Acceptance of Smartphones by Users in BiH Through Extended Technology Acceptance Model

[1] Ensar Mekić
[2] M. Kürşad Özlen

[1] International Burch University, Bosnia and Herzegovina
Faculty of Economics
E-mail: emekic@ibu.edu.ba
[2] Ishik University, Iraq
Business and Management Department
E-mail: kursadozlen@yahoo.com

Abstract.
The main objective of this research paper is to measure acceptance of Smartphones and empirically identify factors which are crucial influencers for Smartphone acceptance. Technology Acceptance Model (TAM) is extended by adding two additional variables, "Perceived enjoyment" (PE) and "Security and privacy" (SP). Survey has been prepared based on variables and measuring items retrieved from literature review, and one hundred and forty nine Smartphone users were surveyed. According to results, users of Bosnia and Herzegovina are slightly agreeable when it comes to all variables except security and privacy. This study is important insight not only for companies operating in market of Bosnia and Herzegovina when it comes to factors that influence people to use Smartphones, but also for mobile oriented companies outside of country with potential to enter Bosnian market. Limitations of this work are too general sample with no specific target group of people, and small sample size. Therefore, this work could serve as stimuli for new researchers to do similar research but with improved sample aspects.
Keywords: Smartphone; TAM; Bosnia and Herzegovina; Adoption

Introduction.
Importance of communication and maintaining the relationships within businesses resulted in extreme significance of mobile phones. Moreover, mobile phone is a device many consumers cannot seem to do without. They use mobile phone as a personal device to stay connected with friends and family and as an extension of their personality and individuality (Grant & O'Donohoe, 2007).

As technology continues to evolve, mobile phones are more and more developed. According to Ting et al (2011), the mobile phone has evolved from essentially an interpersonal communication device to a multimedia machine known as Smartphone (Ting, Lim, Patanmacia, Low, & Ker, 2011). According to Persaud and Azhar (2012), the current literature is more about mobile marketing practices using the classic mobile phone, with its very limited capability, compared to today's Smartphones, which have almost unlimited potential. Therefore, there is a gap in the literature when it comes to Smartphones.

In a rapidly changing environment, because of time scarcity, consumers need to use Smartphone at any time and any place (Genova, 2010). Smartphones provide users checking e-mails, communication on social networking web sites, and using online chat regardless of time and

place which create certain level of dependence on Smartphone (Hudson, 2010). Beside this, Smartphone has the capability to transform consumers' shopping experiences and the value of marketing since consumers can now easily and quickly shop across multiple channels (physical store, web-based, and mobile) with greater level of convenience, flexibility, efficiency, and personalization (Persaud & Azhar, 2012).

Also, the rapid growth of Smartphones has led to a renaissance for mobile services. Go-anywhere applications support a wide array of social, financial, and enterprise services for any user with a cellular data plan. Application markets such as Apple's App Store and Google's Android Market provide point and click access to hundreds of thousands of paid and free applications (Enck, Octeau, McDaniel, & Chaudhuri, 2011).

Bosnia and Herzegovina was in a war from 1992 to 1995, and it is still in process of development. Even though unemployment rate is still high, many customers of Bosnia and Herzegovina are not late when it comes to consumption of innovative technological devices such are Smartphones, tablets etc. Even though the mobile market is quite redefined, and it became quite difficult to buy simple mobile phone instead of Smartphone, there is still no empirical evidence about factors that stimulate users to use Smartphones in Bosnia and Herzegovina. Reason for conducting this study is the fact that there is shortage of literature about this issue in area of Bosnia and Herzegovina.

Therefore, this research is not only important for companies, retailers of mobile phones, licensed distributors and servicers of various mobile brands located in Bosnia and Herzegovina, but also outside of its boundaries, this paper will provide insights for potential new companies into Bosnian market of Smartphones in order to satisfy users. This work will empirically identify factors that influence users to use Smartphones which is important information for potential new entrants of Bosnian mobile market.

In order to conduct this research, extended model of Technology Acceptance Model (TAM) is going to be used. Smartphone users of different ages, genders, education levels and professions are targeted for conducting the survey which is prepared based on the variables retrieved from literature review. Descriptive analyses are employed and the results have been discussed. This work is suggested to be a potential stimulant for new researchers in both geographic and scientific area.

Main aim of this study can be defined as the identification of the strength of determined factors that influence the use of those devices. In the following section of paper, theoretical background provides all necessary definitions and other information which is important for better understanding of this study. After theoretical background, literature review has been prepared to present earlier research in this area. Fourth section provides the characteristics of data and respondents. The fifth part is dedicated for the results, and the article is completed with conclusion.

Theoretical Background
The term Smartphone can be defined as programmable mobile phone that offers advanced capabilities and features in order to enhance the performance of individuals by providing the services such as instant messaging, downloading applications, utilizing information services such as WiFi, global positioning system (GPS) and entertainment (Ting, Lim, Patanmacia, Low, & Ker, (Euromonitor, 2010a), 2011). The Smartphone is accepted to be one of the fundamental steps in the evolution of mobile marketing technology and practices because of its Bluetooth integration, location-based marketing, and other integrated technologies with web-based and physical store marketing (Persaud & Azhar, 2012). Today, there are three operating systems for Smartphones: Apple iOS, Android, Symbian, Windows Mobile etc.

Mobile phones have evolved from their roots as analog walkie-talkies to full-scale Internet-enabled computers (Dagon, Martin, & Starner, 2004). In 2004, mobile phone handsets were arguably the dominant computer form for consumer's purchase. These devices were powerful and sophisticated—many are even more powerful than desktop computers of the late 1990s. Mobile phones were also moving toward an "always on" form of networking (Dagon, Martin, & Starner, 2004).

