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Examining the Factors Influential on Smart Phone Users' Satisfaction Levels: A Case Study from Eskisehir

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ABSTRACT

Parallel to the rapid developments in technology, a rapid change has been experienced in communication tools as well. As a result, smart phones can now perform a number of computer procedures besides allowing ordinary telephone conversations. Today, it is seen that smart phone use is quite common especially among young people. The present study focuses on smart phone users' levels of satisfaction with smart phones and on the factors likely to be influential on their satisfaction levels. For this purpose, the related research data were collected with a questionnaire conducted in Eskisehir, and factor analysis was carried out to determine the factors regarding the participants' attitudes towards smart phone use. Lastly, with the help of logistic regression analysis, a mathematical model was developed to determine the smart phone users' satisfaction levels.

Keywords: Smart Phone Users' Satisfaction Levels, Factor Analysis, Logistic Regression Analysis

Akıllı Telefon Kullanıcılarının Memnuniyet Düzeylerinde Etkili Olan Faktörlerin İncelenmesi: Eskişehir Örneği

ÖZET

Teknolojinin hızlı gelişimiyle birlikte iletişim araçlarında da hızlı bir değişim yaşanmış ve sıradan telefon görüşmelerinin yanı sıra pek çok bilgisayar işlemini de gerçekleştirebilen akıllı telefonlar günlük yaşantımızda yerini almıştır. Günümüzde özellikle gençler arasında akıllı telefon kullanımının oldukça yaygın olduğu gözlenmektedir. Akıllı telefon kullanıcılarının, akıllı telefon kullanımına ilişkin memnuniyet düzeyleri ve bunda etkili olabilecek faktörler bu çalışmanın amacını oluşturmaktadır. Bunun için Eskişehir kapsamında yürütülen bir anket ile toplanan verilere faktör analizi uygulanarak akıllı telefon kullanımıyla ilgili tutumlardan akıllı telefon kullanımına ilişkin faktörler tespit edilmeye çalışılmıştır. Daha sonra lojistik regresyon analizi yardımıyla akıllı telefon kullanıcılarının memnuniyet derecelerini belirleyen matematiksel bir model kurulmuştur.

Anahtar Kelimeler: Akıllı Telefon Kullanımına İlişkin Memnuniyet Düzeyi, Faktör Analizi, Lojistik Regresyon Analizi

1. Introduction

In recent years, one of the areas in which technology has changed most rapidly is the mobile communication tools. Especially use of smart phones among mobile communication tools is gradually increasing day by day. According to IDC (International Data Corporation), which is a leading corporate providing global information for customer technology markets, communication and information technology, the smart phone sale, which was 288.3 million throughout the world in the first quarter of 2014, increased with a rate of 16% reaching 334.4 million in the same period of 2015. Also, the smart phone sale, which was 1.3 billion in total in 2014, increased with a rate of 9.8% in 2015 reaching 1.43 billion (IDC 2015). When the smart phone sale in Turkey is examined, it is seen that it is similar to the smart phone sale in the world in general. According to GfK Research Services Company, in the third quarter of 2015, the Turkish Technical Consumer Goods market grew by 14.9% when compared with the same period of the previous year. In the third quarter of 2015, the biggest sector in Turkey's Technical Consumer Goods market was Telecomunications with a growth rate of 26%, and this was achieved mainly by an increase in sales of smart phones, the driving force in this sector (GfK TEMAX 2015).

The reason for such a rapid growth of the mobile communication industry is the fact that smart phones have turned into tools that can carry out a number of beneficial applications thanks to technological developments. Today, smart phones not only act as a verbal communication tool but also do various jobs of the computer such as transferring data, accessing the Internet, delivering e-mail and instant messages, viewing the digital content and transferring data via the systems within the corporate (Ada and Tatlı 2013). In addition, phones are now used as a multi-functional device, an indispensable accessory, a way of respect, style and image, personal identity and as a tool for entertainment (Polat and Maksudunov 2012).

