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Article

Factors affecting E-commerce adoption: A case of Turkey

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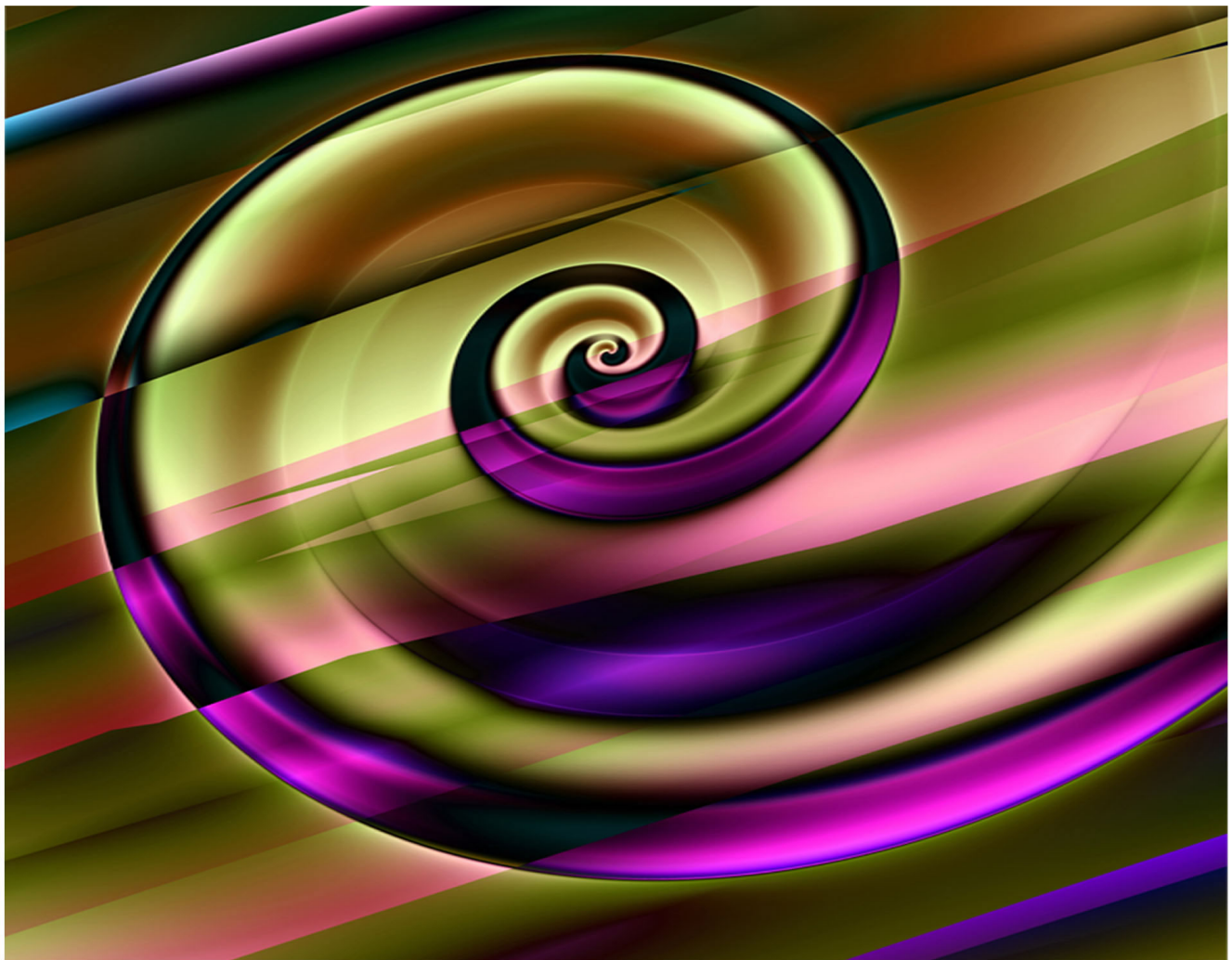
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Factors affecting E-commerce adoption: A case of Turkey

