Extended model of mobile shopping acceptance: An empirical study of consumer behaviour

Robert Stefko[1], Beata Gavurova[2], Maria Olearova[3], Radovan Bacik[4], Lubomir Nebesky[5]

[1] *University of Presov in Presov, Faculty of Management and Business, Department of Marketing and International Trade, Slovakia, ORCID: 0000-0002-0650-7780, robert.stefko@unipo.sk;*
[2] *Tomas Bata University in Zlín, Faculty of Management and Economics, Center for Applied Economic Research, Czech Republic, ORCID: 0000-0002-0606-879X, gavurova@utb.cz (corresponding author);*
[3] *University of Presov in Presov, Faculty of Management and Business, Department of Marketing and International Trade, Slovakia, ORCID: 0000-0001-9086-7975, maria.olearova@unipo.sk;*
[4] *University of Presov in Presov, Faculty of Management and Business, Department of Marketing and International Trade, Slovakia, ORCID: 0000-0002-5780-3838, radovan.bacik@unipo.sk;*
[5] *Ministry of Education, Science, Research and Sport of Slovak Republic, Slovakia, ORCID: 0000-0002-2148-7212, lubomir.nebesky@minedu.sk.*

Abstract: *Although the popularity of mobile commerce is on the rise, mobile shopping is still not widely accepted in Slovakia. Therefore, research and knowledge in this area is insufficient. Based on two research models which explain human behavior (theory of reasoned action) and how the user accepts new technologies (technology acceptance model), the presented study proposes and tests a conceptual model combining the mentioned models and new, stimulating factors (customized offers and price benefits) in order to design a holistic model for predicting consumer behavior with regard to the acceptance of mobile shopping. In the first step of the research, we used exploratory factor analysis (EFA) to extract the predicted factors and verify the validity and reliability of the research tool – a questionnaire. The main research was conducted on a sample of 627 students from Slovak universities (part-time study). Using the confirmatory factor analysis (CFA), we performed a measurement model evaluation, and then, using the structural equation modeling – partial least squares (SEM – PLS) method, we evaluated and quantified the expected effects of the investigated factors. These new, stimulating factors, integrated into the theoretical framework of existing models, have been shown to act as direct and indirect predictors of the intention to mobile shopping. However, perceived usefulness proved to be the strongest predictor. The intention to mobile shopping is also significantly influenced by the attitude to mobile shopping, which is also determined by the new factor customized offers. The results the research arrives at may be beneficial for businesses, as they may reduce the costs associated with the creation of mobile shopping channels from an economic point of view and may increase their market competitiveness.*

Keywords: *Technology acceptance model (TAM), theory of reasoned action (TRA), mobile shopping, mobile commerce, customer behaviour.*

JEL Classification: *M30, M31.*

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Introduction

Although mobile phones have been commercially available for three decades, in the last ten years the mobile devices market has shifted and focused on smartphones. Not only have smartphones revolutionized the way we use mobile devices, but also allowed businesses to communicate directly with customers regardless of location or time (Haghirian et al., 2005). Smartphones have become a central tool of computing and communication technology for the general public (Alwahaish & Snášel, 2013), as these are the most personal technological devices of today (Hennig-Thurau et al., 2010). The increasing availability and deployment of mobile technologies, which are an integral part of the industry, have created entirely new revenue opportunities for organizations and mobile commerce (m-commerce), which has generally been identified as a key driver of further computer technology (Hameed et al., 2010). Mobile technologies create many opportunities and new revenue streams for businesses. If these businesses want to keep up with the changing world, they need to understand the behavior of mobile phone users. Based on structural equation modelling, therefore, this research aims to find out what key factors influence consumers' intentions to make online purchases using mobile devices. The paper uses constructs of the technology acceptance model (Davis, 1989) and theory of reasoned action (Fishbein & Ajzen, 1975) as a basic theoretical framework, supplemented by customized offers and price benefits in order to design a holistic model for predicting consumer behavior when accepting mobile shopping.

