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Exploring Factors Affecting Consumers' Adoption of Shopping via Mobile Applications in Turkey

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Abstract

The aim of this study is to identify the factors behind consumers' adoption of shopping via mobile applications and to develop a new model that explains this situation. The related literature was examined for this purpose. Delphi technique was preferred to determine factors in the study. Data was collected through questionnaires. Exploratory Factor Analysis (EFA) was conducted with SPSS. A research model based on an integration of various theoretical fields was developed. As a result of EFA, ten new dimensions emerged in the study. And then, in order to statistically analyze the measurement and structural models, this study used Smart PLS for Structural Equation Modeling (SEM) technique. After path analysis with Smart PLS, a new conceptual model was developed to explain adoption of shopping via mobile applications by consumers in Turkey. Structures such as Personalization, Word of Mouth Communication and Perceived Mobility used in the model developed within the scope of this research, but rarely used in this field of studies, were verified to be determinants of shopping behavior via mobile applications in Turkey. The model developed within the study is both valid and reliable in terms of its structure and all relations established within the scope of the model are significant.

Keywords: consumer adoption, exploratory factor analysis, mobile applications, mobile shopping, structural equation modeling, smart PLS

1. Introduction

According to the data obtained from the Information and Communication Technologies Authority (ICTA), together with the transition to 4.5G technology in April 2016, the number of 3G subscribers decreased to 15 million while the number of 4.5G subscribers reached to 56 million by the end of March 2017. Again by March 2017 in Turkey, the number of mobile broadband subscriptions getting internet services through both mobile computers and mobile devices were about 53 million (ICTA Market Data, 2017). In addition, according to data of ICTA, numbers of mobile broadband internet subscriptions were 12.5 million in Istanbul, 2016 (ICTA Yearly Provincial Statistics, 2017). According to another data of statistics, the number of smart phone users in Turkey is about 28 million and it is expected to reach 40 million by 2018 (eMarketer, 2014).

When the "Turkey Advanced Payments Report" published by the Interbank Card Center (BKM) in 2016 is analyzed, it is understood that the share of online payments within total numbers equals to 68 billion TRY (total amount is 587 billion TRY); the share of mobile payments within all retail online payments increased from %20 to %30 in Turkey, 2016 (BKM, 2016). The abovementioned number of mobile broadband subscriptions and data about mobile marketing activities indicate that mobile shopping is developing as a booming market in Turkey.

According to the Mobile Marketing Association, mobile marketing is defined as "a set of practices that enables organizations to communicate and engage with their audience in an interactive and relevant manner through any mobile device or network" (MMA, 2009). Downloadable applications, on the other hand, are defined as "programs designed specifically to add functionality to mobile handsets and are able to interact directly with the technical features of the phone" (Chiem et al., 2010). According to another definition, these applications are designed for operating systems of mobile devices and as end-user software that may increase capacity of devices (Purcell, 2011).

The purpose of this study is to identify the factors behind consumers' adoption of shopping via mobile

applications and to develop a new conceptual model that explains this situation. For this purpose, the literature review of this study was conducted on reviews about mobile technologies (Leppäniemi, Sinisalo, & Karjaluoto, 2006; Ngai & Gunasekaran, 2007; Varnali & Toker, 2010; Zhang, Zhu, & Liu, 2012; Ström, Vendel, & Bredican, 2014). The literature review covers articles about theories and models used to analyses acceptance and adoption of new technologies as well as those about acceptance and adoption of mobile marketing applications, mobile advertisements, mobile commerce, mobile banking, mobile shopping and mobile services by consumers. The literature review within the scope of this study identified a good number of factors that affect consumers' adoption of shopping via mobile applications and these factors were evaluated and eliminated by ten marketing experts using the Delphi Technique. After the evaluating process, some conceptual structures were subjected to an EFA. The dimensions obtained as a result of the EFA were included in the research model which is an integration of various theoretical fields. In order to statistically analyze the measurement and structural models, this study used Smart PLS for Structural Equation Modeling (SEM) technique.

Following section starts with a literature review which examines basic theories and models, and proceeds with the explanation of factors affecting consumer adoption in mobile marketing literature. After the literature section, the present study explains research design and methodology, and continues with results of the study, discussion of results and conclusions. The study ends with limitations and future research.

2. Literature Review and Conceptual Framework

There is a wide body of literature that studies consumers' attitudes and intentions toward as well as acceptance and adoption of mobile marketing activities (Bauer, Reichardt, Barnes, & Neumann, 2005; Barutçu, 2007; Barutçu, 2008; Sultan, Rohm, & Gao., 2008; Gao, Sultan, & Rohm, 2010; Uygun, Divanoğlu, & Özçifçi, 2012; Yüce, Deniz, & Gödekmerdan, 2012; Rui-jin, & Xiang-yang, 2012; Yousif, 2012; Gao, Rohm, Sultan, & Huang, 2012; Gao, Rohm, Sultan, & Pagani, 2013; Al-Meshal & Almotairi, 2013; Ryu & Murdock, 2013; Chinomona & Sandada, 2013). It was often observed that researchers developed a model by synthesizing research related structures and various basic models in studies such as Theory of Reasoned Action, Technology Acceptance Model, Theory of Planned Behavior, Innovation and Diffusion Theory, Uses and Gratification Theory etc. On the other hand, a significant number of studies about acceptance and adoption of mobile commerce and mobile shopping by consumers were identified within the literature (Yang, 2005; Wu & Wang, 2005; Mahatanankoon, Wen, & Lim, 2005; Bigné, Ruiz, & Sanz, 2007; Bhatti, 2007; Wei, Marthandan, Chong, Ooi, & Arumugam, 2009; Khalifa & Shen, 2008; Chong, Chan, & Ooi, 2012; Jarvenpaa, Lang, Takeda, & Tuunainen, 2003; Aldas-Manzano, Ruiz-Mafe, & Sanz-Blas, 2009; Lu & Su, 2009; Yang, 2010; Chiem et al., 2010; Yang, 2012; Yang & Forney, 2013; Yang, 2013; Kumar & Mukherjee, 2013; Uğur & Türkmen, 2014; Assaurt & Eiamkanchanalai, 2015; Wang, Malthouse, & Krishnamurthi, 2015; Agrebi & Jallais, 2015).