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Abstract

As the number of internet users increases by leaps and bounds, the importance of electronic commerce (e-commerce) channel intensifies among other sales channels. Internet enables products and services to reach large masses in a scalable way. Hence, both academicians and practitioners show great interest in theorizing and understanding the adoption behavior of e-commerce users. For this purpose, factors having impacts on adoption behavior of e-commerce users are investigated within the scope of the study. Our literature review shows that the most influential factors of e-commerce acceptance are perceived usefulness, perceived ease of use and trust. Therefore, an extension of TAM with trust is proposed as the research model. Data on the factors are collected from 186 respondents and analyzed using structural equation modeling (SEM) method to test model validity and hypotheses. This study reveals users' perceptions of usefulness and trust are important factors towards adoption of e-commerce in Turkey. According to our study, Turkish users demand trustworthiness of products and services as well. Moreover, usefulness in means of time and money savings and easy reach of many products and services positively affects adoption. Furthermore, perceived ease of use doesn't directly affect adoption; rather it imposes on e-commerce adoption through perceived usefulness and trust.

Key Words: User Adoption, E-commerce, Technology Acceptance Model (TAM), Trust, Structural Equation Modeling (SEM)

INTRODUCTION

Internet usage is no longer limited as a networking media, but it also has a role as marketing and sales transaction medium for people. By using Internet, people have the opportunity to do business worldwide, attain new customers and lower expenses. According to Gartner's report in 2013, e-commerce has altered into digital commerce as it embraces the emerging mobile and social channels. From this point, e-commerce is not just a web-based selling method; it is a transformational initiative for organizations in order to survive in today's digital world. For gaining a major role from this initiative, both academic and business world are trying to fully understand the dynamics of adoption of e-commerce by customers. The main objective of this study is to test a model that will determine the factors that influence customer adoption of e-commerce in Turkey. E-commerce is increasing in Turkey at a great pace but not significantly when compared to the total trade volume, rather it increases as a remedy to cover the foreign trade deficit (Gökmen, 2012). Gökmen (2012) also emphasizes the importance of understanding the reasons of the difficulty in adoption of e-commerce in Turkey for its further development. Additionally, Turkish Ministry of Economy publishes on its web site informative content about e-commerce and support e-commerce companies with incentives (www.ekonomi.gov.tr), which underlines the importance of e-commerce adoption. With respect to our research, the proposed model is built on the perceived ease of use and usefulness factors of technology acceptance model (TAM) and trust. The hypotheses are tested with structural equation modeling method. The result of the research is expected to be useful to help e-commerce companies to improve their online sales by adjusting their customer strategies. Additionally, this study also adds to the technology acceptance literature by incorporating trust relevant to e-commerce.

This study is divided into four parts. The first part covers the theoretical background. The second part deals with the proposal of research model and the methodology of the study. The third part includes the findings of the study. The last part discusses the conclusions and limitations of the study and unfolds future research areas related to user adoption in e-commerce.

LITERATURE REVIEW

E-commerce began in 1995 when "Netscape.com" internet portal published the first web advertising and uncovered the idea that Internet could be used as a new medium for advertising and sales. Related to birth of the e-commerce, the term is used for all business transactions realized through the Internet or the Web (Laudon & Laudon, 2014). From the time when the e-commerce first began, e-commerce itself transferred from its origin as a mechanism for online retail sales into something much broader. E-commerce has become the platform for media and new, unique services and capabilities that aren't found in the physical world such as Facebook, Twitter, Google Search, Groupon, iTunes or Tumblr (Laudon & Traver, 2014). By the end of 2016, the population of the world is expected to reach 7.3 billion, where 3.7 billion of us use internet. The usage and the penetration of internet grow rapidly in last 15 years and the number of internet users soars to 8 times in this period (Internetworldstats.com). Related to the increase in internet users, e-commerce channel increases significantly and alters e-commerce term to digital commerce with the integration of mobile and social channels. According to Goldman Sachs research, digital commerce adoption and expansion is anticipated to further accelerate and continue to transform the way we shop and sell.