The literature on m-commerce followed similar constructs in relation to the adoption of mobile marketing (Ünal et al., 2011), the use of mobile applications (Chung et al., 2016) and e-commerce (Yu et al., 2018), but so far these constructs have not been tested in the context of mobile shopping. This research therefore seeks to integrate new, stimulating factors into existing models in order to fill in the knowledge gap and, through an appropriate regression model, to explain the intent to shop via smartphone. In the first part of the paper, we present the theoretical framework of the researched problem as well as an overview of previous research studies, which form the basis of our assumptions. Subsequently, the research methods and the structure of the research sample are described. The next part of the paper presents the results of our study. Later, we discuss the main findings and present the resulting managerial implications. The final part of the paper outlines the limits of this study.

1. Theoretical background

The original models that have been proposed so far in connection with the adoption of mobile commerce are the theory of reasonable action – TRA (Fishbein & Ajzen, 1975), theory of planned behavior – TPB (Ajzen, 1991), the technological acceptance model – TAM (Davis, 1989), theory of diffuse innovation – DOI (Rogers, 2003) and the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003). Of these models, TAM is the most commonly used theoretical model with more than 44% of studies using it (Marriott & Williams, 2016). However, researchers who employ TAM have pointed out its limitations – the saturation point. Therefore, TAM is often supplemented by other factors to improve understanding of the issues in the field (Taylor & Levin, 2014).

This study relies on two research models that explain human behavior (theory of reasoned action) and the way users adopt new technologies (technology acceptance model). TRA was first presented by Fishbein and Ajzen (1975) and is based on the hypothesis that people act based on their own thoughts, attitudes and opinions of the surroundings, which in turn lead to a certain behavior. This behavior is controlled (the behavior depends only on the person) and is based on behavioral intention (BI), i.e., the probability that the consumer will take a certain action. The subject model is considered (in the literature on consumer behavior) to be the most widely used theoretical basis in the field of social science research (Zhang et al., 2013).

The TAM model was introduced by Davis (1989) and, although it was originally designed to model the adoption of information systems in the workplace, it has been used in other areas, too. Many experts see this model as a great tool for measuring the acceptance of e-commerce or mobile commerce (Belas et al., 2020a; Gefen et al., 2003; Rauniar et al., 2014). The author of this model has identified two specific dimensions that determine the intention to use (IU) – perceived usefulness and perceived ease of use. The intention to use new technologies

is the basic construct of this model, and Chew (2006) defined behavioral intent as the power of an individual's intention to perform a certain behavior. In the context of mobile shopping, this construct describes an individual's ability to perform online transactions through mobile devices and wireless connections (Yang, 2005).

Some studies (Sheeran et al., 2016) indicate that medium-to-large sized changes in intentions are associated with only small-to-medium sized changes in behavior. The study by Tao (2009) found no significant impact of behavior intention on actual use and only low correlations between intention and behavior. In addition, intentions rarely (if ever) explain all the variance in behavior (Conner & Norman. 2022). As it seems, correlational studies almost exclusively focus on behavioral intentions rather than customer behaviour. Experimental studies that manipulate intentions and observe effects on subsequent behavior similarly indicate less than perfect relationships (Conner & Norman, 2022). Previous studies reported in this article focus on predictors of mobile shopping intention rather than consumer behavior. For this reason, we only included the mobile shopping intention factor in the research model.

The factors such as customized offers and price discounts were included in the conceptual model as predictors to better explain consumers' purchase intention, as we assume that these factors are capable of improving the customer experience of mobile shopping. Furthermore, we believe that the improvement of the customer experience can positively influence the customer's attitude towards this type of shopping because personalization and money-saving provide customers with pleasure from the purchase and improve the relationship between the customer and the merchant.

1.1 Relationships assumed under the research

Fig. 1 shows authors' research model and expected relationships between the variables examined.