Due to its features mentioned above, a smart phone has started to penetrate into all areas of our lives. Studies demonstrate that smart phones are currently used to meet people's needs in the areas of medicine (Payne, Wharred and Watts 2012; McTavish et.al. 2012; Armstrong et.al. 2010, 2012; Smart 2012; Ozdalga, Ozdalga and Ahuja 2012; Chhablani, Kaja and Shah 2012; Michael and Geleta; 2013), in the areas of education (Shin et.al. 2011; Herington 2009; Baumgart 2011; Yu and Conway 2012; White and Turner 2011; Möller et.al. 2011), in the areas of business (Carayannis and Clark 2011; Carayannis, Clark and Valvi 2013; Chang and Park 2011; Ford 2012) as well as in other related areas.

The variety and constant development of smart phone applications gradually increased the number of smart phone users, which, in turn, drew researchers' attention to smart phone users. In literature, there are several studies conducted to determine smart phone users' behaviors and their intention of use. In one study investigating smart phone user behavior, Verkasalo (2010) provides a framework for mobile user population measurements and defines the unique advantages on device measurements along with key weaknesses. In another study carried out by Verkasalo et al. (2010), the researchers examined those who used three mobile applications and those who did not and aimed at finding out what was influential on their intention to use these applications. Peslak, Shannon and Ceccucci (2011) investigated the

variables and activities regarding university students' use of smart phones and mobile phones in USA and tried to learn about use of mobile devices in general. Chen, Yen and Chen (2009) empirically combined four models that would help predict adaptation of smart phone as the acceptance and spread of smart phones. They found that attitudes towards smart phone adaptation were influenced basically by organizational and environmental factors. Eom and Kim (2014) used a newly developed "public application maturity model" and measured its maturity level to determine the adaptation of public to smart phone applications in Korea. In addition, the researchers analyzed the factors influential on the differences in the maturity level of public applications. Kang and Jung (2014), in their study conducted to compare smart phone use in USA and Korea, reported that the two user populations believed smart phones help them meet their reliability and self-doing needs predicting their smart phone use and life satisfaction.

Also, some other researchers conducted studies to determine satisfaction with smart phone applications and smart phone use. Chun, Chung and Shin (2013) aimed at determining the factors that could be influential on university students' use of smart phone applications with the help of multiple discriminant analysis. The researchers examined the factors influential on customer satisfaction in detail such as meeting the needs, performance development, ease of use, ease of understanding, privacy/reliability and influence of the peer. In addition, they determined which users were more satisfied with smart phone applications in terms of gender, frequency of use, years of use and free applications. Hsu, Chiu and Hsu (2013) compared effectiveness, productivity and user satisfactions in Taiwan in relation to the smart phone interface for two different operating systems (Android and iPhone operating systems). In order to summarize the positive and negative evaluations regarding the use and features of the two smart phone operating systems, the researchers used correspondence analysis. Gerogiannis, Papadopoulou and Papageorgiou (2012) structured the model of Fuzzy Cognitive Map to provide customer perception regarding satisfaction with information technology products such as smart phone. The model helped reveal whether smart phone functions or the product-cost balance was more influential on perceived user satisfaction. Lee, Kim and Kim (2011) conducted a study to measure the quality of service and customer satisfaction regarding online shopping services in smart phones. For this purpose, a large model was developed by using the SERQUAL and WebQual models to measure the quality of smart phone shopping service, and Partial Least Square (PLS), one of structural equality models, was used to test the research hypotheses. In the study, it was found that usability and information of the online services (digital contents), accessibility, security and economic feasibility of the wireless Internet services (wireless networks) had significant impact on customers' satisfaction. Chanwimalueng and Kasemsan (2011) examined smart phone users' satisfactions with respect to the complexity and concreteness of images. To be able to measure the understanding and perception of icon, the Technology Acceptance Model was used. Park, Oh and Lee (2011) examined the factors influential on user satisfaction for smart phone based instant messengers. The results demonstrated that self-disclosure, flow, and social presence significantly affected on user satisfaction. Park and Lee (2011) aimed at determining the effects of the smart phone experience, including phone stress and enjoyment and device characteristics on consumer satisfaction. In their pilot study, the researchers reported that instant connectivity was an important factor regarding customer