When the internet user statistics are further analyzed, it is found that Turkey has nearly 46.3 million Internet users with 59.6 % population penetration rate as of November, 2015 (Internetworldstats.com). In line with the growth of internet users, e-commerce is increasing at a great pace but not significantly when compared to the total trade volume, rather it increases as a remedy to cover the foreign trade deficit (Gökmen, 2012). According to Turkish Industry and Business Association's (TÜSİAD's) E-Commerce Report in 2014, the reason behind not fully realizing the e-commerce potential in Turkey is user's prejudice against e-commerce usage and lack of technical, financial and procedural infrastructure. Digital-literacy of Turkish internet users is not mature enough to let them realize how internet and e-commerce could positively influence their daily life, business results, from a more broad perspective the future of the country. The trust in e-commerce transactions is not established among Turkish e-commerce users. Consequently, examining factors affecting e-commerce adoption is highly important for the development of e-commerce business in Turkey.

As the importance of the e-commerce rises, the researchers' attention grows considerably in this area and they try to unveil the motivation of e-commerce with different models. Among these models, TAM gets a big portion of attention. The technology acceptance model is an adaptation of the theory of reasoned action (TRA) from social psychology (Fishbein & Ajzen, 1980). TAM proposes that two beliefs about a new technology, perceived usefulness (PU) and perceived ease of use (PEOU), determine a person's attitude toward using that technology, which in turn determine their intention to use it (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989). Perceived usefulness is the degree to which one believes that using the technology will enhance his/her performance (Davis et al., 1989). Perceived ease of use is the degree to which one believes that using the technology will be free of effort (Ha & Stoel, 2008). Moreover, it is proposed that PEOU would influence PU.

TAM has been constantly studied and the two major advancements, namely TAM 2 (Venkatesh & Davis 2000; Venkatesh 2000) and the Unified Theory of Acceptance and Use of Technology (Venkatesh, Morris, Davis, & Davis, 2003) are issued. Thereafter, TAM 3 and a related research agenda are proposed with the inclusion of pre and post implementation interventions (Venkatesh & Bala, 2008). Within the scope of our literature review, Gefen and Straub (2000) emphasize the relative importance of perceived ease of use in e-commerce adoption as a means of TAM model. Lin (2007) compares the technology acceptance model and two variations of the theory of planned behavior to examine which model better predicts e-commerce usage intentions. Hernandez, Jimenez and Martín (2007) deploys an extended TAM model to test differences between potential and experienced e-commerce users.

The term trust is investigated by many researchers within the e-commerce concept. McKnight and Chervany (2002) build an interdisciplinary typology for trust concept in e-commerce and defined both conceptual-level and operational-level trust constructs, which are related to e-commerce consumer actions. Thereafter, Gefen, Karahanna and Straub (2003) suggests that repeated online purchase intentions are the product of TAM factors and trust. As a result of their study, they evidence that online trust is built through a belief that the vendor has nothing to gain by cheating, there are safety mechanisms built into the web site, and by having an easy-to-use web site interface. Pavlou (2003) combines TAM with trust and perceived risk for understanding key drivers for engaging consumers in on-line transactions. Salam, Iyer, Palvia and Singh (2005) combine TAM and trust in their research model and highlight the importance

of nurturing consumer trust in the context of e-commerce. They indicate trust as combination of technological, behavioral, social, psychological, and organizational interactions among human and non-human technological parties. Moreover, Palvia (2009) proposes that trust is crucial for any long-term business relationship, because it is critical wherever risk, uncertainty and/or interdependence exist, as it mitigates risk. E-commerce companies are interested in building exchange relationships with online customers. Important signs for the persistence of relationships are customer's beliefs and intentions related to trust in the e-commerce company. He investigates the role of trust in e-commerce transactions in relation with benevolence, integrity and competence and finds the need for including both technology and trust factors in the development of long running relationships with online customers. Additionally, Çelik and Yılmaz (2011) include trust factor by many other factors such as enjoyment, quality of shopping to their model for adoption of e-commerce services and emphasize significant impact of trust on the online purchasing attitude in Turkey. Finally, Napitupulu and Kartavianus (2014) analyze trust as an actor influencing customer buying decision through online shopping and revealed that trust affect online purchase decision significantly along many factors such as information quality, perceived ease of payment, and benefits of online shopping.