The latest generations of Smartphones are more than miniature versions of personal computers by providing more services. Since the introduction of Apple's iOS1 and the Android operating systems, Smartphone sales have significantly increased. The introduction of market

places for apps (such as Apple's App Store, or Google's Google Play) has provided a strong economic driving force, and many applications have been developed for iOS and Android (Egele, Kruegel, Kirda, & Vigna, 2011).

According to Baron et al (2006), technology acceptance has become a central issue in IS research since the TAM was first introduced by Davis in 1989. They stated that over the following 15 years, the TAM has been tested, re-examined, refined and expanded in order to reflect the range of technological developments over that period (Baron, Patterson, & Harris, 2006).

Davis (1989) proposed the Technology Acceptance Model (TAM) in order to explain the adoption and use of information technology. According to TAM, perceived usefulness (PU) and perceived ease of use (PEOU) are the two key determinants of technology adoption. There are six components of Technology Acceptance Model proposed by Davis in 1989. Those components are as follows (Figure 1): Perceived Usefulness (PU); Perceived Ease of Use (POU); External Variables (EV); Attitude (A); Behavioral Intention (BI); Actual Behavior (AB).

According to Davis (1989), PU is the level up to which individual users expect that the adoption of a specific technology could enhance their job performance. On the other hand, he referred that PEOU is the degree to which individual users believed that using the considered technology would be simple to use. Additionally, both PU and PEOU influence the attitude of individuals towards the use of a specific technology, while attitude and PU influence the individual's behavioral intention (BI) to use the technology. PU is influenced by PEOU as well, because PEOU can indirectly influence the acceptance of technology through PU, while BI is also considered to have influence on subsequent adoption behavior (Davis, 1989).

Behavioral Intention (BI) refers to conscious plans in order or not to perform some specified future behavior (Warshaw & Davis, 1985).

External Variables (EV) are used to determine undefined externally controllable factors (Davis, 1989).

According to Davis, beliefs influence behavior only via their indirect influence on attitudes, and he found that attitudes do not fully mediate the impact of perceived usefulness and perceived ease of use on behavior (Davis, 1989).

Actual Behavior (AB) refers to final actions of user guided by behavioral intention. In other words, when it comes to technology acceptance model, actual behavior refers to usage, non-usage of particular technology, and ways of using it.
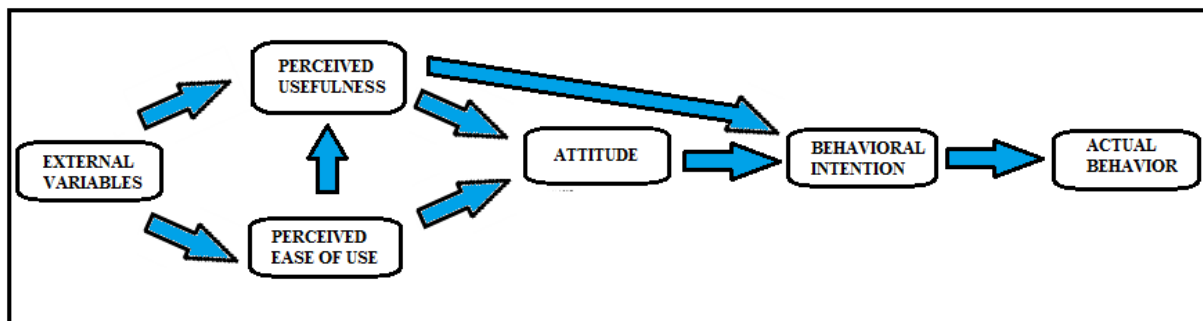

Figure 1 – Original TAM proposed by Davis

Later Davis (1993) defined TAM comprehensively as specification of causal relationships between system design features, perceived usefulness, perceived ease of use, attitude toward using, and actual usage behavior (Davis, 1993).

Many researchers modified and used TAM for their own research's characteristics. Accordingly, Chtourou and Souiden (2010) used the same model but by introducing new "fun" variable. Their study intended to examine the effect of the fun aspect on consumers' adoption of technological products (Chtourou & Souiden, 2010). The model they tested is presented in Figure 2.
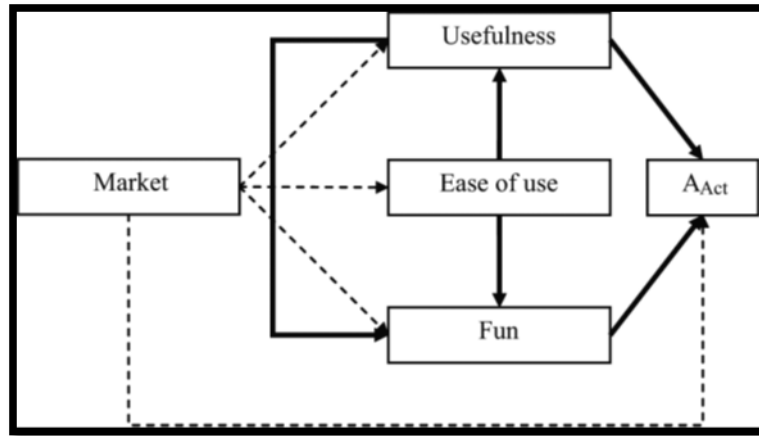
Figure 2 - Model tested by Mohamed Saber Chtourou and Nizar Souiden (2010)

They concluded that fun is an important antecedent of the attitude toward the act (use of mobile devices for surfing the internet). Additionally, fun was also found to mediate the effect of usefulness on attitude. Therefore, TAM model used in this research will have the construct "fun" as an important element in the adoption process.