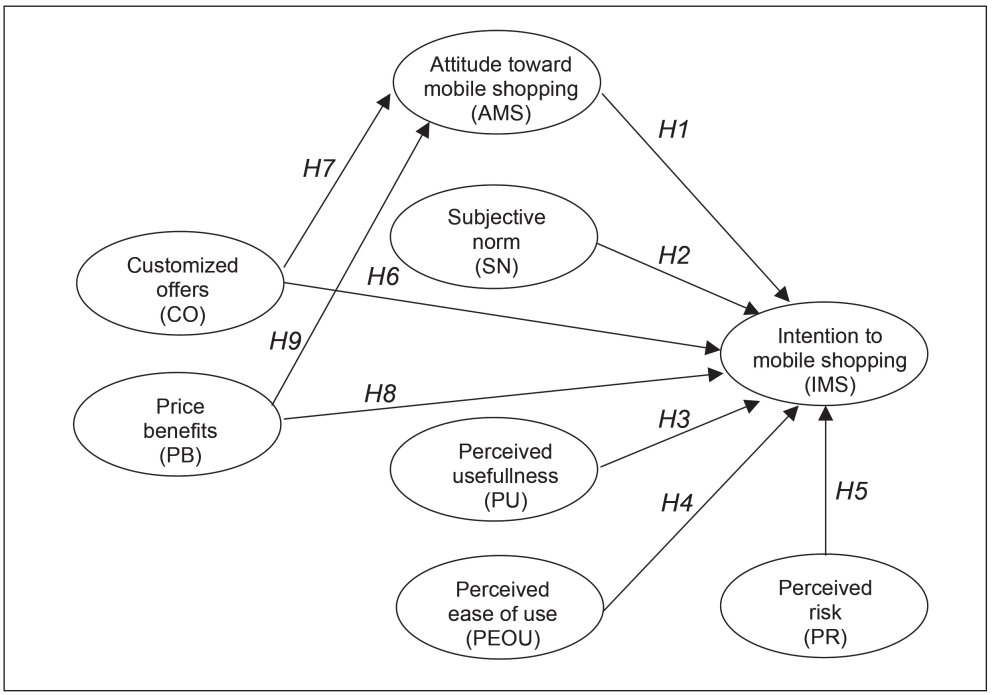

Fig. 1: Hypothesized research model

Source: own

Attitude toward m-shopping (AMS)

Huseynov and Yıldırım (2016) recently stated that the key variable influencing the intention to shop online is primarily the attitude of the consumer. Pavlou (2003) argues that an attitude influences a consumer to act in a certain way in order to obtain, dispose of and use a product or service. Attitudes towards online shopping via mobile phones are the extent to which consumers see this platform as a positive experience (Crespo & Del Bosque, 2010; Musova et al., 2021). Similarly, Chang et al. (2015) found that individual consumer attitudes toward mobile shopping technologies are positively related to their positive experiences, which in turn lead to favorable behavior. Based on the above, we establish the following hypothesis:

H1: We assume the attitude towards mobile shopping has a statistically significant positive impact on the intention to shop using a mobile phone.

Subjective norm (SN)

According to Chan and Lu (2004), subjective norms are other people's attitudes that determine what other people should do. Subjective norms can also be defined as perceived societal pressures or responses to specific behaviours (Nasco et al., 2008). Chen and Tung (2014) describe subjective norms as a certain pressure from society related to online shopping. Therefore, social influence has a suggestive effect on the intention to use mobile phones to shop online (Yang, 2012). This statement is also supported by the research of San-Martin et al. (2015), which states that users collect information from individuals or groups in order to internalize opinions. With regard to the above, we set the following hypothesis:

H2: We assume the subjective norm has a statistically significant positive impact on the intention to shop using a mobile phone.

Perceived usefulness (PU)

Perceived usefulness, according to Davis (1989), is the extent to which one believes that using the system will increase his performance. In the context of shopping, it is the extent to which the consumer believes that using a mobile device to purchase products will increase his performance (Moorty & Sann, 2014). Perceived usefulness rate refers to values such as convenience, price comparisons, wider supply or better availability of information (Jih & Lee, 2003). Therefore, perceived usefulness in the context of mobile shopping is associated with the ability to shop regardless of place and time (Metzker et al., 2021; Wu & Wang, 2006; Yang & Forney, 2013). The perceived usefulness construct was also researched in the field of m-commerce, where e.g., Jayasingh and Eze (2015), Kalinic and Marinkovic (2016), and Moorty and Sann (2014) confirmed that the perceived usefulness is positively related to the intention to behave in a certain way in relation to the use of mobile commerce. Hanafizadeh et al. (2014), Akturan and Tezcan (2012), and Sharma et al. (2017) found that perceived usefulness positively influences the adoption of mobile banking and Zarmpou et al. (2012) confirmed that perceived usefulness has a positive effect on the intention to behave in certain way in connection with the use of mobile services. Based on the above, we formulated the following hypothesis:

H3: We assume perceived usefulness has a statistically significant positive impact on the intention shop using a mobile phone.