RESEARCH MODEL AND METHODOLOGY

This part includes the proposed model, hypotheses, and the research methodology of the study.

Proposed Research Model

Theoretical models obtained as a result of a comprehensive literature review on e-commerce are compared to each other, and a lean research model that is able to explain the adoption of e-commerce among Turkish users is developed. In addition to perceived ease of use and perceived usefulness factors of classical TAM, trust factor retrieved from literature is added and attempts are made to explain the causal relations between these factors and their impact on e-commerce usage intentions of Turkish users. Prior studies have validated TAM as a robust framework for understanding users' adoption of technology in e-commerce (Gefen & Straub, 2000; Lin, 2007; Hernandez et al., 2007; Ha & Stoel, 2008). Moreover, trust component is deployed by prior researchers with TAM components (Mcknight & Chervany, 2002; Gefen et al., 2003; Pavlou, 2003; Salam et al., 2005; Palvia, 2009; Çelik & Yılmaz, 2011, Napitupulu & Kartavianus, 2014). Moreover, as Gefen et al. (2003) proposes that perceived ease of use is significantly affecting trust in e-commerce, because users are tend to trust already known web site designs, an additional hypothesis from perceived ease of use to trust is added to the study. The related hypotheses are as follows:

Hypothesis 1. Perceived ease of use is positively influencing the perceived usefulness of e-commerce.

Hypothesis 2. Perceived usefulness is positively influencing the intention of people to use e-commerce.

Hypothesis 3. Perceived ease of use is positively influencing the intention of people to use e-commerce.

Hypothesis 4. Perceived ease of use is positively influencing trust in e-commerce.

Hypothesis 5. Trust is positively influencing the intention of people to use e-commerce.

The complete picture of the proposed research model is shown in Figure 1.

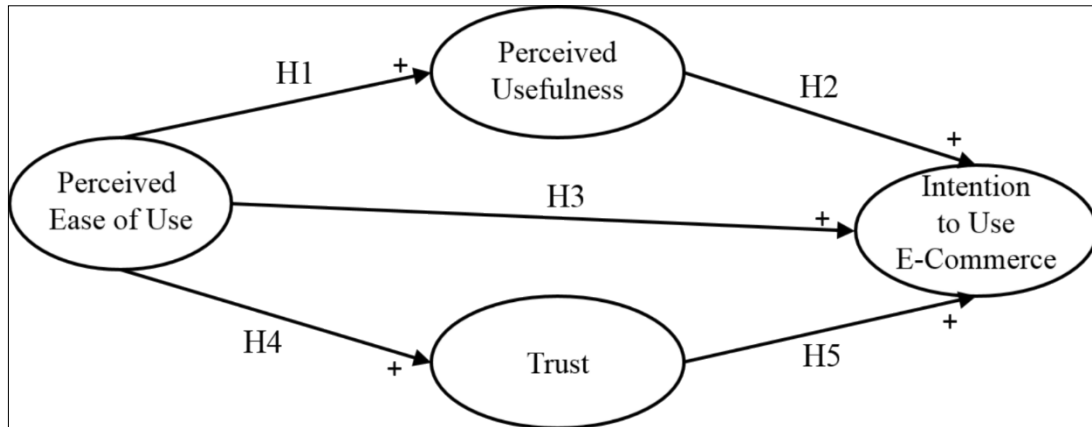


Figure 1. Proposed Research Model

Research Methodology

The methodology used in this study is the survey research. A questionnaire is prepared to collect data. Structural Equation Modeling (SEM) is used for measuring the effects of each factor, and verifying the research hypotheses. The questionnaire items are adapted from prior studies for measuring the proposed constructs. Primary data are collected with the help of an online survey tool.