TeroPikkarainen et al (2004) extended TAM by adding four additional elements and tested the acceptance of online banking (Pikkarainen, Pikkarainen, Karjaluoto, & Pahnila, 2004). Their model is presented in Figure 3.
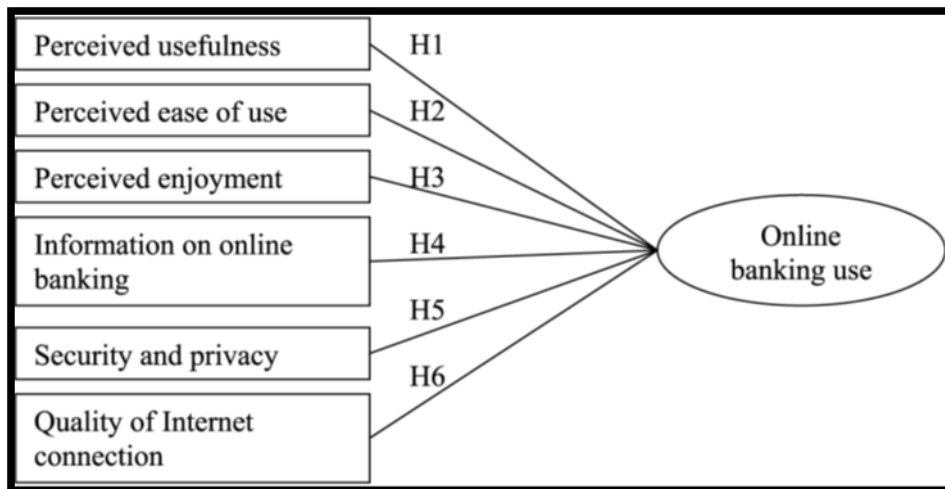

Figure 3 - Extended TAM by Tero Pikkarainen et al (2004)

They found that perceived usefulness and information on online banking on the Web site were the main factors influencing online-banking acceptance (Pikkarainen et al., 2004).

Since Smartphones are generally known as mobiles with interface that is more user-friendly compared to simple mobile phone, this research prefers inserting "Perceived enjoyment" as an important variable to extended TAM. Also, since authors perceive "Perceived enjoyment" as same as variable "fun", this study choses "Perceived Enjoyment" (Pikkarainen et al., 2004).

Beside this variable, in our extended TAM model, we decided to use variable "security and privacy" as well. Even though according to Pikkarainen et al (2004), this variable refers to security of online banking, Smartphones as powerful devices with ability to connect to internet are vulnerable.

Given the increased sophistication, features, and convenience of these smartphones, users increasingly rely on them to store and process personal information. For example, inside the

phone, it is possible to find phone call log with information about placed and received calls, an address book that connects to the user's friends or family members, browsing history about visited URLs, as well as cached emails and photos taken with the built-in camera. Since they are all private information, the safety of these data is the natural concern (Zhou, Zhang, Jiang, & Freeh, 2011).

All Smartphones have some level of risk. Generally, more time spent connected to internet, brings higher possibilities of risk for Smartphone users compared to simple phone users. Accordingly, "security and privacy" dimension is important to consider while measuring Smartphone acceptance and stimuli for doing it. In the end, after extending TAM through addition of the above variables, proposed model developed for this research is presented in Figure 4.
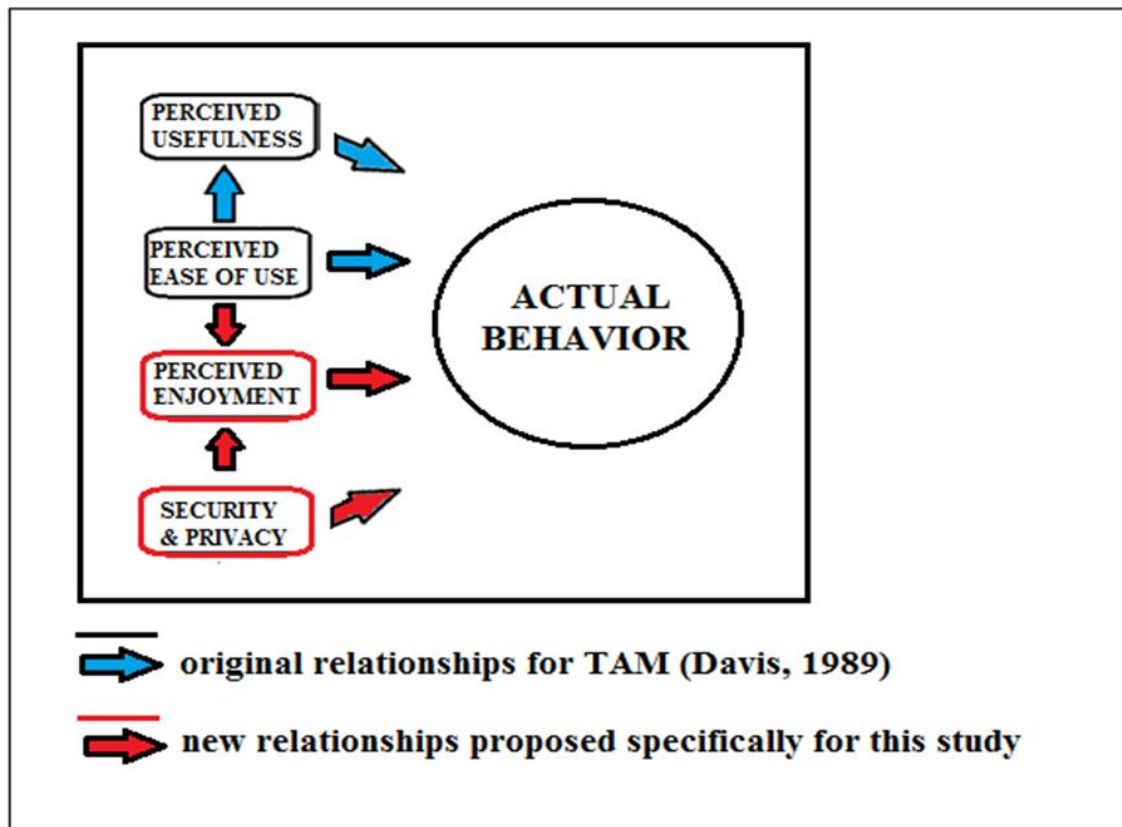