Perceived ease of use (PEOU)

Perceived ease of use is the extent to which the consumer is convinced that the use of a particular technological system is effortless (Davis, 1989). In the context of mobile shopping, simplicity is perceived in combination with easy access to the Internet (Lu & Su, 2009), easy navigation of all mobile functions as well as functions provided by mobile shopping (Wong et al., 2012) and easy navigation on web pages (Groß, 2015). Many researchers, such as Kalinic and Marinkovic (2016), Moorty and Sann (2014), and Bhatti (2007) confirmed the significant impact of the perceived ease of use on the consumer's intention to adopt m-commerce, e.g., research by Zarmpou et al. (2012) supported a positive impact on the behavioural intent to use mobile services; Hanafizadeh et al. (2014) confirmed the effect of perceived simplicity on the adoption of m-banking. Based on the above, we state the following hypothesis:

H4: We assume that the perceived ease of use has a statistically significant positive impact on the intention to shop using a mobile phone.

Perceived risk (PR)

Li et al. (2007) define perceived risk as the consumer's perception of uncertainty and adverse consequences when engaging in activities.

According to Schiffman and Kanuk (2007), this is the uncertainty that online consumers face when they cannot predict the consequences of their purchasing decisions. Perceived risk has been identified as a negative determinant of consumers' intent to use m-commerce (Bauer et al., 2005; Belas et al., 2020b; Marakova et al., 2021). This statement is also supported by the research of Mizanur and Sloan (2017) and Marriott and Williams (2018). Based on the above, we state the following hypothesis:

H5: We assume that the perceived risk has a statistically significant negative impact on the intention to shop using a mobile phone.

Customized offers (CO)

Personalization or customization is referred to as individualization of the mobile user and customer service differentiation (Stafford et al., 2004). Personalization is also identified as a utilitarian benefit that results from the disclosure of personal information (Sun et al., 2016). Zhu and Chang (2016) emphasize that customizing and personalizing advertisements based on the customers' preferences, interests, and needs is one of the main advanced dimensions in social media advertisement to affect their intention to purchase the products. Personalization both enables customers to evaluate the advantage offered, features provided and their purchase intention (Blasco-Arcas et al., 2014). A study of Li and Liu (2017) indicating personalization linked with to increase more purchase intention. Based on the above, we state the following hypotheses:

H6: We assume customized offers have a statistically significant positive impact on the intention to shop using a mobile phone.

H7: We assume customized offers have a statistically significant positive impact on the attitude to shop using a mobile phone.

Price benefits (PB)

Cash rewards refer to cash or cash equivalents such as coupons, discounts, and gift certificates (Lee et al., 2013). The impact of price benefits has been examined mainly in the context of the adoption of mobile marketing, where it has been shown that financial incentives can significantly affect the consumer (Varshney, 2003). Another study confirms that incentives, such as vouchers and discounts, also increase people's intention to accept user-based ads (Richard & Meuli, 2013). Bluschke (2011) stated that the vision of saving money affects consumers' intention to buy clothes in the context of e-commerce significantly. Based on the above, we state the following hypotheses:

H8: We assume price benefits have a statistically significant effect on the intention to shop using a mobile phone.

H9: We assume price benefits have a statistically significant effect on the attitude to mobile shopping.

2. Research methodology

As the research combines the constructs of the TAM and TRA models into a theoretical model (also using new assumed constructs), the process of data collection took place in three steps. We used a questionnaire as a research tool for quantitative research. Respondents' subjective responses were measured using the 5-point Likert scale, where 1 = strongly agree and 5 = strongly disagree.