2.1 Basic Theories and Models

2.1.1 Theory of Reasoned Action

The theory (Ajzen & Fishbein, 1980) considers "intention" as a determining factor for the decision to display a specific behavior or not. According to this theory, intention is a function of two determining factors, nature of the person and social influence. The personal factor consists of positive or negative individual evaluations taken as reference when performing the behavior. The term used to describe this situation is "attitude toward the behavior". The second determinant of intention is an individual's perception of the social behavior put on him or her to perform or not to perform the behavior in question and this factor is termed as "subjective norm". The theory claims that behavior is determined by behavioral intention, while behavioral intention is a function of individual attitude toward the behavior and a function of social norms (Ajzen & Fishbein, 1975). In the study, marketing experts reached on a consensus about that **subjective norm** has an impact on the consumers' adoption of shopping via mobile applications.

2.1.2 Technology Acceptance Model

This model aims to identify external factors that affect intrinsic beliefs, attitudes and intentions. In order to achieve this aim, the model theoretically bases on the model of reasoned action. In a way similar to Theory of Reasoned Action, Technology Acceptance Model suggests that use of computers is determined by behavioral intentions while behavioral intentions are determined by individuals' attitude toward use of systems and the perceived usefulness (Davis, Bagozzi, & Warshaw, 1989). The theory focuses on "perceived usefulness" and "perceived ease of use" concepts and in this way aims to identify the fundamental factors behind use of systems.

A number of scholars in the field suggest that additional factors are needed to enhance this model. Therefore an extended version of the technology acceptance model, called as **TAM 2**, was developed. Within the scope of this

model, the social influence process which consists of subjective norm, voluntariness and image components and the cognitive instrumental process consisting of job relevance, output quality, result demonstrability and perceived ease of use significantly affect user's acceptance (Venkatesh & Davis, 2000). In the study, marketing experts reached on a consensus about that **image** has an impact on the consumers' adoption of shopping via mobile applications. The image is described as the perception that use of an innovation increases one's status within the social system (Moore & Benbasat, 1991).

Another study within the field developed an integrated model at the user level (**TAM 3**), based on the suggestion that there is a lack of research on the role of interventions in information technologies which are considered helpful for managerial decision making mechanisms. The study also suggests new concepts as determinants of the perceived usefulness and the perceived ease of use concepts, namely individual differences, system characteristics, social influence and facilitating conditions. In the study, marketing experts reached on a consensus about that **facilitating conditions** have an impact on the consumers' adoption of shopping via mobile applications. Facilitating conditions refer to organizational support which makes use of information technologies possible (Venkatesh & Bala, 2008).

According to the model (TAM3), determinants of the perceived usefulness are the perceived ease of use, subjective norms, image, job relevance, output quality and result demonstrability concepts. In addition, determinants of the perceived ease of use concept mentioned by the model include computer self-efficacy, perception of external control, computer anxiety, computer playfulness, perceived enjoyment, and objective usability. In the study, marketing experts reached on a consensus about that **perceived enjoyment** has an impact on the consumers' adoption of shopping via mobile applications. Perceived enjoyment refers the degree to which an activity of using a system is perceived to be enjoyable (Venkatesh, 2000).

2.1.3 Theory of Planned Behavior

Theory extends Theory of Reasoned Action by taking perceived behavioral control in consideration, which refers to users' perception about internal and external restrictions that may affect the behavior (Ajzen, 1991). Perceived behavioral control means availability of opportunities, sources and purposes (time, money, skills, cooperation with others) for an individual to enable him or her to display a specific behavior and to ensure success of this behavior (Ajzen, 1991). In the study, marketing experts reached on a consensus about that **perceived behavioral control** has an impact on the consumers' adoption of shopping via mobile applications.

2.1.4 Innovation and Diffusion Theory

The theory explains the main component in terms of diffusion of new ideas and thoughts as; diffusion of (1) an innovation (2) through communication using certain channels, (3) in a specific time and (4) among members of the social system (Rogers, 1995). According to this theory, the degree to which members of the social system perceive characteristics of an innovation determines the rate of adoption. An innovation has five characteristics: (1) Relative advantage, (2) compatibility, (3) complexity, (4) trialability and (5) observability (Rogers, 1995). First three of these factors were identified as in relation with the decision to adopt (Tornatzky & Klein, 1982) and use of information technologies (Moore & Benbasat, 1993).

