developed by Parasuraman et al. (2005). As for app design, we adjusted a total of 10 items from the scales of Barnes & Vidgen (2002) and Wolfinbarger & Gilly (2003), who used these items in e-commerce and web design respectively. Regarding emotional attachment, we incorporated and adjusted in our instrument 10 items from Stauss and Neuhaus, (1997), Yu & Dean (2001). Concerning App utility, we took 8 items from respective scales of Grigoroudis et al (2008), Manolitzas et al (2011) and Casaló et al. (2008). To measure user satisfaction in e-services, we used the 4 items adjusted by Kuo et al. (2009). As for measuring intention to upgrade and positive WoM, we used 4 items from the scales also used by Collier & Bienstock (2006), Lee et. al (2011) and Carpenter & Fairhurst (2005).

## 4. Findings

### *Factor Analysis and Scale Reliability*

In order to reduce the total number of scale latent variables and thus, to simplify analysis process, a factor analysis (FA) method was performed. The latter analysis is generated so that Likert statements would be able to be grouped according to their content. As far as safety scale is concerned, FA and Scale Reliability unveiled the existence of 2 reliable sub-scales: a) Deception (3 items) and b) Safety of personal data & identification (2 items). Cronbach Alpha for these scales were greater than 0.60, showing the reliability. As for the design scale, FA revealed two subscales; a) App design (6 items, Cronbach Alpha >0.7) and b) App reliability (1 item, thus CA is not applicable). Concerning Emotional Attachment, FA proved the existence of one reliable scale; a) Emotional Attachment (5 items) with Cronbach Alpha greater than 0.70. Regarding Utility, FA unveiled a reliable scale with CA also greater than 0.70 (7 items). As far as the scale of User Satisfaction is concerned, FA revealed a single reliable scale of 4 items (Cronbach Alpha >0,9). Last, but not least, FA unveiled 2 distinct and reliable scales of “Intention to Upgrade to Premium” (2 items) and Word of Mouth (2 items) with Cronbach alpha values greater than 0.90.

### *Antecedents of App User Satisfaction*

With the final objective to explore the antecedents that simultaneously effect App User Satisfaction, the method of multiple regression was generated. As independent variables, deception, safety of personal data & user identification, app design, reliability, emotional attachment, addiction and utility were all inputs in a multiple regression model. The final model run into a stepwise method, unveiled a significant model with ANOVA degrees of Freedom and F statistic equal to 3 and 36,2 respectively ( $p < 0.05$ ). As for the significant variables, safety of personal data & identification, app design, and emotional attachment all explained the 34,5% of the total variance of App User Satisfaction.

According to the FA performed, the hypotheses were split according to the subscales generated. Table 1 illustrates the variables included in the multiple regression model. The scale of safety was split into Deception and Safety of personal data & user identification, the scale of App design into App design and Reliability, emotional attachment and Utility were used as distinct scales.

The final hypotheses tested were the following:

*H<sub>1a</sub>: Deception is negatively related to App satisfaction*

*H<sub>1b</sub>: Safety of personal data & user identification is positively related to App satisfaction*

*H<sub>2a</sub>: App design is positively related to App satisfaction*

*H<sub>2b</sub>: Reliability is positively related to App satisfaction*

*H<sub>3</sub>: Emotional attachment is positively related to App satisfaction*

*H<sub>4</sub>: Utility is positively related to Intention to App satisfaction*

*H<sub>5</sub>: App Satisfaction is positively related to Intention to upgrade to premium service*

*H<sub>6</sub>: App Satisfaction is positively related to (positive) Word of Mouth (WoM)*

**Table 1:** Antecedents of App User Satisfaction (a)

<b>Independent Variable</b>	<b>Beta</b>	<b>P (sig)</b>	<b>Hypotheses</b>
Deception	0,02	<b>0,97</b>	<b>H1a: Rejected</b>
Safety of personal data & user identification	0,12	<b>0,04</b>	<b>H1b: Accepted</b>
App design	0,24	<b>0,00</b>	<b>H2a: Accepted</b>
Reliability	-0,08	<b>0,16</b>	<b>H2b: Rejected</b>
Emotional Attachment	0,40	<b>0,00</b>	<b>H3: Accepted</b>
Utility	0,08	<b>0,24</b>	<b>H4: Rejected</b>

a Dependent Variable: **App User Satisfaction (R Squared = 0,345)**

According to Table 1, Deception proved not to exert significant effect on satisfaction ( $p > 0.05$ ). The p value of the beta coefficient extracted by the model is greater than the acceptable error of 5% ( $p = 0.97 > 5\%$ ). Thus, *H<sub>1a</sub>: Deception is negatively related to App satisfaction* should be accepted at a confidence level of 95%. In addition, the Safety of personal data & user identification has a significant positive effect on app user satisfaction ( $p < 0.05$ ). Hence, *H<sub>1b</sub>: Safety of personal data & user identification is positively related to App satisfaction* can be accepted at a confidence level of 95%. As for App design, it has a positive effect on app user satisfaction ( $p < 0.05$ ). Reliability on the other hand has no effect on satisfaction ( $p > 0.05$ ). As a result, *H<sub>2a</sub>: App design is positively related to App satisfaction* can be accepted and *H<sub>2b</sub>: Reliability is positively related to App satisfaction* should be rejected for the same significant level (95%). Last, but not least, Emotional attachment has a strong and significant positive effect on app user satisfaction ( $p < 0.05$ ), whereas Utility has no significant effect ( $p > 0.05$ ). Hence, *H<sub>3</sub>: Emotional attachment is positively related to App satisfaction* can be accepted and *H<sub>4</sub>: Utility is positively related to Intention to App satisfaction* is rejected.