satisfaction and that female customers were not satisfied with smart phones compared with male customers. Using path analysis based on structural equation model, Hwang, Moon and Hwang (2013) investigated effects of users' values on the intention to use of smart phone games and on users' satisfaction. The results revealed that social value, functional value and personal value had statistically significant influence on satisfaction and that the hedonistic value was not influential, though. In addition, it was found that intention of use had significant influence on user satisfaction.

In related literature, there are several other studies regarding smart phone users throughout the world, yet there is little or no research investigating smart phone users in Turkey. Within this scope, Ada and Tatlı (2013) conducted a survey on the employees of a corporate from the mobile communication sector in Turkey to determine the factors influential on smart phone use and to reveal the extent to which these factors had influence on smart phone use, and they analyzed the research model with the method of Partial Least Squares (PLS). In one study carried out in the city of Kastamonu, Taner (2013) investigated users' evaluations regarding smart phones to determine which criteria smart phone users take into account while preferring to use smart phones and which features of smart phones they use. Other similar studies conducted with smart phone users in Turkey did not focus on user satisfaction. On the other hand, feedback regarding user satisfaction is fairly important for producers and sellers.

The purpose of the present study was to determine the factors that could be influential on smart phone users' levels of satisfaction with smart phone use in Turkey and to develop a mathematical model that helps determine their levels of general satisfaction with smart phone use. For this purpose, depending on the thought that smart phone use is more common among young people, a questionnaire was applied to a total of 563 participants selected among smart phone users in Eskişehir, which is a prominent city known as "a city for university students" in Turkey with its young population. In the study, with the help of factor analysis conducted to examine the data collected via the questionnaire, the factors related to smart phone use and attitudes towards smart phone use were determined. Following this, the factor scores regarding the smart phone use factors were taken as independent variables, and a mathematical model was developed to determine smart phone users' satisfaction levels with the help of logistic regression analysis.

In the following part of the study, the focus was on factor analysis and logistic regression analysis. The forth part examined the data set in the study. In the fifth part, the results of factor analysis and logistic regression analysis were presented. As for the last part of the study, several striking results were mentioned.

2. Factor Analysis

Factor analysis is a multivariate statistical technique used to determine the number and nature of latent variables or factors needed to account for the pattern of correlations among a set of observed measures, commonly referred to as indicators (Brown 2006; Fabrigar and Vegener 2011).

The mathematical model for factor analysis is similar to multiple regression equation. In a generalized form, the model is given below:

$$Y_i = \sum_j \alpha_{ij} F_j + ... + \delta_i U_i \quad (1)$$

where Y_i is observed variables; F_{js} are termed as the common factors; α_{ij} is the loading of the i^{th} variable on the j^{th} factor; U_i is the unique factor which represents that component of variable Y_i , which is not explained by the common factors; and δ_i is the loading on the unique factor.

A unique solution for the α_{ij}s can be found if the factors have a mean of zero and a variance of 1 and are uncorrelated with each other. The factors themselves can also be defined as linear combinations of the variables as follows

$$F_k = \sum_i \beta_{ki} X_i \quad (2)$$

where F_k represents the kth factor and β_{ki} is the correlation of the k^{th} factor with the ith variable (Niffikeer, Hewins and Flavell 2000).

Prior to the extraction of the factors, several tests could be conducted to evaluate the suitability of the respondent data for factor analysis. These tests include Bartlett's Test of Sphericity and Kaiser-Meyer-Olkin (KMO) measure of Sampling Adequacy. The Bartlett's Test of Sphericity should be significant ($p<.05$) for factor analysis to be suitable (Williams, Brown and Onsman 2012). The KMO measure ranges from 0 to 1, and the result of the related test statistics is expected to be higher than 0.70 (Meyer, Gamst and Guarino 2006; Hutcheson and Sofroniou 1999).