Relative advantage indicates the degree to which the innovation is more useful than the replaced situation (Roger, 1995). The benefits in this regard consist of economic benefits, image development, ease of use and satisfaction. These benefits share similarities with the usefulness factor included in the TAM (Taylor & Todd, 1995). Complexity refers to the level of difficulty in learning, understanding and applying an innovation (Rogers & Shoemaker, 1971). This concept shows similarity with the ease of use component of the TAM (Taylor & Todd, 1995). **Compatibility**, on the other hand, explains the degree to which the innovation complies with values, previous experience and current needs of the adopter (Roger, 1995). In the study, marketing experts reached on a consensus about that compatibility has an impact on the consumers' adoption of shopping via mobile applications.

2.1.5 Technology Readiness Index

Technology Readiness Index was developed by Parasuraman in 2000. The aim of this index is to identify preventive and encouraging factors in terms of individuals' tendency to use new technologies. The Technology Readiness Index consists of four dimensions. These four dimensions are optimism, which refers to a positive approach toward technologies; **innovativeness**, which indicates the tendency to be a leader in a specific technology and thought; discomfort, which is perceived lack of control over technology; and finally insecurity, distrust of technology and skepticism about its ability to work properly (Parasuraman, 2000).

In the study, marketing experts reached on a consensus about that **innovativeness** has an impact on the

consumers' adoption of shopping via mobile applications.

2.2 Mobile Marketing Literature Review

The literature review conducted within the scope of this study was based on reviews about mobile technologies (Leppäniemi, Sinisalo, & Karjaluoto, 2006; Ngai & Gunasekaran, 2007; Varnali & Toker, 2010; Zhang, Zhu, & Liu, 2012, Ström, Vendel, & Bredican, 2014). Within this context, articles that are analysed by the studies in question were scanned in line with the aims of this study. It was identified that studies within the literature analysis consumers' acceptance and adoption of mobile marketing activities (Bauer, Reichardt, Barnes, & Neumann, 2005; Barutçu, 2007; Barutçu, 2008; Sultan, Rohm, & Gao., 2008; Gao, Sultan, & Rohm, 2010; Uygun, Divanoğlu, & Özçifçi, 2012; Yüce, Deniz, & Gödekmerdan, 2012; Ruijin, & Xiangyang, 2012; Yousif, 2012; Gao, Rohm, Sultan, & Huang, 2012; Gao, Rohm, Sultan, & Pagani, 2013; AlMeshal & Almotairi, 2013; Ryu & Murdock, 2013; Chinomona & Sandada, 2013), mobile advertisements (Leppäniemi & Karjaluoto, 2005; Xu, 2006; Vatanparast & Asil, 2007; Merisavo et al., 2007; Okazaki, 2007; Barutçu & Göl, 2009; Usta, 2009; Şahin & Aytekin, 2012; Özgüven, 2013), mobile services (Nysveen, Pedersen, & Thorbjørnsen, 2005; James, Thong, Moon, & Tam, 2008; Turel, Serenko, & Bontis, 2007; Lu, Liu, Yu, & Wang, 2008; Pagani, 2004; Kleijnen, Ruyter, & Wetzels, 2004; Hung & Chang, 2005; Luarn & Lin, 2005; Park & Yang, 2006; Kim, Chan, & Gupta, 2007; Rao & Troshani, 2007; Lopez-Nicolas, Molina-Castillo, & Bouwman, 2008; Kim & Han, 2009; Faziharudean & Li-Ly, 2011; Kim, 2012; Du, Zhu, Zhao, & Lv, 2012; Zarmpou, Saprikis, Markos, & Vlachopoulou, 2012; Wang & Lin, 2012), mobile commerce (Yang, 2005; Wu & Wang, 2005; Mahatanankoon, Wen, & Lim, 2005; Bigné, Ruiz, & Sanz, 2007; Bhatti, 2007; Wei, Marthandan, Chong, Ooi, & Arumugam, 2009; Khalifa & Shen, 2008; Chong, Chan, & Ooi, 2012; Jarvenpaa, Lang, Takeda, & Tuunainen, 2003) and mobile shopping (Aldas-Manzano, Ruiz-Mafe, & Sanz-Blas, 2009; Lu & Su, 2009; Yang, 2010; Chiem et al., 2010; Yang, 2012; Yang & Forney, 2013; Yang, 2013; Kumar & Mukherjee, 2013; Uğur & Türkmen, 2014; Assaurt & Eiamkanchanalai, 2015; Wang, Malthouse, & Krishnamurthi, 2015; Agrebi & Jallais, 2015) and attempt to determine the factors which have influence on consumers' attitude and behavioral intention.

This section of the study covers original structures which are not mentioned in aforementioned models but encountered within the literature. It is observed that the Value Based Adoption Model, which explains consumers' adoption of mobile internet in terms of value maximization, uses the concept of the **perceived value** (Kim, Chan, & Gupta, 2007). Within the scope of this model, the perceived value refers to the exchange between advantages obtained by the consumers such as relevant features and benefits and the resources used such as price, opportunity cost, time and necessary effort. Therefore the concept covers the perceived monetary value and the perceived cost as well (Zhang, Zhu, & Liu, 2012; Wei, Marthandan, Chong, Ooi, & Arumugam, 2009; Faziharudean & Li-Ly, 2011; Kim, 2012). The level of preexisting knowledge about the innovation itself or a similar product/service, or **existing knowledge**, reduces the innovation's degree of complexity (Bauer, Reichardt, Barnes, & Neumann, 2005; Yang, 2005). **Perceived mobility** refers to the fact that mobile services enable widespread and instant communication. "**Positive Word of Mouth Communication**" focuses on individuals' willingness to recommend products and services and encourage use of them as a result of loyalty, rather than their own future use and purchasing behavior (Assarut & Eiamkanchanalai, 2015; Turel, Serenko, & Bontis, 2010). **Perceived Informativeness** refers to his or her perceiving products and services of mobile applications as a significant source of knowledge (Bauer, Reichardt, Barnes, & Neumann, 2005; Okazaki, 2007). **Perceived risk** consists of three key concepts (Lu, Liu, Yu, & Wang, 2008). These are protection during the data transmission process and of data storages, privacy concerns, success in achieving desired outcomes. In conclusion, **personalization** refers to the customized offerings related to products and services sent by a mobile application (Xu, 2006).