Figure 4 - Proposed Research Model

Literature Review

In order to support this research with appropriate literature review, fifteen relevant articles related to both, TAM and Smartphone issues have been carefully selected and reported in this section of the paper.

In 2007, Park and Chen aimed to investigate the effect of human motivation the adoption decision of Smartphones among medical doctors and nurses. Their study investigates Smartphone users' perception based on users' perceived adoption by evaluating their self-efficacy, technology acceptance model (TAM) and innovation attributes leading to an adoption attitude. Their results indicated that behavioral intention to use is largely influenced by PU and attitude toward using Smartphones. Also, authors found that PU and PEOU positively determine attitude toward using Smartphones (Park & Chen, 2007).

Mobile phones have historically provided limited and tightly controlled interfaces to third-party applications (Enck, Ongtang, & McDaniel, 2008; Badamas, 2001). Badamas (2001) expressed the need for security considerations by the users and their supervisors. Sensitive Company data are usually available on mobile computers. Therefore, serious consideration must be given to the security aspect of these mobile computers. Those mobile computers are nowadays called Smartphones (Badamas, 2001).

Dong-Her, Binshan, Hsiu-Sen, Ming-Hung (2008) paid more attention to security aspects of mobile phones. They aim to provide information about mobile viruses for end-users or organizations and recommend useful tips of how individuals can protect their mobile phones from the intrusion of mobile phone viruses. They investigated infection routes, threats, damage, and spreading ways of mobile phone viruses and provides available countermeasures, but also provided useful tips about mobile viruses, indicating what to do and how to do it (Dong-Her, Binshan, Hsiu-Sen, & Ming-Hung, 2008).

Zhou, Zhang, Jiang and Freeh (2011) searched about the protection of information for Smartphones and they found that mobile users are increasingly relying on Smartphones to store and handle personal information which increases the risk by Smartphone applications. Additionally, they argued that there is a need for new privacy modes in Smartphones (Zhou, Zhang, Jiang, & Freeh, 2011).

Also, it is important to mention that many authors found very interesting to research about ways in which users use their smartphones and therefore they considered factors regarding that. Accordingly, Wilburn Lane & Chris Manner (2011) conducted study that directly tests the effect of the "Big Five" personality traits on smartphone ownership and use. They found that extraverted individuals were more likely to own a smartphone. Extraverts reported a greater importance on the texting function of smartphones. Additionally, authors found that more agreeable individuals place greater importance on using the smartphone to make calls and less importance on texting(Lane & Manner, 2011).

Jae Hyun You, Jae Hak Lee &Cheol Park (2011) focused on factors influencing adoption and post-adoption of smart phone. They aimed to develop a comprehensive model for consumers' adoption of smart phone and their behaviors after adoption. When it comes to their results, authors found that relative advantage, aesthetics and social image are positively related to adoptive intention of smart phone. Second, adoptive intention of smart phone is positively related to adoption of smart phone. Adoption of smart phone is positively related to relationship investment, while relationship investment is positively related to switching cost and emotional attachment. Switching cost is positively related to continued adoptive intention. Emotionalattachment is positively related to switching cost and continued adoptive intention(You, Lee, & Park, 2011).

It is also interesting to mention case studiy regarding investigation into student interest in the use of personal technology such is smartphone to enhance their learning. Ben Woodcock, Andrew Middleton and Anne Nortcliffe (2012) conducted a study and found that students who own smartphones are largely unaware of their potential to support learning and, in general, do not install smartphone applications for that purpose. They are, however, interested in and open to the potential as they become familiar with the possibilities for a range of purposes. Authors propose that more consideration needs to be given to smartphones as platforms to support formal, informal and autonomous learner engagement(Woodcock, Middleton, & Nortcliffe, 2012).

As smartphones have different providers and they are based on different platforms, RutiGafni and Nitza Geri (2013) tried to answer the question do operating systems affect perceptions of smartphone advantages and drawbacks? Currently, the most prevailing operating systems are Apple's iOS and Google's Android. Accordingly, this empirical study investigated if users of iOS and Android differ in their perceptions of the advantages and disadvantages of smartphones. The main findings indicate that there were no important differences between the users of the two operating systems with regard to the general characteristics of the smartphone as a mobile device. Only small differences were found in the perceptions of comfortableness and complexity of the devices(Gafni & Geri, 2013).

When it comes to diversity in smartphones usage, group of authors researched this issue using detailed traces from 255 users. According to results of the study, there was huge diversity in smartphone usage, for instance, the average number of interactions per day varies from 10 to 200, and the average amount of data received per day varies from 1 to 1000 MB.Authors found that qualitative similarities exist among users that facilitate the task of learning user behavior. Also, authors demonstrated the value of adapting to user behavior in the context of a mechanism to predict future energy drain(Falaki et al., 2010).