In factor analysis, the commonly used factor selection procedures are based on eigenvalues. One of them is the Kaiser-Guttman rule. The Kaiser-Guttman rule is widely accepted because of its simplicity and objectivity. The logic of the Kaiser-Guttman rule is that when an eigenvalue is less than 1, the variance explained by a factor is less than the variance of a single indicator. Because the goal of factor analysis to reduce a set of input indicators (the number of latent factors should be smaller than the number of input indicators), if an eigenvalue is less than 1, then the corresponding factor accounts for less variance than the indicator (whose variance equals 1) (Brown 2006). Thus, the number of eigenvalues higher than 1 is taken into consideration while determining the number of factors (Jöreskog 2003; Stevens 2009).

After an appropriate factor solution has been established, the researcher may wish to use the information about the factors in subsequent analyses. For instance, researchers may want to identify an individual's placement or ranking on the factors, to use the information with hypothesis test to determine how factor scores differ between groups, or to incorporate factor information as part of a regression or predictive analysis. To use the factor information in these studies, factor scores must be calculated (DiStefano, Zhu and Mintrilla 2009). Conceptually, a factor score is the score that would be observed for a person if it were possible to measure the latent factor directly (Brown 2006). Factor scores represent individual differences on factors and can be determined with different methods such as exact scores, regression estimates and composite estimates. Exact scores are obtainable for component analysis, while several types of factor score estimates (i.e., regression, least squares) are available in common factor analysis. These alternative methods for estimating

common factor scores yield different factor score matrices for the same data, correlations, and factor loading matrices. Least squares technique for estimating common factor scores is appropriate when factor scores are correlated with external variables, which are used as independent variables in regression analysis or which are used as dependent variables in analysis of variance (Ford, MacCallum and Tait 1986).

In the present study, in order to develop a mathematical model to determine smart phone users' levels of satisfaction, the factor scores obtained from the factors regarding smart phone use were calculated. Following this, these scores were used as independent variables in logistic regression analysis. The following part presents logistic regression analysis.

3. Logistic Regression Analysis

Logistic regression is a statistical method used to find the best fitting model to describe the relationship between an outcome (dependent or response) variable and one or more independent (predictor or explanatory) variables as in the linear regression analysis. What distinguishes a logistic regression model from the linear regression model is that the outcome variable in logistic regression is binary or dichotomous rather than continuous (Hosmer and Lemeshow 2000; Pampel 2000).

The logistic regression model is given below:

$$\Pi(x) = \frac{e^{\beta_0 + \beta_1 x}}{1 + e^{\beta_0 + \beta_1 x}} \tag{3}$$

where $\Pi(x)$ represents the conditional mean Y given x, that is $\Pi(x)$=E(Y\x). A transformation of $\Pi(x)$ is the logit transformation, and this transformation is defined as (Hosmer and Lemeshow 2000):

$$g(x) = \ln\left[\frac{\Pi(x)}{1-\Pi(x)}\right] = \beta_0 + \beta_1 x \tag{4}$$

For the purpose of estimating the unknown parameters in logistic regression, the maximum likelihood method was used rather than least squares.

After estimating the unknown parameters, the appropriateness and adequacy of the logistic regression model are assessed. Evaluations of a logistic regression model include the overall model evaluations, statistical tests of individuals predictors, goodness-of-fit statistics and validation of predicted probabilities (Peng and So 2002).

While evaluating the overall model fit, whether the logistic model provides a better fit to the data than the intercept-only model is controlled. The overall model evaluations contain three inferential statistical tests: the likelihood ratio, Score and Wald tests. All three test statistics are distributed as chi-squares with degree of freedom equal to the number of predictors.

The statistical significance of individual regression coefficients can be tested with Wald statistic. The Wald statistic is calculated by dividing the coefficient by respective

standard error and then taking the square of the result. The statistic has a chi-square distribution.