Marketing experts reached on a consensus about seven structures mentioned above in this section. On the other hand, structures like need for uniqueness, mobile affinity, media effect, trialability were excluded from the study.

3. Research Design and Methodology

The literature review within the scope of this study identified a good number of factors that affect consumers' adoption of shopping via mobile applications and these factors were analyzed by ten marketing experts using the Delphi Technique. As a result of mentioned technique, certain conceptual structures that are Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Perceived Behavioral Control (PBC), Subjective Norms (SN), Image (IMA), Perceived Entertainment (PE), Facilitating Conditions (FC), Innovativeness (INN), Compatibility (COMP), Existing Knowledge (EN); Perceived Value (PV), Perceived Mobility (PM), Word of Mouth Communication (WOM), Perceived Informativeness (PI), Perceived Risk (PR) and Personalization (PER) were included in the study to be subjected to an EFA. The items in **table-1** were adapted from the studies on mobile

technologies reviewed within the literature and modified to be compatible with the study. The present study includes: four items measuring Perceived Usefulness (Davis, Bagozzi, & Warshaw, 1989; Ahn, Ryu, & Han, 2004; Wu & Wang, 2005); five items measuring Perceived Ease of Use (Davis, Bagozzi, & Warshaw, 1989; Nysveen, Pedersen, & Thorbjørnsen, 2005); four items measuring Perceived Value (Sirdeshmukh, Singh, & Sabol, 2002; Kim, Chan, & Gupta, 2007); four items measuring Perceived Risk (Bauer, Reichardt, Barnes, & Neumann, 2005; Wu & Wang, 2005); four items measuring Perceived Enjoyment (Nysveen, Pedersen, & Thorbjørnsen, 2005); five items measuring Innovativeness (Goldsmith & Hofacker, 1991; Parasuraman, 2000); three items measuring Existing Knowledge (Flynn & Goldsmith, 1999; Bauer, Reichardt, Barnes, & Neumann, 2005); four items measuring Word of Mouth Communication (Lin, Sher, & Shih, 2005; Turel, Serenko, & Bontis, 2010); three items measuring Perceived Mobility (Hong, Thong, Moon, & Tam, 2008); three items measuring Personalization (Mittal & Walfried, 1996; Chellappa & Sin, 2005; Xu, 2006); three items measuring Perceived Informativeness (Bauer, Reichardt, Barnes, & Neumann, 2005); two items measuring Subjective Norm (Bhattacherjee, 2000; Nysveen, Pedersen, & Thorbjørnsen, 2005); two items measuring Image (Moore & Benbasat, 1991). Moreover, Attitude and Behavioral Intention concepts mentioned in the final model of the study were measured with three items for each (Shimp & Kavas, 1984; Bauer, Reichardt, Barnes, & Neumann, 2005; Yang & Zhou, 2011). In conclusion, the conceptual structure of Behavior was examined by addressing two questions (Kim, 2012). In order to efficiently identify the factors behind consumers' adoption of shopping via mobile applications, the sample of this study was chosen from people who do shopping via mobile applications. It means that the study uses a nonrandom method which is called as the judgmental sampling. The data was collected through questionnaires conducted between April-June, 2017, from 450 consumers who live in Istanbul, Turkey and use mobile applications for shopping but only 438 of them were included in the analysis process. 64 variables to be analyzed were scaled by a 5point Likert type scale and the respondents were asked to answer these questions by choosing points from (1) strongly disagree to (5) strongly agree.

An EFA with SPSS was conducted in order to identify dimensions of the data collected from consumers. The dimensions obtained as a result of the EFA were included in the research model and the relations within the literature (Figure 1) Contrary to covariance based AMOS and LISREL path modeling techniques (CB-SEM), SMART PLS is a regression based technique which rests upon the path analysis (Chinomona & Sandada, 2013). A study conducted with SMART PLS and AMOS to explore the structural equation modeling compatible with confirmatory factor analysis revealed that values of PLS-SEM are more efficient than those of CBSEM, even when the data is same (Afthanorhan & Afthanorhan, 2013). Smart PLS software has sufficient capacity to process complicated prediction models on small and medium scaled samples. After EFA, due to the reasons mentioned above, this study used Smart PLS software in order to statistically analyze the measurement and structural models.

4. Results

When the data associated with participants are examined (Table 2), it is seen that 64% of those using mobile applications for shopping are in 26-36 age group, 42% are female and 58% were male, while 80% of all participants have a monthly income over the value of minimum wage applied in Turkey.