Chtourou and Souiden (2010) considered the fun aspect of the product as a predictor of innovation adoption. Their study intended to examine the effect of the fun aspect on consumers' adoption of technological products. Authors tested three competing models, mainly derived from

the technology adoption model (TAM), in Canada and France in order to present two different maturity stages through a survey of 367 actual users of mobile devices.Their results show that fun is an important antecedent of the attitude (using mobile devices for surfing the internet). Furthermore, fun is found to mediate the effect of usefulness on attitude.

As various technological devices developed over time, many researchers tried to measure the adoption levels of those technological devices through TAM. Naturally, application of TAM in different areas of technology, and different types of users required some modifications. Therefore, scholars used extended or adjusted versions of TAM in their researches. In the following part of literature review, some of those works will be summarized.

Davis (1989) developed and validated new scales for two specific variables, perceived usefulness and perceived ease of use as the fundamental determinants of user acceptance in two six-item scales with reliabilities of .98 for usefulness and .94 for ease of use. According to Davis (1989), usefulness had a significantly greater correlation with usage behavior compared to ease of use.

Wang et al (2003) used TAM as a theoretical framework, and added "perceived credibility" as a new factor considering the user's security and privacy concerns in the acceptance of Internet banking. They examined the effect of computer self-efficacy on the intention to use Internet banking. Their results were supportive for extended TAM in predicting the intention of users to adopt Internet banking. The significant effect of computer self-efficacy on behavioral intention through perceived ease of use, perceived usefulness, and perceived credibility is also observed.

Pikkarainen et al (2004) conducted group interviews with banking professionals and used TAM literature and e-banking studies to develop their model which will indicate online banking acceptance among private banks in Finland. Their findings indicated that perceived usefulness and information on online banking on the Web site were the main factors influencing online-banking acceptance.

Yan, Gong and Thong (2006) applied TAM in a very specific area of SMS. They applied an information technology acceptance framework, which assumesthe effect of various external factors on a person's perceived usefulness, perceived ease of use, and subjective norms, leading to user acceptance of the SMS in telecommunications research.

Baron, Patterson and Harris (2006) critically examined the definitions of key constructs of the technology acceptance model (TAM) by highlighting the inadequacy of a concentration on simple acceptance of technology for a consumer community of practice. Furthermore, they suggested reviewing the definition of the key TAM constructs by evaluating the existence of counter-intuitive behaviors, technology paradoxes and intense social and emotional elements in actual text message usage.

Lee (2006) extended TAM to investigate the factors affecting the adoption of the e-learning system (ELS) in mandatory and voluntary settings. The results confirmed the findings of the original TAM.

Liao et al (2007) prepared their research model as an extension of TAM in order to identify factors influencing the usage of 3G mobile services in Taiwan. They collected data from 532 respondents and found that perceived usefulness, perceived ease of use and perceived enjoyment are positively related to attitude, and perceived enjoyment has a positive influence on perceived usefulness.

Sang, Lee and Lee (2009) aimed to examine the influencing factors of e-government adoption in Cambodia as one of the Association of Southeast Asian Nations (ASEAN) member states. Their comprehensive model of user adoption of e-government is improved by considering the technology acceptance model (TAM), the extended TAM (TAM2), the diffusion of innovations (DOI) theory, and trust to build an adoption. According to the results, the assumed relationships are supported for perceived usefulness, relative advantage, and trust.

Variables & survey

As a result of literature review, five variables are identified and positioned in the developed model including **Perceived usefulness (PU)**(useful mobile for employees), **Perceived Ease of Use (POU)**(having device that allows people to access their information and realize adequate communication in a simple and quick manner), **Perceived enjoyment (PE)**(In highly competitive market, needs of customers are increasingly satisfied), **Security and Privacy**

(SP)(for the private information users store in their Smartphones and the financial activities (money transactions) they do via Smartphones, the risk should be reduced), **Actual behavior (AB)**(the use of Smartphones).

Measurement Items

In order to develop survey questions, for PU, POU, PE, SP the work of Pikkarainen et al (2004) is used. While doing their research, the authors focused on factors which influence acceptance of online banking. For the last variable (AB), Egele et al. (2011) is considered since functions of Smartphones enumerated by authors served as good measuring items for developing appropriate questions used to measure variable AB (Table 1).

Table 1 –Used References for Survey Questions

Variables	References
Perceived Usefulness (PU)	Pikkarainen et al (2004)
Perceived Ease of Use (POU)	
Perceived Enjoyment (PE)	
Security and Privacy (SP)	
Actual Behavior (AB)	Egeleet al (2011)

The model & Hypothesizes

In Figure 4, the extended TAM through addition of mentioned variablesis presented. Proposed research model includes two new variables, "Perceived Enjoyment (PE)" and "Security and Privacy (SP)" beside TAM (Davis, 1989). After analyzing the proposed model, it is possible to conclude that SP influences both PE and Actual Behavior (AB), while PE influences AB, but also, at the same time is being influenced by SP and Perceived Ease of Use (PEU). Perceived Usefulness (PU) affects AB, while PEU at the same time influences PE, PU and AB.