We measured each construct of each model reflexively using several items based on previous scientific studies to ensure their validity. The inclusion of items in research was subject to certain criteria. Factor loadings had to reach a value higher than 0.7. To make sure the research tool is reliable, the internal consistency of the tool was secured by using the Cronbach's alpha coefficient ($\alpha > 0.7$). Tab. 1 shows research variables and own results of factor loading.

The items were translated from English into Slovak (localization). The items were subsequently translated back into English to ensure the validity of these items. The first step of the research was a pretest performed on a sample of 18 respondents to ensure a correct understanding of the questionnaire items. To minimize bias in the answers, we emphasized that the research focused only on personal opinions – there were no right or wrong answers.

In the second step of the research, in the period November–December 2019, we carried out a preliminary research in order to obtain input data for the extraction of factors and validation of the research tool. The data file was made of a sample of $n = 276$ students of Slovak universities. In the third step of data collection, the main research was carried out in the period January–February 2020.

Tab. 1: Researched variables and factor loading (FL) – Part 1

Latent construct		FL	Manifest variables	Source
Perceived usefulness (PU)	PU1	0.583	Shopping via a mobile phone can improve my life.	Zhou (2013)
	PU2	0.596	I feel that shopping on a mobile phone is useful.	Zhou (2013)
	PU3	0.496	Mobile shopping can help me make better shopping decisions.	Manzano et al. (2008)
	PU4	0.561	Mobile shopping enhances the quality of my purchases.	Manzano et al. (2008)
	PU5	0.555	Shopping on mobile phone allows me to shop faster.	Groß (2015)
	PU6	0.450	Shopping on a mobile phone shortens the time I spend shopping.	Groß (2015)
Perceived ease of use (PEOU)	PEOU1	0.623	I think it would be easy for me to learn to shop using a mobile phone.	Manzano et al. (2008)
	PEOU2	0.788	I think shopping on a mobile phone would be easy.	Yang (2010)
	PEOU3	0.760	Mobile shopping is clear and understandable.	Groß (2015)
	PEOU4	0.668	Mobile shopping is intuitive and effortless.	Groß (2015)
	PEOU5	0.749	Overall, I think it is easy to shop on a mobile phone.	Groß (2015)
Subjective norm (SN)	SN1	0.655	I would shop on mobile because many of my friends also shop on mobile phones.	Yang and Forney (2013)
	SN2	0.861	People who are important to me think I should shop on a mobile phone.	Yang and Forney (2013)
	SN3	0.517	The mass media (e.g., television, radio, newspapers) influence my decision to shop on a mobile phone.	Kalinic and Marinkovic (2016)
	SN4	0.601	I would use mobile shopping more often if this service was used by people in my area.	Kalinic and Marinkovic (2016)
	SN5	0.312	Mobile shopping is a trend nowadays.	Kalinic and Marinkovic (2016)
Attitude toward mobile shopping (AMS)	AMS1	0.658	Mobile shopping is tempting.	Manzano et al. (2008)
	AMS2	0.564	Mobile shopping is fascinating.	Manzano et al. (2008)
	AMS3	0.492	Mobile shopping is interesting.	Manzano et al. (2008)
	AMS4	0.698	Mobile shopping is a good idea.	Manzano et al. (2008)
	AMS5	0.786	I like the idea of shopping through a mobile phone.	Phong et al. (2018)
	AMS6	0.382	Using a mobile phone for shopping is sensible.	Phong et al. (2018)