Data of the 438 participants were subjected to an EFA with SPSS software, within the framework of the study. It is often mentioned as a general rule that factor analysis should be applied to more than 300 samples (Çokluk, Şekercioğlu, & Büyüköztürk, 2012). The obtained data was analyzed through principal axis factoring method and the Promax rotation technique. Variables with sampling sufficiency values less than 0.4, single variables under specific factors, variables which are under multiple factors and at the same time have factor load differences less than 0.1 were excluded from the study and 10 different dimensions were obtained as a result of the factor analysis, each of them having eigenvalues over 1. Internal consistency of factors was measured by using the Cronbach's Alpha (α) value. The rate of variance explained as a result of the EFA is 69%. Internal consistency and explained variance rates of the factors, KMO values associated with the data set and significance level are given in Table 1.

Following the determination of factors that have influence over consumers' adoption of shopping via mobile applications by EFA, the research model given in Figure 1 was developed in order to test relations of these factors with the structures of Attitude, Behavioral Intention and Behavior. The relations within the scope of this study were tested with Smart PLS software using bootstrapping resampling method. Relations within the model were tested at a significance level of 0.01. The path coefficients and T values in the research model are located in Table 3. The conceptual model developed through the analyses conducted with Smart PLS software and used to explain consumers' adoption of shopping via mobile applications is given in Figure 2.

When the external loads of latent variables determined by the analysis are examined, it is seen that all variables belonging to the structure of behavior are over 0.6 except for one (B2:0,409). Some experts of psychometrics (Churchill, 1979) suggest that reflective indicators with standardized outer loads less than 0.4 should be excluded from the model. The lowest behavioral variable was not excluded from the model as its load was over the limit. Composite Reliability (CR) value is expected to be over 0.7 within the first phase of the study and over 0.8 or 0.9 during the following phases (Nunnally and Bernstein, 1994). When Table 1 is examined, it is seen that all CR values belonging to latent variables, except for Behavior (0.695), are over the value of 0.7. These results show that all latent variables used in this model are reliable.

In order to evaluate the validity, two subtypes should be analyzed. These are convergent validity and discriminant validity. It is recommended to use the Average Variance Extracted (AVE) for evaluation of the convergent validity (Fornell & Larcker, 1981). The AVE value should be over 0.5. Table-1 shows that threshold coefficients of AVE values belonging to the latent variable are higher than 0.5. Therefore convergent validity of the latent variable within this model was verified. It is also stated that as square roots of the AVE values belonging to latent variables can also be used for the discriminant validity, the square root values should be higher than the correlation value among latent variables (Fornell & Larcker, 1981). The Fornell Larcker Criterion section, which is given in the report output of Smart PLS software, is also summarized in Table 4. The values written with boldface letters inside the Table indicate square roots of AVE scores belonging to latent variables. Table-3 verifies the discriminant validity of the measurement used in the study. The study uses the Variance Inflation Factor (VIF) to test the indicator variables that form the formative latent variables in terms of multicollinearity. As a rule, a VIF value over 10 indicates existence of harmful collinearity (Henseler & Ringle, 2009). None of the indicators and latent variables used in this study has VIF values over 5. Therefore, there is no problem with multicollinearity between indicator variables and latent variables used in the model.

The analysis conducted with Smart PLS software measures the path coefficients associated with the structures used in the model. Significance of these coefficients is evaluated by using the bootstrapping method. This method provides "t values" for each path prediction. All paths indicating relations among latent variables of the model developed by the study have significance values of 0.01 (Figure 2). The R^2 value, which is the coefficient of determination for Behavior latent variable is 0.079. Behavioral Intention latent variable of this model has an impact at the rate of 0.281 over the Behavior. Perceived Usefulness, Attitude and the Perceived Mobility altogether explain Behavioral Intention latent variable's variance, which is 63.8%. Attitude (0.604) has the strongest impact on Behavioral Intention within the model and it is followed by the Perceived Usefulness (0.167) and Perceived Mobility (0.141). Moreover, latent variables of Perceived Usefulness, Innovativeness, Personalization, Perceived Informativeness and Word of Mouth Communication altogether explain the Attitude latent variable's variance of 59.1%. Latent variables which have impacts on Attitude are the Perceived Usefulness (0.342), Personalization (0.273), Word of Mouth Communication (0.190), the Perceived Informativeness (0.129) and Innovativeness (0.119). On the other hand, variance (47.1%) of the latent variable belonging to the Perceived Usefulness is explained by latent variables of Subjective Norm and the Perceived Ease of Use. The Perceived Ease of Use (0.595) has the strongest impact on this latent variable and it is followed by Subjective Norm (0.231).

Table 1. Results of EFA and smart PLS

	EFA Loadings	Outer Loadings (PLS)	R^2 (PLS)	α (EFA)	CR (PLS)	AVE (PLS)	VIF (PLS)
Perceived Usefulness / Value (α: 0.880; VE: % 28.397)							1.820
PU – 1	0.663	0.724					2.002
PU – 2	0.595	0.629					1.903
PU – 3	0.543	0.623	0.471	0.883	0.908	0.556	1.440
PU – 4	0.443	0.666					1.642
PV – 1	0.662	0.778					2.329
PV – 2	0.877	0.855					2.937
PV – 3	0.999	0.835					2.908
PV – 4	0.825	0.812					2.513
Innovativeness / Existing Knowledge (α: 0.838; VE: % 7.697)			0.000	0.842	0.879	0.512	1.439
INN – 1	0.526	0.718					2.025
INN – 2	0.729	0.803					2.643