Data & Methodology

Data for this study is collected by the means of a survey conducted in Bosnia and Herzegovina in 2013. A total of 200 questionnaire forms were delivered to respondents, and 149 of them were answered giving a response rate of 74.5%. Surveys were filled mainly at universities by students, academic and administrative staff. This resulted in a sample that was well distributed in terms of demographic information (e.g. age, and education). Seven point Likert scale was preferred in order to test the agreements of the respondents on six variables through thirty questions. The collected data is then inserted into an excel spreadsheet and analysed descriptively. The surveys were distributed both online and personally. Online version of survey was created, and its link was sent via e-mail to potential participants. In total, 67 surveys were filled in hard copy form, while 82 were completed online.

Results
Demographics

Demographics information includes respondents' department, positions within the department, education levels, gender and age. The survey is responded by 85 males and 64 females. When it comes to their education level, even 98 of them are students of undergraduate degree. Three surveyed participants have PhD, while 38 are masters of Science. Ten of participants wanted to stay anonymous when it comes to their educational background, and they selected option other with no explanation of what is their education level. The positions of the respondents were grouped according to their similar characteristics. It is possible to conclude that most of employed respondents are Academic Staff, Managers and Administration. Even 52% of surveyed respondents were students with no employment position.

Table 2 - Positions of the respondents

Academic Staff	14
Accounting	3
Administration	12
Engineer	6
Journalist	1
Lawyer	3
Manager	13
Students	77
Teacher	1
Blank	19
Total	149

From Table 3, it is easy to conclude that Perceived Usefulness of Smart phones is found to be important for consumers of Bosnia and Herzegovina, since the mean of 5,52 indicates that many consumers agreed with the statements.

Table 3 Perceived Usefulness (PU)

Variables & Questions	Mean	Std. Deviation
Perceived Usefulness (PU)	5,52	1,36
Using Smartphone enhances my effectiveness of utilizing communication & information services	5,57	1,30
Using Smartphone makes it easier for me to utilize communication & information services	5,74	1,32
Using Smartphone enables me to utilize communication & information services more quickly	5,63	1,42
Using Smartphone for my communication & information services increases my productivity	5,20	1,51
Using Smartphone improves my performance of utilizing communication & information services	5,22	1,38
Overall, Smartphone is useful for me to utilize communication & information services	5,75	1,23

When it comes to results regarding Perceived Ease of Use (POU), users were found to be agreeable that Smartphones are easy to use for them (Table 4).

Table 4 Perceived Ease of Use

Variables & Questions	Mean	Std. Deviation
Perceived Ease of Use (POU)	5,66	1,28
I find it easy to do what I want to do via Smartphone	5,59	1,31
Overall, I find Smartphone easy to use	5,58	1,33
My interaction with Smartphone is clear and understandable	5,74	1,20
Learning to use Smartphone is easy for me	5,85	1,22
It is easy for me to become skillful at using Smartphone	5,60	1,34
I find Smartphone to be flexible to interact with	5,63	1,29

According to the results of Perceived Enjoyment, since mean is 5,72, regarded as almost clear agreement with the statement, it is possible to conclude that users enjoy and are satisfied with pleasant usage of their Smartphone. (Table 5)

Table 5 Perceived Enjoyment

Variables & Questions	Mean	Std. Deviation
Perceived Enjoyment (PE)	5,72	1,40
Using an Smartphone is pleasant	5,65	1,43
Using an Smartphone is positive	5,78	1,36

When it comes to Security and Privacy of using Smartphones, Bosnian users are observed to be neutral (4.17) indicating that users do not perceive Smartphones as very trustable devices in terms of their ability to protect their privacy and security (Table 6).

Table 6 Security and Privacy

Variables & Questions	Mean	Std. Deviation
Security and Privacy (SP)	4,17	1,69
I trust in the technology Smartphone is using	4,66	1,71
I trust in the ability of Smartphone to protect my privacy	3,93	1,73
I trust in Smartphone	4,17	1,56
Using Smartphone is financially secure	4,17	1,64
I am not worried about the security of Smartphone	3,90	1,79

From Table 7, it is easy to conclude that generally users are using all functions offered by Smartphones. However, most of them are using Smartphones for multimedia purposes and accessing their e-mail and social media. Few users are using Smartphones for only essential mobile functions.

Table 7 Actual Behavior

Variables & Questions	Mean	Std. Deviation
Actual Behavior (AB)	5,20	1,67
I use my Smartphone only for essential mobile functions	4,06	1,87
I use my Smartphone to access e-mail and social media	5,62	1,58
I use my Smartphone for applications and games	5,20	1,84
I use my Smartphone for multimedia purposes (photos, videos, music...)	5,91	1,39

In Table 8, overall results are presented. According to the results, Smartphones users in Bosnia and Herzegovina are mostly slightly agreeable when it comes to statements about their acceptance of Smartphones.

Table 8 Overall Result

Variable	Mean	Std. Deviation
Perceived Usefulness (PU)	5,52	1,36
Perceived Ease of Use (POU)	5,66	1,28
Perceived Enjoyment (PE)	5,72	1,40
Security and Privacy (SP)	4,17	1,69
Actual Behavior (AB)	5,20	1,67
Overall Result	5,25	1,48

Discussion

Park and Chen (2007) searchedhuman motivations affecting an adoption decision for Smartphones among medical doctors and nurses and investigated Smartphone users' perception based on users' perceived adoption under the self-efficacy by employing technology acceptance model (TAM) and innovation attributes leading to an adoption attitude. Their results indicate that behavioral intention to use is largely influenced by perceived usefulness (PU) and attitude toward using Smartphone. According to this study related to users of B&H, maximization of PU, POU, PE and minimization of SP are main stimuli for behavioral intention. According to Encket al (2008), mobile phones have historically provided limited and tightly controlled interfaces to third-party applications. Our results show that users of Bosnia and Herzegovina are aware of mentioned problem. There is a need for security considerations of Mobile computer systems-Smartphones (Badamas, 2001). Accordingly, more attention needs to be paid to security issues of Smartphones usage in Bosnia and Herzegovina, especially in a case of companies' sensitive data. This can be innovative competitive advantage for companies dealing with Smartphones production and trade.