Tab. 1: Researched variables and factor loading (FL) – Part 2

Latent construct		FL	Manifest variables	Source
Perceived risk (PR)	PR1	−0.571	I do not feel safe providing my personal information when shopping on a mobile.	Marriott and Williams (2018)
	PR2	−0.750	When shopping on a mobile phone, there is a higher risk that I will receive a faulty or poor quality product.	Marriott and Williams (2018)
	PR3	−0.675	It is easy to make a mistake when shopping on a mobile phone.	Marriott and Williams (2018)
	PR4	−0.757	Using a mobile phone for shopping can be risky.	Marriott and Williams (2018)
Intention to mobile shopping (IMS)	IMS1	0.595	If I had the chance, I would shop on a mobile phone.	Yang and Forney (2013)
	IMS2	0.719	I intend to purchase products on a mobile phone.	Yang and Forney (2013)
	IMS3	0.724	I believe that my interest in mobile shopping will increase in the future.	Yang (2010)
	IMS4	0.491	I recommend mobile shopping to others as well.	Yang (2010)
	IMS5	0.644	In the future, I intend to shop more with my mobile phone than I do today.	Groß (2015)
Customized offers (CO)	CO1	0.367	I like relevant product information that is tailored to my personal interests.	Own processing
	CO2	0.713	If I receive relevant content that interests me (e.g., video, image, information) on my mobile phone, I would be happy.	
	CO3	0.544	I like product offers if they are relevant to my shopping preferences.	
	CO4	0.338	It is important to me that the merchant's offer is tailored to my personal needs.	
	CO5	0.696	I am interested in special offers tailored to my needs.	
	CO6	0.603	I would be pleased if the merchant showed interested in my needs when shopping.	
Price benefits (PB)	PB1	0.378	I would be happy if I could save money by shopping on my mobile phone.	Own processing
	PB2	0.503	I expect lower product prices in mobile shopping than in regular online shopping.	
	PB3	0.410	If I get a discount on products when shopping on mobile phone, it will increase my satisfaction with the purchase.	
	PB4	0.320	Mobile shopping is cost-effective.	
	PB5	0.466	The benefits (e.g., discounts, coupons, gift vouchers) that I can use in mobile shopping will make me happy.	
	PB6	0.651	I would shop using a mobile phone if product prices were lower.	
	PB7	0.714	I think I would shop using a cell phone if it was cost-effective for me.	

Source: own

2.1 Research sample

Most research studies are based on a sample of full-time students due to their willingness to participate (Groß, 2015; Yang, 2005). As there is no research mapping the behaviour of part-time students, we decided to fill this research gap and contribute with new research findings. In comparison with full-time students, the part-time students and more heterogenous in terms of their age, and are of different economic status, which brings a welcome diversity into consumer behaviour. The research sample consisted of part-time students of 17 public universities in Slovakia. Data on the total population of the target group in question were taken from the Annual reports on the state of higher education for 2018 (Ministry of Education, Science, Research and Sport of Slovak Republic, 2018).

To create a sample, we used a selection method based on availability and subsequent quota selection (Hendl, 2015), where the main classification features were gender and university. Each university was represented by a given number of students (Tab. 2). The total research sample consists of 63% women and 37% men, while the proportionality of the gender reflects the profile of part-time students of Slovak universities. The average age of the respondents was 30 years and the dominant part of the respondents are employees employed full-time. The research sample in terms of age structure reflects the profile of a mobile phone user in the EU (Eurostat, 2019). The sample size (n = 627 respondents) represents 4% of the base sample size (N = 15,674). The aim was to fill the quotas as per individual universities. Therefore, the staff of the individual universities were asked to distribute the questionnaires exclusively to part-time, regardless of the field of study. Tab. 2 shows the structure of

Tab. 2: Structure of the research sample according to the selected feature – university

	Name of university	Basic set (count)	Selection file (count)	Share (%)
1.	University of Economics in Bratislava	660	26	4.17
2.	Catholic University in Ružomberok	892	36	5.77
3.	University of Prešov in Prešov	1,443	58	9.29
4.	Slovak University of Agriculture in Nitra	1,009	40	6.41
5.	Slovak University of Technology in Bratislava	204	8	1.28
6.	Technical University in Košice	653	26	4.17
7.	Technical University in Zvolen	602	24	3.85
8.	Alexander Dubček University of Trenčín in Trenčín	466	19	3.04
9.	Trnava University in Trnava	1,262	51	8.01
10.	J. Selye University	360	14	2.24
11.	Comenius University in Bratislava	2,859	114	18.27
12.	Constantine the Philosopher University in Nitra	1,512	61	9.62
13.	Matej Bel University in Banská Bystrica	1,304	52	8.33
14.	Pavel Jozef Šafárik University in Košice	587	24	3.69
15.	University of St. Cyril and Methodius in Trnava	1,181	47	7.53
16.	University of Veterinary Medicine and Pharmacy in Košice	87	3	0.48
17.	University of Žilina in Žilina	593	24	3.85
Total		15,674	627	100.00

Source: own

the research sample according to the selected feature – university. Basic and sample data are shown, as well as the percentage of respondents representing the university.