Goodness of fit statistics assesses the fit of a logistic model against actual outcomes (Peng, Lee and Ingersoll 2002). Hosmer Lemeshow test is often used to examine the goodness-of-fit of the logistic regression model. The test statistic is calculated from a 2xg table of observed and estimated expected frequencies, where g is the number of groups formed from the estimated probabilities (Peng and So 2002). If the null hypothesis is rejected, it means that the model does not adequately fit the data.

In addition, there are some descriptive measures of goodness of fit. The Cox & Snell R^2 and the Nagelkerke R^2 that are similar to the coefficient of determination (R^2) in linear regression are two such statistics. The maximum value of Cox & Snell R^2 can be less than 1. The Nagelkerke R^2 is an adjusted version of Cox & Snell R^2 and covers the full range from 0 to 1; therefore, it is often preferred. The R^2 statistics indicate how useful the explanatory variables are in predicting the response variable (Bewick, Cheek and Ball 2005).

Another approach for model evaluation is to compare predicted group membership with observed group membership. Using the predicted probabilities for each case, the expected group membership is calculated as well. Cross-classifying the two categories of the observed dependent variable with the two categories of predicted dependent variable produces a 2x2 table. A highly accurate model would show that most cases fall in the cells defined by "0" on the observed and "0" on the predicted group membership and by "1" on the observed and "1" on the predicted group membership. Relatively few cases would fall into the cells defined by a mismatch of observed and predicted group membership. A simple summary measure equals the percentage of all cases in the correctly predicted cells. A perfect model would correctly predict group membership for 100% of the cases; a failed model would do no better than chance by correctly predicting 50% of the cases. The percentage of correctly predicted cases from 50 to 100 provides a crude measure of predictive accuracy (Pampel, 2000).

4. Data

The data set used in the study was obtained with a questionnaire developed to determine smart phone users' levels of satisfaction with smart phone use. The questionnaire was applied to a total of 563 participants randomly selected among smart phone users in the city of Eskişehir. However, 63 questionnaires which were not properly filled out by the respondents were not included in the study. Thus, the data obtained from a total of 500 questionnaires were used. The questionnaire form was made up of two parts. The first part included information about the socioeconomic and demographic backgrounds of the respondents. The second part was made up of a 5-point Likert-type scale including 25 items developed to measure smart phone users' attitudes towards smart phone use.

The dependent variable in this study was "level of satisfaction with smart phone use", and the options related to the variable were "Quite satisfied", "Satisfied", "Dissatisfied" and "Quite dissatisfied". However, all the respondents to the questionnaire marked the options of "Quite satisfied" and "Satisfied"; in other words,

none of the participants marked to other two options, which represented dissatisfaction. Thus, for the analysis of the data, the dependent variable was accepted to have two options, and the procedure was followed accordingly.

The independent variables in the study were the factors obtained as a result of application of factor analysis to the Likert-type questions that measured the participants' attitudes towards smart phone use.

5. Empirical Results

In the study, most of the respondents to the questionnaire (94.2%) reported that they were "Quite satisfied" with smart phone use, and the rest of them said they were "Satisfied" (5.8%). There was no participant dissatisfied with smart phone use. In addition, Table 1 presents the participants' levels of satisfaction with smart phone use with respect to their socioeconomic and demographic features.