The questionnaire is divided into two parts, namely A and B. Part B of the questionnaire contains questions about demographic profile of respondents such as: age, gender, educational background, and internet usage frequency. Part A of the questionnaire comprised 18 questions about the constructs within the theoretical framework of the study. Five questions for perceived ease of use, four for perceived usefulness, five for trust, and four for behavioral intentions to use an e-commerce site are asked to online respondents. For each sub-item, a 7-level Likert scale is implemented in the measurement device from “7-strongly agree” to “1-strongly disagree”. A pilot study is also conducted among graduate students from MIS faculty; these efforts are resulted in only minor modifications to the survey instrument.

Online survey link is shared on social platforms such as Facebook, LinkedIn and Twitter, additionally researchers are sent the link to technology companies and university platforms which they have access to. Convenience sampling is deployed in the study for obtaining those people that are most conveniently available for answering the questionnaire. The questionnaire is replied by 186 respondents. Hair, Black, Babin and Anderson (2010) indicates that it requires minimum 150 sample size with a research model including seven or less constructs, modest communalities, and no unidentified constructs for SEM technique.

SEM method requires a solid research design by assuring a reasonable sample size, continuously and normally distributed observed variables, and no missing data (Hair et al., 2014). Each topic is carefully examined by researchers in order to guarantee a valid research design. Our sample size is 186, which is suitable for models containing four factors. Each factor is measured at least with 3 items. All observed variables are continuously measured with 7-level

Likert scale. The skewness and curtosis of observed variables are checked that they got a value between ± 2 , and overall multivariate normality is assured by checking that the sum of skewness of all observed variables is less than 10. The online questionnaire is so designed that the respondents could not leave an unanswered question. This assures that data file does not include any missing data.

ANALYSIS AND RESULTS

SEM is a confirmatory technique as a generalisation of path models, principal component analysis and confirmatory factor analysis where several constructs are connected by causal links (Tenenhaus, 2008). In this study the two-step approach is applied. Researchers first examine the measurement model to test reliability and validity. Then they examine the structural model to test research hypotheses and model fitness.

Descriptive Statistics

The demographics of the respondents are analyzed and it is found that while 84% of the respondents are between 16 – 37 years old, there are 27 respondents who are elder than 38 years old. The research sample includes 109 female and 77 males. When the educational level is investigated, many respondents are either university graduate or have a master's degree. Moreover, 48 % uses the Internet more than 30 hours a week.

Confirmatory Factor Analysis (CFA)

This part of the study includes the results of CFA to test measurement model validity. The analysis is carried on using AMOS 21.0. Maximum likelihood estimation (MLE) procedure is chosen to do CFA.

The measurement model includes 18 items describing four latent constructs: perceived ease of use, perceived usefulness, trust and intention to use e-commerce. The initial test of the measurement model using CFA indicates that some construct revisions are needed. In this manner, indicators of perceived ease of use (PEOU2 and PEOU3), perceived usefulness (PU2), purchasing behavior (PB1) and trust (TR1 and TR2) whose loadings lower than 0.7, are deleted from the model in order to represent the constructs well and increase the goodness of fit indices of the measurement model. Therefore 12 items are retained. Table 1 shows the results of new CFA that includes 12 items. According to Table 1, all indicators are significant with 0.001 p-values. PU3 and TR5 have factor loadings 0.69 and 0.68 respectively. These values are very close to 0.70, for that reason they do not violate integrity of the constructs. Other 10 factor loadings are greater than 0.70.