Conclusion

Even though Bosnia and Herzegovina is developing country, results of this research showed that Smartphone users of B&H are utilizing these devices in many aspects of their daily lives. Slight agreement regarding every variable except variable entitled "security and privacy" indicates that users are also aware that Smartphones are not able to protect their privacy against third parties always which says more about the level of using the Smartphones. Considering this result, it is possible to conclude that providing more security and privacy for consumers could be good motivational factor and stimuli for users of Bosnia and Herzegovina to decide among many Smartphone alternatives. In other words, it could be competitive advantage for Smartphone producers who are selling their products in B&H. Additionally, variable actual behavior provided insight about what aspects of Smartphones are mainly used by users in Bosnia and Herzegovina.

References

1. Badamas, M. A. (2001). Mobile computer systems–security considerations.Information management & computer security, 9(3), 134–136.
2. Baron, S., Patterson, A., & Harris, K. (2006). Beyond technology acceptance: understanding consumer practice. International Journal of Service Industry Management, 17(2), 111–135.
3. Barrera, D., Kayacık, H., Oorschot, P., &Somayaji, A. (2010).A Methodology for Empirical Analysis of Permission-Based Security Models and its Application to Android.ACM Conference on Computer and Communications Security. Chicago, Illinois: ACM.
4. Bugiel, S., Davi, L., Dmitrienko, A., Fischer, T., & Sadeghi, A. R. (2011). XManDroid: A New Android Evolution to Mitigate Privilege Escalation Attacks. Center for Advanced Security Research Darmstadt.
5. Chtourou, M. S., &Souiden, N. (2010).Rethinking the TAM model: time to consider fun. Journal of Consumer Marketing, 27(4), 336–344.
6. Dagon, D., Martin, T., &Starner, T. (2004). Mobile Phones as Computing Devices: The Viruses are Coming! Pervasive Computing, 11–15.

7. Davis, D. F. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. MIS Quarterly, 319-340.

8. Davis, D. F. (1992).Extrinsic and intrinsic motivation to use computers in the workplace. Journal of Applied Social Psychology, Vol.22, 1111-1132.

9. Davis, D. F. (1993). User acceptance of information technology: system characteristics, user perceptions and behavioral impacts. Academic Press Limited, 475-487.

10. Davis, D. F., Bagozzi P. R. &Warshaw, R. P. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. Management Science, 35(8), 982-1003.

11. Dong-Her, S., Binshan, L., Hsiu-Sen, C., & Ming-Hung, S. (2008). Security aspects of mobile phone virus: a critical survey. Industrial Management & Data Systems, 108(4), 478-494.

12. Egele, M., Kruegel, C., Kirda, E., & Vigna, G. (2011). PiOS: Detecting Privacy Leaks in iOS Applications. Proceedings of the ISOC Network and Distributed System Security Symposium (NDSS).

13. Enck, W., Gilbert, P., Chun, B. G., Cox, L. P., Jung, J., McDaniel, P., et al. (2010).TaintDroid: An Information-Flow Tracking System for Realtime Privacy Monitoring on Smartphones. Proceedings of the 9th USENIX Symposium on Operating Systems Design and Implementation (OSDI).

14. Enck, W., Octeau, D., McDaniel, P., &Chaudhuri, S. (2011). A Study of Android Application Security.Proceedings of the 20th USENIX Security Symposium.

15. Enck, W., Ongtang M., & McDaniel, P. (2008).Mitigating Android Software Misuse Before It Happens. Networking and Security Research Center The Pennsylvania State University.

16. Enck, W., Ongtang M., & McDaniel, P. (2008).Mitigating Android Software Misuse Before It Happens. Networking and Security Research Center The Pennsylvania State University.

17. Euromonitor (2010a). Smartphone: not just iphones, but a boomerang movement. Euromonitor International database (accessed 16 April 2010).

18. Falaki, H., Mahajan, R., Kandula, S., Lymberopoulos, D., Govindan, R., &Estrin, D. (2010).Diversity in smartphone usage.In Proceedings of the 8th international conference on Mobile systems, applications, and services (pp. 179–194). Retrieved from http://dl.acm.org/citation.cfm?id=1814453

19. Gafni, R., & Geri, N. (2013). Do Operating Systems Affect Perceptions of Smartphone Advantages and Drawbacks? Issues in Informing Science and Information Technology, 10. Retrieved from http://iisit.org/Vol10/IISITv10p175-184Gafni0099.pdf

20. Genova, G. L. (2010). The anywhere office = anywhere liability. Business Communication Quarterly, 73, 119-26.

21. Grant, I., &O'Donohoe, S. (2007). Why young consumers are not open to mobile marketing. International Journal of Advertising, 26(2), 223-46.

22. Hudson, A. (2010). Measuring the impact of cultural diversity on desired mobile reference services. Reference Research Review, 38(2), 1-13.

23. Lane, W., & Manner, C. (2011).The impact of personality traits on smartphone ownership and use.International Journal of Business and Social Science, 2(17), 22–28.

24. Lee, Y.-C. (2006). An empirical investigation into factors influencing the adoption of an e-learning system. Online Information Review, 30(5), 517–541.

25. Liao, C.-H., Tsou, C.-W., & Huang, M.-F.(2007). Factors influencing the usage of 3G mobile services in Taiwan. Online Information Review, 31(6), 759–774.