#### *Impact of User Satisfaction on Upgrade Intention and Positive WoM*

In order to answer the question of the Impact of User Satisfaction on Upgrade Intention and Positive WoM, the bivariate analysis and Pearson Correlation significance tests were used. The Correlation matrix that follows shows that App User Satisfaction is not related to Upgrade to premium intention ( $p > 0.05$ ). Thus, *H<sub>5</sub>: User Satisfaction is positively correlated to Upgrade Intention* can be rejected. However, User Satisfaction is positively correlated to positive WoM ( $r = 0.370$ ,  $p < 0.05$ ). Thus, when User Satisfaction increases one unit, WoM

increases 0,370 units. Hence, H6 can be accepted at a confidence level of 95% that User Satisfaction is positively related to positive WoM.

Hence, *H5: App Satisfaction is positively related to Intention to upgrade to premium service* can be rejected at a 95% confidence level, whereas *H6: App Satisfaction is positively related to (positive) Word of Mouth (WoM) should be accepted for the same level.* Table 2 reveals the statistics of the Pearson Correlation analysis used.

**Table 2:** Correlation Matrix between User Satisfaction and Upgrade Intention and positive WoM

		User Satisfaction	Hypotheses
<b>Upgrade Intention</b>	Pearson Correlation	0,033	<b>H5: Rejected</b>
	Sig. (2-tailed)	<b>,646</b>	
	N	202	
<b>Positive WoM</b>	Pearson Correlation	0,370(**)	<b>H6: Accepted</b>
	Sig. (2-tailed)	<b>0,00</b>	
	N	202	

\*\* Correlation is significant at the 0.01 level (2-tailed).

## 5. Conclusions, Implications and Proposal for further research

The findings of the multiple regression analysis of the previous section proved that a) Safety of personal data & identification, b) App design and c) Emotional attachment consist of critical success factors positively impacting app user satisfaction. These findings are consistent to the research of Parasuraman, Zeithaml και Malhotra (2005), Hsu (2018) and Hsu, Chang και Chen (2012). In addition, deception and app utility do not suggest antecedents of app user satisfaction. These findings are not aligned to the findings of Parasuraman, Zeithaml and Malhotra (2005), Hsiao et al. (2016) and Lee et. Al (2011).

As far as the impact of app user satisfaction on intention to upgrade to premium service is concerned, this research unveiled that user satisfaction is not related to upgrade intention. The latter finding is not consistent to the research findings of Parasuraman et al. (2005), Kim et al. (2006) and Hsiao et al. (2016). However, this paper illustrated that app user satisfaction exerts positive effect on Word of Mouth communication - WoM (i.e. positive references to friends or colleagues). These findings totally confirm other researchers such as των Xu et al. (2015), Ogara et al. (2014) as well as Dwivedi et al. (2018). These authors supported that WoM is imperative to develop market share growth, since the offering is better promoted to more potential customers along with its both value which leads to increased brand awareness.

Further conclusions of the current research suggest that app design just like product design (i.e. aesthetics, packaging etc.), is very important for brand managers to achieve the maximum market penetration and thus, boosting e-business market share. As a result, mobile applications should be as user friendly as possible, which means both its design and operation should be simple and possible too (Parasuraman et al., 2005; Pikkarainen, et al. 2006; Olubusola, 2015). The abovementioned designed environment reduces service accessibility costs, and thus bounce rates, leading to higher app user engagement (Olubusola, 2015).

According to Hsiao et al. (2016), some further tools to achieve better design consist of personalized services and advice to users to reduce time wasting when using the application using artificial intelligence and best satisfaction services that other similar users find very interesting.

Furthermore, forging emotional attachment suggest the best marketing practice according to the beta coefficient of the multiple regression analysis conducted ( $\beta=0,4$ ,  $p<0,05$ ). Apple also uses this practice with its products, by encouraging the creation of apple communities, improving the image of high tech-product and raising brand awareness and brand loyalty (Dwivedi et al., 2018). Emotional attachment is also created through the simplicity of products and services, leading to excessive customer and brand experience. Emotional attachment is also created through enthusiastic and joyful environment, likeable use that creates the sense of freedom and self-confidence (Dwivedi et al., 2018).

Last, but not least, safety policies and user identification also proved to be vital for the app user satisfaction. These factors lead to better sense of safety, simultaneously providing value to customers along with brand preference. These findings are consistent to Parasuraman, Zeithaml and Malhotra (2005), Kim et al. (2006) and Liébana-Cabanillas et al. (2013). Basic limitations of this research concern the use of quantitative data collection method using structured questionnaires. Surveys' major disadvantage is that participants cannot reveal their emotions and thus, it would be an opportunity to crosscheck quantitative results with qualitative ones using in-depth interviews. In addition, a survey works as a frozen picture at a certain period. There is a possibility that the replication of this survey could show differentiated findings. This research took place in Greece using the method of convenience sampling. As a result, confirmation to other countries is needed in order to generalize these findings to other cultures. Thus, a proposal for future research would be the replication of this research to other countries with different temperament and/or using qualitative research to triangulate quantitative findings.

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