Factor	Item	Factor Loading	Factor Loading Squared	Measurement Error	p-value
Perceived ease of use (PEOU)	PEOU1	0.87	0.76	0.24	
	PEOU4	0.83	0.69	0.31	0.001
	PEOU5	0.94	0.88	0.12	0.001
Perceived usefulness (PU)	PU1	0.72	0.52	0.48	0.001
	PU3	0.69	0.48	0.52	0.001
	PU4	0.91	0.83	0.17	
Trust (TR)	TR3	0.76	0.58	0.42	

	TR4	0.78	0.61	0.39	0.001
	TR5	0.68	0.46	0.54	0.001
Buying	BI2	0.71	0.50	0.50	0.001
Intentions	BI3	0.81	0.66	0.34	0.001
(BI)	BI4	0.89	0.79	0.21	

Table 1. Results of Confirmatory Factor Analysis

The test of the final measurement model demonstrates a good fit between the data and the proposed measurement model. All indicators are significant with 0.001 p-values, so they do not violate integrity of the constructs. The χ^2 for the measurement model is calculated to be 53.124 with 48 degrees of freedom (df). The CFA also resulted that the overall model fit indices were good shown in Table 2.

Fit Indices	χ^2	P Value	χ^2/df	GFI	AGFI	CFI	NFI	RMSEA
Recommended Value	<2df	0.05<p<1.0	<2	>0.95	>0.90	>0.95	>0.90	<0,05
Model Value	53.124	0.283	1.107	0.955	0.927	0.996	0.964	0.024

Table 2. The recommended and actual values of fit indices of measurement model

Construct Validity and Reliability

Validity and reliability are examined through confirmatory factor analysis. Validity includes convergent validity and discriminant validity. Convergent validity is the degree to which multiple attempts to measure the same concept in agreement. Convergent validity is assessed based on factor loading, construct reliabilities, and variances extracted. Table 3 lists the standardized item loadings, average variance extracted (AVE) and construct reliability (CR) values. Most item loadings are larger than 0.7 and t values indicated that all loadings are significant at 0.001. All AVEs are exceeding 0.5 and all CRs are exceeding 0.7. Thus the measurement scale has a good convergent validity (Bagozzi & Yi, 1988; Gefen, Straub, & Boudreau, 2000).

Factor	Item	Standardized Loading	AVE	CR
Perceived ease of use (PEOU)	PEOU1	0.865	0.77	0.93
	PEOU4	0.827		
	PEOU5	0.935		
Perceived usefulness (PU)	PU1	0.722	0.61	0.80
	PU3	0.694		
	PU4	0.913		
Trust (TR)	TR3	0.759	0.55	0.72
	TR4	0.775		
	TR5	0.677		
Buying Intentions (BI)	BI2	0.710	0.65	0.84
	BI3	0.808		
	BI4	0.894		

Table 3. Standardized Item Loadings, AVE and CR

Moreover, discriminant validity is the degree to which the measures of different concepts are distinct. To examine the discriminant validity, researchers compare the square root of AVE with factor correlation coefficients. The analysis results show that the correlations for each construct is less than the square root of AVE by the indicators measuring that construct, as shown in Table 4, indicating the measure has adequately discriminant validity (Fornell & Larcker, 1981; Gefen et al., 2000).

	PEOU	PU	TR	BI
PEOU	0.877			
PU	0.763	0.782		
TR	0.715	0.769	0.738	
BI	0.709	0.780	0.731	0.808

Table 4. Comparison of the square root of AVE with factor correlation coefficients

Reliability is to check the trustworthiness and un-biasedness of the empirical data. In another way, the reliability indicates the extent to which the variable or a set of variables are consistent in what they are intended to measure (Yu & Buahom, 2013). Construct reliability (CR) describes the adequateness of the items describing a construct. CR levels in Table 4, which are higher than 0.7 for each construct, indicate that the model is reliable (Hair et al., 2014).