INN – 3	0.678	0.780					2.095
INN – 5	0.678	0.636					1.997
EN – 1	0.652	0.644					1.466
EN – 2	0.585	0.671					1.576
EN – 3	0.688	0.739					2.137
Word of Mouth (α: 0.842; VE: %5.365)							1.637
WOM – 1	0.801	0.781					1.738
WOM – 2	0.809	0.882	0.000	0.845	0.895	0.682	2.388
WOM – 3	0.769	0.868					2.324
WOM – 4	0.750	0.766					1.651
Perceived Mobility (α: 0.841; VE: % 3.812)							1.414
PM – 1	0.738	0.848	0.000	0.844	0.905	0.761	1.890
PM – 2	0.682	0.892					2.022
PM – 3	0.879	0.876					2.197
Personalization (α: 0.819; VE: % 3.405)							1.288
PER – 1	0.857	0.866	0.000	0.824	0.895	0.739	2.150
PER – 2	0.762	0.871					2.051
PER – 3	0.660	0.841					1.622
Perceived Informativeness (α: 0.835; VE: % 3.252)							1.558
PI – 1	0.771	0.876	0.000	0.840	0.903	0.756	2.387
PI – 2	0.781	0.881					2.447
PI – 3	0.715	0.852					1.638
Perceived Ease of Use (α: 0.766; VE: % 3.115)							1.057
PEOU – 1	0.612	0.761					1.495
PEOU – 3	0.568	0.835	0.142	0.778	0.855	0.598	1.627
PEOU – 4	0.744	0.660					1.382
PEOU – 5	0.619	0.826					1.705
Subjective Norm (α: 0.874; VE: % 2.719)							1.057
SN – 1	0.784	0.952	0.000	0.876	0.941	0.889	2.542
SN – 2	0.878	0.934					2.542
Attitude							1.672
ATT – 1	-	0.930	0.591	0.804	0.886	0.726	3.628
ATT – 2	-	0.930					3.645
ATT – 3	-	0.670					1.269
Behavioral Intention							1.000
BI – 1	-	0.890	0.638	0.902	0.939	0.836	2.672
BI – 2	-	0.951					4.610
BI – 3	-	0.901					3.005
Behavior							-
B1	-	0.988	0.079	-	0.695	0.572	1.076
B2	-	0.409					1.076
N = 438; KMO = 0.897; Bartlett's Sph. χ^2 = 10792.866; df = 861; EFA Total Variance Explained = 69.309							

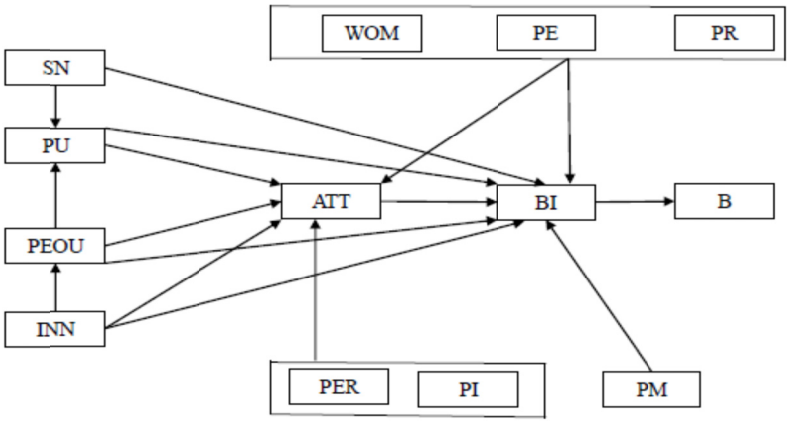

Figure 1. Research model

Table 2. Data of research sample and descriptives

Gender	**Frequency**	**Percentage**	**Mobile Shopping Areas done via Apps**	**Fre.**	**Per.**
Female	181	42	General/ Private Shopping	377	26
Male	256	58	Second Hand Trading	121	8
Age			Mobile Couponing	118	8
17-25	44	10	Plain Ticket	287	19
26-36	278	64	Book	206	14
37-47	97	22	Food	192	14
48 and over	19	4	Vacation	168	11
Income			**Daily Duration of Using Mobile Shopping Apps**		
1400 TRY and below	77	17	Lower than 10 minutes	196	45
1401-2500TRY	84	19	Lower than 30 minutes	157	36
2501-4500TRY	48	11	Lower than 1 hour	66	15
4501-7000TRY	65	15	1 to 3 hours	19	4
7001TRY and over	165	38			
Education			**Number of Mobile Shopping Using Apps**		
Primary School	5	1.1	Once every 6 months	65	15
High School	25	5.7	Once every 3 months	60	14
Associate's Degree/College	271	61.9	Once every 2 months	46	10
Postgraduate	137	31.3	Once every month	101	23
			2 to 5 every month	145	33
			2 to 5 every week	21	5

Table 3. Path coefficients and T values of the research model

Relationships	Path Coefficients	T Statistics
BI -> B	0.281	6.283**
ATT -> BI	0.604	12.483**
INN -> BI	0.125	0.512
PEOU -> BI	0.048	1.063
PE -> BI	0.041	0.017
PR -> BI	-0.141	0.931
PM -> BI	0.141	3.441**
PU -> BI	0.167	3.395**
SN -> BI	-0.007	0.590
WOM -> BI	0.117	1.300
PE -> ATT	0.061	1.447
INN -> ATT	0.119	2.755**
PEOU -> ATT	-0.010	0.207
PER -> ATT	0.273	7.007**
PI -> ATT	0.129	2.735**
PR -> ATT	-0.162	1.120
PU -> ATT	0.342	7.538**
WOM -> ATT	0.190	4.464**
PEOU -> PU	0.595	13.799**
SN -> PU	0.231	6.136**
INN -> PEOU	0.377	7.684**

Note. * $p < 0.05$. **$p < 0.01$.