26. Park Yangil, Chen V. Jengchung (2007).Acceptance and adoption of the innovative use of Smartphone. Industrial Management & Data Systems, Vol. 107 No. 9, pp. 1349-1365.

27. Persaud, A., &Azhar, I. (2012).Innovative mobile marketing via Smartphones. Are consumers ready? Marketing Intelligence & Planning, 418-443.

28. Pfleeger, C. P., & Pfleeger, S. L. (2006). Security in computing (4th ed.). Prentice Hall.

29. Pikkarainen, T., Pikkarainen, K., Karjaluoto, H., &Pahnila, S. (2004). Consumer acceptance of online banking: an extension of the technology acceptance model. Internet Research, 14(3), 224–235.

30. Sang, S., Lee, J.-D., & Lee, J. (2009). E-government adoption in ASEAN: the case of Cambodia. Internet Research, 19(5), 517–534.

31. Ting, D. H., Lim, S. F., Patanmacia, T. S., Low, C. G., & Ker, G. C. (2011). Dependency on smartphone and the impact on purchase behavior. Young consumers, 12(3), 193-203.

32. Wang, Y.-S., Wang, Y.-M., Lin, H.-H., & Tang, T.-I. (2003). Determinants of user acceptance of Internetbanking: an empirical study. International Journal of Service Industry Management, 14(5).

33. Warshaw, P. R., & Davis, D. F. (1985).Disentangling Behavioral Intention and Behavioral Expectation. Journal of Experimental Social Psychology, 213-228.

34. Woodcock, B., Middleton, A., &Nortcliffe, A. (2012).Considering the Smartphone Learner: developing innovation to investigate the opportunities for students and their interest.Student Engagement and Experience Journal, 1(1).

35. Yan, X., Gong, M., & Thong, J. Y. L. (2006). Two tales of one service: user acceptance of short message service (SMS) in Hong Kong and China. info, 8(1), 16–28.

36. You, J. H., Lee, J. H., & Park, C. (2011).Factors Influencing Adoption and Post-Adoption of Smart Phone. Retrieved from http://www.ipcsit.com/vol9/20-B009.pdf

37. Zhou, Y., Zhang, X., Jiang, X., & Freeh, V. W. (2011).Taming Information-Stealing Smartphone Applications (on Android).Proceedings of the International Conference on Trust and Trustworthy Computing (TRUST).

Appendix.Survey

MEASURING ADOPTION OF SMARTPHONES AMONG USERS IN BiH THROUGH TECHNOLOGY ACCEPTANCE MODEL (TAM)

Dear respondent,

This is a survey related to the "**Measuring adoption of Smartphones among users in B&H through TAM**". Please fill the following survey honestly and carefully. Beside each question put mark X for one of the seven offered stages of agreement-Disagreement ratio. For each question leave just one mark. For any further information please contact emekic@ibu.edu.ba

Description of rating scales

#	Value	Meaning Assigned
1	**Strongly Disagree**	*You totally Disagree with the statement*
2	**Disagree**	*You believe that statement is not true to some extent*
3	**Slightly Disagree**	*You are partially Disagreed with the statement*
4	**Neutral**	*You are finding statement as not influential*
5	**Slightly agree**	*You are partially agreed with the statement*
6	**Agree**	*You believe that statement is true to some extent*
7	**Strongly agree**	*You are completely agreed with the statement*

Demographics	
Your department/unit	
Your current position/role in department/unit	
Education level	◯ Doctorate ◯ Master ◯ Undergraduate ◯ Other
Gender	◯ Male ◯ Female
Age	◯ ≤30 ◯ 31-40 ◯ 41-50 ◯ 51-60 ◯ ≥61

	Perceived Usefulness (PU)	Disagree Agree
1	Using Smartphone enhances my effectiveness of utilizing communication & information services	1 2 3 4 5 6 7
2	Using Smartphone makes it easier for me to utilize communication & information services	1 2 3 4 5 6 7

3	Using Smartphone enables me to utilize communication & information services more quickly	1 2 3 4 5 6 7
4	Using Smartphone for my communication & information services increases my productivity	1 2 3 4 5 6 7
5	Using Smartphone improves my performance of utilizing communication & information services	1 2 3 4 5 6 7
6	Overall, Smartphone is useful for me to utilize communication & information services	1 2 3 4 5 6 7

Perceived Ease of Use (POU)		**Disagree Agree**
1	I find it easy to do what I want to do via Smartphone	1 2 3 4 5 6 7
2	Overall, I find Smartphone easy to use	1 2 3 4 5 6 7
3	My interaction with Smartphone is clear and understandable	1 2 3 4 5 6 7
4	Learning to use Smartphone is easy for me	1 2 3 4 5 6 7
5	It is easy for me to become skillful at using Smartphone	1 2 3 4 5 6 7
6	I find Smartphone to be flexible to interact with	1 2 3 4 5 6 7

Perceived Enjoyment (PE)		**Disagree Agree**
1	Using Smartphone is pleasant	1 2 3 4 5 6 7
2	Using Smartphone bank is positive	1 2 3 4 5 6 7

Security and Privacy (SP)		**Disagree Agree**
1	I trust in the technology Smartphone is using	1 2 3 4 5 6 7
2	I trust in the ability of Smartphone to protect my privacy	1 2 3 4 5 6 7
3	I trust in Smartphone	1 2 3 4 5 6 7
4	Using Smartphone is financially secure	1 2 3 4 5 6 7
5	I am not worried about the security of Smartphone	1 2 3 4 5 6 7