	Level of satisfaction with smart phone use				
	Satisfied		Quite satisfied		
Variable	Number	Percentage (%)	Number	Percentage (%)	***Total***
Gender					
Female	14	4.9	271	95.1	285
Male	15	7.0	200	93.0	215
Age					
18-25	21	6.0	330	94.0	351
26-35	5	5.9	80	94.1	85
36-45	3	5.4	53	94.6	56
46 or older	0	0.0	8	100.0	8
Educational Background					
Elementary School	2	8.0	23	92.0	25
Secondary School	20	6.6	284	93.4	304
Associate Degree/Bachelor	7	4.7	142	95.3	149
Postgraduate	0	0.0	22	100.0	22
Marital Status					
Bachelor	29	6.1	446	93.9	475
Married	0	0.0	17	100.0	17
Widow(er)	0	0.0	8	100.0	8
Monthly Income					
Lower than 1000 TLs	16	4.4	349	95.6	365
1000–2000 TLs	10	18.5	44	81.5	54
2000–3000 TLs	1	1.8	54	98.2	55
3000–4000 TLs	1	4.8	20	95.2	21
More than 4000 TLs	1	20.0	4	80.0	5
Smart phone use time					
Less than 1 year	16	6.9	215	93.1	231
1–3 years	9	4.7	184	95.3	193
More than 3 years	4	5.3	72	94.7	76
Phone Brand					
Samsung	14	5.9	223	94.1	237
IPhone	3	4.8	59	95.2	62
HTC	4	12.9	27	87.1	31
LG	5	20.8	19	79.2	24
Sony	0	0.0	48	100.0	48
Nokia	1	2.3	43	97.7	44
General Mobile	0	0.0	26	100.0	26
Other	2	7.1	26	92.9	28

Table 1. Distribution of the respondents' levels of satisfaction with smart phone use with respect to the socioeconomic and demographic variables

According to Table 1, it could intuitively be stated that the participants' socioeconomic and demographic features were not influential on their levels of

satisfaction with smart phone use. In terms of especially the variables of gender, age, educational background, marital status and smart phone use time, all the participants had similar levels of satisfaction with smart phone use.

In the present study, the purpose was to determine the factors that could be influential on the participants' levels of satisfaction with smart phone use. For this purpose, the factors likely to be influential on satisfaction with smart phone use are determined with the Likert-type questions directed to measure the attitudes towards smart phone use in the questionnaire used in the study. First of all, the reliability of the scale measuring the attitudes towards smart phone use was examined, and the Cronbach alpha coefficient was calculated as 0.902. As a result, the scale was considered to be reliable.

In the study, factor analysis was conducted to determine the factors likely to be influential on the level of satisfaction with smart phone use. For this purpose, first, the appropriateness of the data set to factor analysis was examined. As a result of the analysis, Bartlett Test of Sphericity was found statistically significant (Bartlett's Test of Sphericity=4917.142, Significance=0.00). In addition, Kaiser-Meyer-Olkin measure of sampling adequacy was larger than 0.70 (KMO=0.891); in other words, the use of factor analysis was appropriate. The results also revealed that 6 factors explained 61.719% of the variance.

The first factor included the following six statements related to "technical features of smart phone" and explained 28.455% of the variance.

- Taking high resolution photos and videos is important for me.
- High level of internal memory of the smart phone is important.
- The smart phone should work on my e-mail account and open the attached files delivered.
- I should be able to download large sizes of data in a short time.
- The cut-copy-paste feature should be practical enough to use.
- I frequently use screen rotation in various applications.

The second factor included the five statements below related to "recommending and being loyal to smart phone use" explained 11.982% of the variance.

- If I needed to buy a new phone, I would prefer a smart phone again.
- I like using a smart phone.
- I suggest people around to use a smart phone.
- I am satisfied with the features of my phone.
- I will keep using smart phone in the future.

The third factor included the following five statements related to "personal image" and explained 7.311% of the variance.

- Smart phone increases the quality of my life.

- Smart phone has influence on my self-expression.
- It is important for me to have a phone appropriate to my characteristics.
- My close friends want me to use a smart phone.
- People whose thoughts I give importance to think I should have a smart phone.

The fourth factor included the following three statements related to "purpose of smart phone use" and explained 5.101% of the variance.

- My smart phone helps me carry out my social activities.
- I frequently use my phone while doing things in my professional life.
- There is a close relationship between my smart phone and my life style.

The fifth factor included the following four statements related to "smart phone purchase behavior" and explained 4.841% of the variance.