Table 4. Correlation between constructs

Research Constructs	ATT	B	BI	INN	PEOU	PER	PI	PM	PU	SN	WOM
ATT	**0.852**										
B	0.292	**0.756**									
BI	0.771	0.281	**0.914**								
INN	0.483	0.244	0.423	**0.716**							
PEOU	0.443	0.114	0.477	0.377	**0.773**						
PER	0.535	0.138	0.413	0.330	0.214	**0.860**					
PI	0.537	0.116	0.488	0.373	0.430	0.384	**0.870**				
PM	0.450	0.209	0.499	0.458	0.495	0.239	0.446	**0.872**			
PU	0.614	0.225	0.611	0.379	0.648	0.283	0.507	0.513	**0.745**		
SN	0.331	0.015	0.283	0.265	0.233	0.117	0.296	0.292	0.370	**0.943**	
WOM	0.569	0.245	0.433	0.504	0.345	0.400	0.450	0.365	0.445	0.281	**0.826**

Lastly the formula given below was used to measure goodness of fit value of the model (Tenenhaus, Vinzi, Chatelin, & Lauro, 2005):

$$GoF = \sqrt{\overline{AVE} * \overline{R^2}}$$

According to the formula above, goodness of fit (GoF) value of the model was measured as 0.51 and this value (Wetzels, Odekerken-Schröder, & Van Oppen, 2009) was identified as over the threshold value which is 0.36. This result shows that the model has a good overall fit.

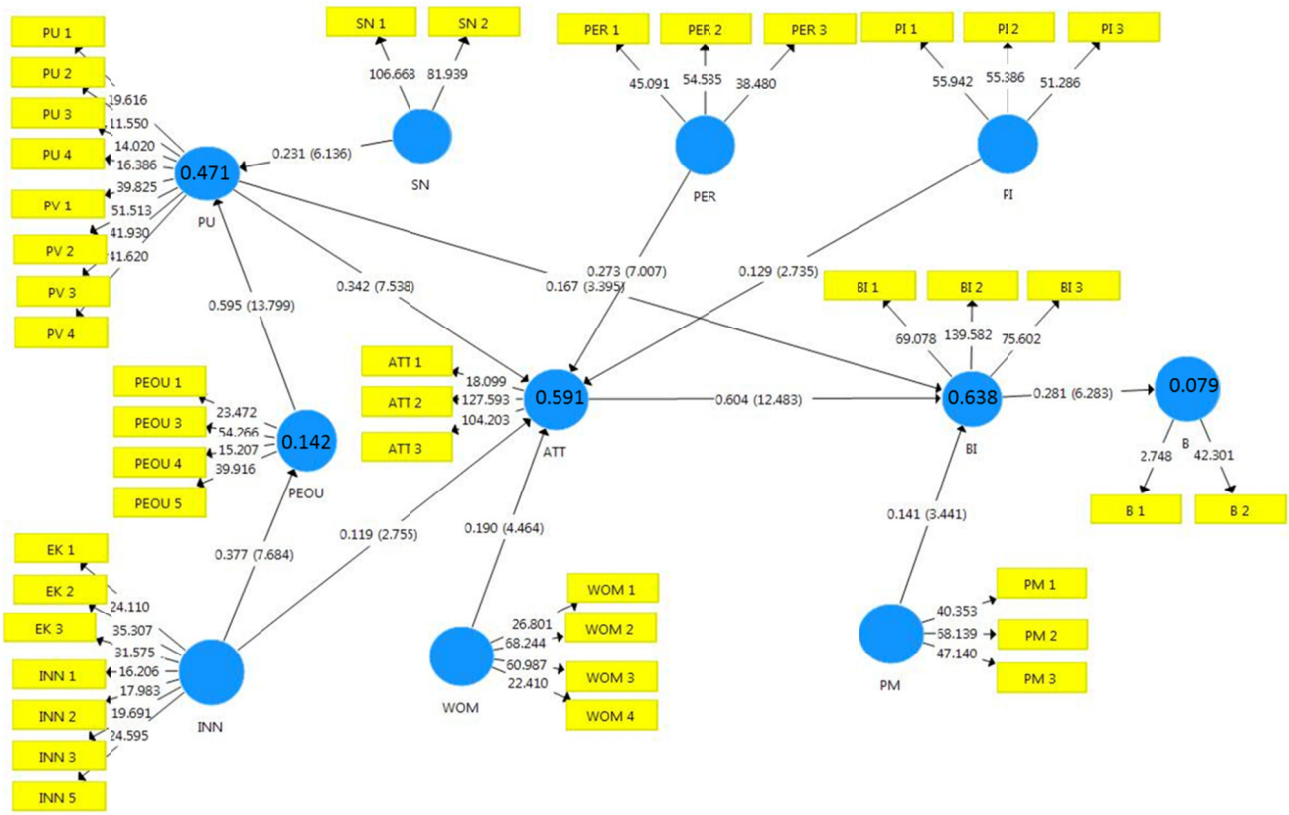

Figure 2. The developed model for consumers' adoption of shopping via mobile application

Note. Figure includes values of R^2, path coefficients and T values; $p < 0.01$ for all paths.