Structural Model

Structural model validity consists of hypotheses testing. Hypothesis tests support all postulated paths except for one, H3. Therefore, the model is again modified by deleting the insignificant path from perceived ease of use to behavioral intention for e-commerce usage. The final model results indicate better model fit indices. The structural model suggested in this study is tested using the maximum likelihood method. The results show an acceptable fit of the proposed structural model with $\chi^2(49)=92.696$, $p=0.00$, $\chi^2/df= 1.892$, CFI=0.969, NFI=0.937, RMSEA=0.049. The hypotheses are interpreted according to results of this final model in the following subsections:

Hypothesis 1 explicates the association between perceived ease of use and perceived usefulness. Perceived usefulness of e-commerce is significantly influenced by its perceived ease of use ($\beta=0.80$, $p=0.000$). This hypothesis is thus supported and 63 percent of the variance in perceived usefulness is explained by this antecedent. Hypothesis 2 examines the impact of perceived usefulness on usage intension of e-commerce. Perceived usefulness has a significant impact on usage intention ($\beta=0.75$, $p=0.000$) supporting this hypothesis. Hypothesis 4 examines the impact of perceived ease of use on trust. Perceived ease of use has a significant impact on trust ($\beta =0.75$, $p=0.000$) supporting this hypothesis and 57 percent of the variance in trust is explained by perceived ease of use. Hypothesis 5 explicates the impact of trust on behavioral intention. Behavioral intention is significantly influenced by trust ($\beta=0.20$, $p=0.011$).

Finally, Table 5 shows the square multiple correlations (R^2) as well as the path coefficients including direct and indirect effects as a summary.

	Behavioral Intention to Use (BI)			Perceived Usefulness (PU)		Trust (TR)	
	Direct	Indirect	Total	Direct	Total	Direct	Total
PEOU		0.75	0.75	0.80	0.80	0.75	0.75
PU	0.75		0.75				
TR	0.20		0.20				
R²	0.78			0.63		0.57	

Table 5. Direct/Indirect Effects between the Constructs

CONCLUSION

This study explores factors influencing user adoption of e-commerce in Turkey. The study proposes trust, perceived usefulness, and perceived ease of use as critical elements of user adoption and tests the impact of these factors using a modification of the TAM.

This study confirms the robustness of TAM, explaining technology acceptance behavior for users within the context of e-commerce. Suggesting an extended TAM to which trust element is added, this study discovers that users' perceptions of usefulness and trust are predictive of their intentions towards usage of e-commerce. It is found that the role of trust is of high importance in the usage intention. A trusted e-commerce perception is built usually through security measures implemented on web sites. E-commerce companies could employ trust building mechanisms to manipulate e-commerce. Likewise, online customers value the company behind the e-commerce and the trustworthiness of products/services they buy as well.

Perceived usefulness (PU) is revealed as a determinant of user adoption in e-commerce among Turkish users. Digital-literacy of Turkish internet users is not mature enough to let them realize how internet and e-commerce could positively influence their daily life, business results, from a more broad perspective the future of the country (TÜSİAD, 2014). Supporting this, e-commerce managers could launch consciousness-raising campaigns for emphasizing the usefulness of e-commerce in means of time and money savings and easy reach of vast variety of products and services through e-commerce.

Furthermore, perceived ease of use (PEOU) does not directly affect the e-commerce usage intension; rather it imposes on user adoption through perceived usefulness (PU) and trust. According to Pikkarainen (2004), it is explained with the fact that as users learn about PEOU, its impact becomes instrumental and PEOU imposes on adoption through PU. Likewise, PEOU enhances the trust perception of users. PEOU is seen by users as a sign of investing in relationship for building trust. E-commerce managers could focus on deploying easy-to-use security methods, which strengthen both trust and PEOU perceptions of users.

Limitations in generalizing the results of this study are raised by convenience sampling method. A more dispersed e-commerce user sample in terms of education and age could be used in the future research. Moreover, replicating this study using different factors would contribute to extension of the research model. In addition, researchers are planning to implement the same research model into mobile commerce environment for exploring the effects of digital transformation to user adoption in e-commerce and compare the results of these two models.

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