- Options for smart phone colors play an important role in my phone preference.
- Applications for smart phones (Tango, WhatsApp, Line and so on) are influential on my purchase of a smart phone.
- My use of social networks is an important factor for my owning a smart phone.
- Establishing communication with my relatives and acquaintances whom I haven't seen for a long time is influential on my purchase of a smart phone.

The sixth factor included the following two statements related to "Appearance of a smart phone" and explained 4.029% of the variance.

- I am satisfied with the appearance of my smart phone and with its size.
- I think my smart phone is the best among other similar smart phones.

By using the factor scores obtained from the results of factor analysis, binary logistic regression analysis was applied to establish a mathematical model that determines the smartphone user's level of satisfaction. The factor scores was used as independent variables, and the smartphone user's level of satisfaction (0=satisfied, 1=quite satisfied) was used as the dependent variable. With the reference category of "quite satisfied" with smartphone usage the results of logistic regression analysis obtained with the help of forward selection method are presented in Table 2.

Variable	$\widehat{\beta}$	**S.E.**	**Wald**	**df**	**Sig.**	**Exp($\widehat{\beta}$)**
Factor 1	0.294	0.152	3.730	1	0.050	1.342
Factor 2	1.027	0.170	36.502	1	0.000	2.794
Factor 4	0.367	0.206	3.169	1	0.075	1.443
Intercept	3.449	0.287	144.239	1	0.000	31.480
Likelihood Ratio (LR) = 172.362 (p<0.000) Hosmer-Lemoshow test = 8.016 p=0.432 Nagelkerke R Square = 0.261						

Table 2. Logistic regression estimates and odds ratios for smartphone user's level of satisfaction

In this study, the overall model fit was examined using the Likelihood Ratio (LR) test statistics. From the LR test statistics, logistic regression model was found statistically significant at the significance level of 0.01. Thus, the model obtained provides a better fit to the data than the intercept-only model. In addition, Hosmer-Lemeshow test was used to examine the goodness-of-fit of the logistic regression model. The Hosmer Lemeshow test statistics 8.016 was insignificant ($p > 0.05$) suggesting that the model demonstrated good fit to the data. In other words, the null hypothesis showing the good fit of the model to the data can not be rejected.

A descriptive measure of goodness-of-fit presented in Table 2 was Nagelkerke R Square, which indicates that 26.1% of the variation in the dependent variable is explained by the logistic model.

The statistical significance of individual regression coefficients was tested using the Wald statistics. According to Table 2, there were three factors in the model when the forward variable selection method was used. Factor 2 was significant at the significance level of 0.1%; Factor 1 was significant at the significance level of 5%; and Factor 4 was significant at the significance level of 10%. Factor 1 (technical features of smart phone), Factor 2 (recommending and being loyal to smart phone use), and Factor 4 (purpose of smart phone use) were the significant variables explaining the levels of satisfaction with smart phone use.

The Exp ($\widehat{\beta}$) column in Table 2 shows the odds ratios. The odds ratios are easier to interpret than logistic regression estimates. The odds ratio shows how times more or how many times less one of observation possibilities of two events is likely to occur than the other. If odds ratio is grater than 1, then the odds of an outcome occurring increase; if the value is less than 1, any increase in the predictor leads to a drop in the odds of the outcome occurring. In this study, the odds rates for all the factor variables found significant were higher than 1. This result demonstrates that all the factor variables presented in Table 2 had influence on the increase in the level of satisfaction with smart phone use. The variable most influential on satisfaction level was Factor 2, which was made up of statements regarding "recommending and being loyal to smart phone use".

A 1-unit increase for the variable of Factor 1 (technical features of smart phone) made the level of satisfaction with smart phone use 1.342 times (reference category was "quite satisfied". In other words, a 1-unit increase regarding the variable of Factor 1 led to an increase of 34% in the odds of "quite satisfied" with smart phone [(1-1.342).100].