5. Discussion of Results

The factors behind consumers' adoption of shopping via mobile applications were explained in 10 different dimensions in line with the results of EFA conducted within the scope of this study. These dimensions are Perceived Usefulness, Innovativeness, Perceived Entertainment, Word of Mouth Communication, Perceived Risk, Perceived Mobility, Personalization, Perceived Informativeness, Perceived Ease of Use and Subjective Norm. All the dimensions obtained through EFA are reliable. The rate of variance explained as a result of EFA is 69%. On the other hand, it is seen that variables of Perceived Usefulness and Perceived Value are classified under the same factor. With reference to the fact that variables belonging to both of the aforementioned factors are in a close relationship with each other, it can be inferred that only one of the latent variables could be enough for the measurement. This inference also applies to Innovativeness and Existing Knowledge factors.

Coefficients of determination (R^2), path coefficients and significance values associated with Smart PLS software developed within the scope of this study are given in Figure 2. In marketing researches, 0.75 is considered as a satisfying level for coefficient of determination (R^2), while 0.50 is considered as acceptable and 0.25 as weak (Wong, 2013). R^2 values of this study on the model which explains consumers' adoption of shopping via mobile applications are approximately 8% for Behavior, 64% for Behavioral Intention, 59% for Attitude and lastly 47% for Perceived Usefulness. It is seen from these results that Behavioral Intention, Attitude and the Perceived Usefulness structures have acceptable R^2 values, while Behavior structure has a weak one. On the other side, all

of relations established by internal latent variables in this model are significant.

When the model developed in this study is examined within the context of relations among conceptual structures analyzed by previous studies in the literature, it is identified that Innovativeness (Pagani, 2004; Gao, Rohm, Sultan, & Pagani, 2013), Perceived Informativeness (Bauer, Reichardt, Barnes, & Neumann, 2005; Okazaki, 2007) and Personalization (Chellappa & Sin, 2005; Xu, 2006) have significant relations with Attitude, similar to the studies within the relevant literature. On the other hand, Attitude (Ajzen & Fishbein, 1975) and Perceived Mobility (Hong, Thong, Moon, & Tam, 2008; Faziharudean & Li-Ly, 2011) have significant relations with Behavioral Intention parallel to the existing literature. Perceived Usefulness also has significant relations with both Attitude and Behavioral Intention as in TAM. Again in parallel with the previous studies, Behavioral Intention has a significant relation with Behavior as in the Theory of Reasoned Action. Differently from the data of previous studies within the literature (Nysveen, Pedersen, & Thorbjørnsen, 2005; Bauer, Reichardt, Barnes, & Neumann, 2005; Wu & Wang, 2005), Perceived Entertainment and Perceived Risk structures, both of which were obtained through EFA conducted during the analysis process, have significant relations with neither Attitude nor Behavioral Intention. As it is also seen in previous studies within the literature, Innovativeness is in a significant relationship with Perceived Ease of Use, whereas Subjective Norm and Perceived Ease of Use are in a similar relation with Perceived Usefulness (Davis, Bagozzi, & Warshaw, 1989; Yang, 2005; Yang, 2005; Bhatti, 2007).

6. Conclusions

The present study has some significant findings from Turkish culture about consumers' adoption of shopping via mobile applications. Structures such as Personalization, Word of Mouth Communication and Perceived Mobility used in the model developed within the scope of this research, but rarely used in this field of studies, were verified to be determinants of shopping behavior via mobile applications. Considering today's marketing approach to customize products and services in line with individual wishes and needs, it seems highly natural that personalization may be a determining factor for adoption of mobile applications. Therefore users of mobile shopping applications who have positive attitudes would be more willing to share their personal information to benefit customized offers. In the information age we are in, consumers want to bring together all the information they can obtain about products and services before making purchase decision for choosing the best option. In this regard, consumers are highly affected by comments and evaluations of those who have previously experienced a specific product, service or application. High sensitivity toward bandwidth, data transmission rates and geographical locations are among limiting factors for mobile applications' ability to perform functions. The concept of mobility, which expresses the perception of "everytime and everywhere", shows the expectations of consumers from products and services in a specific place and time interval. That's why to overcome these limiting factors would enhance the perception of mobility. Considering the developed model and factors affecting consumer adoption of shopping via mobile applications such as personalization, word of mouth communication and perceived mobility can give firms to gain a sustainable competitive advantage in a digital world. The results of the study are considered to beneficial for mobile application developers who are independent individuals and professional organizations like brands.

7. Limitations and Future Research

Some possible semantic and verbal mistakes in translation of variables given in survey forms from English to Turkish are considered among limitations of the study. The developing but not settled structure of the market associated with mobile technologies in Turkey is another limitation. On the other hand; as the research model was developed in consideration of relations within the literature, Attitude, Intention and Behavior concepts were not included in the exploratory factor analysis.

Considering the relatively low level of mobile shopping in Turkey, where numbers of smart phone users and mobile broadband subscribers are rather high, further studies to identify the determinants and explain the behavior in question with larger samples from different regions are needed in purpose of ensuring diffusion of mobile shopping in Turkey.

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