A 1-unit increase in the variable of "recommending and being loyal to smart phone use" made the level of satisfaction with smart phone use 2.794 times higher. In another saying, a 1-unit increase regarding the variable of Factor 2 resulted in an increase of 179% in the odds of "quite satisfied" with smart phone use [(1-2.794).100].

A 1-unit increase in the variable of "purpose of smart phone use" (Factor 4) made the level of satisfaction with smart phone use 1.443 times higher. In other words, it caused an increase of 44% in the odds of "quite satisfied" with smart phone use [(1-1.443).100].

Using the coefficient estimates in Table 2, the logistic regression model for the level of satisfaction with smart phone use can be formulated as follows:

Logit (p) = 3.449 + 0.294 Factor 1 + 1.027 Factor 2 + 0.367 Factor 4

The probabilities of "quite satisfied" with smart phone use can be calculated for various values of factor variables by returning from the model to p.

Table 3 presents the individuals' correct classification success with the help of logistic regression model. According to Table 3, 93.4% of the observed individuals were classified correctly. In other words, the model correctly predicted the smart phone use satisfaction level of 93.4% of all the 500 participants.

Observed	**Predicted**		**Correct classification percentage (%)**
	Satisfied	Quite satisfied	
Satisfied	0	29	0.0
Quite satisfied	4	467	99.2
General rate	0.0	94.2	93.4

Table 3. Correct classification rate of logistic regression model

6. Conclusions

Today, smart phones have become an indispensible mobile communication tool which not only includes a number of mobile applications but also acts as a navigation device, entertainment tool, camera and a pocket computer. The present study demonstrated that the majority of smart phone users were "quite satisfied" with smart phone use. Reporting that individuals once introduced to a smart phone would keep using it in their future lives, the participants in the present study recommended all others to use a smart phone. In the study, the variable with the biggest influence on the users' levels of satisfaction with smart phone use was found to be the factor variable of "recommending and being loyal to smart phone" Even if no new application is developed for smart phones or even if no related advances are experienced in related technologies, current smart phones will continuously be popular since they provide users with the opportunities that traditional communication tools fail to provide.

In the present study, which was carried out to determine the factors likely to be influential on the level of satisfaction with smart phone use and to develop a related model, it was found that another variable with significant influence on the users' levels of satisfaction with smart phone use was the factor variable of "technical features of smart phone". It was found that giving importance to such features of smart phones as having a large internal memory, downloading larger data rapidly, allowing synchronization with the user's e-mail account and taking high-definition photos and videos increased the participants' levels of satisfaction with smart phone use. These features of smart phones allow users to do their job in their professional life even when they are away from their work places. In addition, frequent use of smart phone in social life increases the popularity of smart phones. In short, purpose of use of smart phones is influential on users' levels of satisfaction with smart phone use. This result was supported with the research findings, and the factor variable

regarding "purpose of smart phone use" was found significant in explaining the level of satisfaction.

Despite all the variables reported above to be influential on users' levels of satisfaction with smart phone use, smart phones are not regarded as a way of image making. In another saying, individuals do not believe in the influence of smart phones on self-expression, and using a smart phone only because others want it does not have influence on the level of satisfaction with smart phone use. In addition, it was found that the color of the phone, its size and its appearance did not have any influence on the users' satisfaction level at all.

Consequently, smart phones provide great facilities and lead to satisfaction for individuals who have intensive work load and an active life style. Although most young people use a smart phone for such applications as Facebook, Twitter and WhatsApp, the number of those who use it to facilitate their job and to find solutions to problems is not low. Smart phones, which have become a part of human life, should not only pertain to the working class or to young people but also be used commonly by retired, older or non-working people to facilitate their life. If a smart phone is used wisely, it leads to great benefits; on the other hand, when it is used unwisely, it results in loss of great time. Therefore, for the purpose of developing themselves and contributing to the development of their country, individuals should not just use a smart phone to watch videos or to navigate in social media but follow the agenda and make effort to conduct research on social, cultural and scientific issues as well.

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