Two screening questions were also included in the research tool: i) How often do you shop online using a PC/laptop?; and ii) How often do you shop online using a mobile device?

Based on the answers, only respondents who have experience with shopping using a mobile phone were included in the sample. Those who replied that they do not shop via mobile phone were excluded from the file (n = 109 respondents). According to the replies, it is evident that the frequency of online shopping via PC/laptop is higher than via mobile devices, which suggests that m-commerce in Slovakia is still in its infancy.

3. Research results

3.1 Validation of a research tool

In order to extract factors and validate the research tool, we used exploratory factor analysis (EFA), which was applied to a sample of data obtained from pre-research (n = 276). In principal component analysis (PCA), Varimax rotation was used to determine a factor load greater than 0.50 (Hair et al., 1998). The basic conditions for the use of EFA are an acceptable sample adequacy value assessed using Kaiser-Meyer-Olkin (KMO) (0.5–1), as well as an acceptable output of the Bartlett homogeneity test of variance (<3), and a significant value (<0.05). Our KMO output is equal to 0.92, which indicates that the adequacy of the sample is sufficient and based on the p-value we conclude that the variance of the tested samples is different from 0. There is no doubt about employing EFA, as both basic conditions for its use were met. The basic starting point for the application of factor analysis is the estimation of the number of factors. For this purpose, parallel analysis was carried out. The results are presented in the scree plot shown in Fig. 2. The aforementioned method considers 8 factors to be the most suitable number of extracted factors. These 8 factors explain approximately 66% of the variability, which is an acceptable value.

To ensure the significance of the factor loadings value, we identified the significant load factors based on the sample size. According to Hair et al. (2014), with a sample size greater than 250 observations (276 in our case), the factor loadings value can be considered significant if it is greater than 0.35. Items that show affiliation to another factor, as well as items that reach a value of less than 0.35, will be excluded and will not enter the further steps of the analysis. Therefore, only 35 out of the original 44 research instrument items will be subject to further analysis.

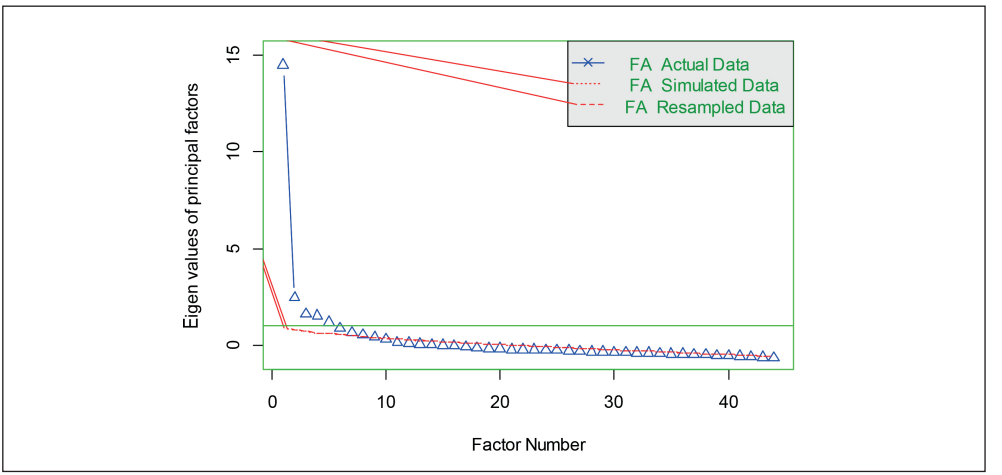

Fig. 2: Estimation of the number of factors – parallel analysis

Source: own

3.2 Measurement model evaluation

The outputs of this part of the analysis indicate the degree of suitability of the methods for the evaluation of the structural model. In the first step, confirmatory factor analysis (CFA) was performed using maximum likelihood estimation (MLE) (Schmitt, 2011). Taking into account the sample and the number of variables, the fit statistics of the measurement model showed outputs on the border of acceptability – CFI (0.90), TLI (0.91), RMSEA (0.06) and SRMR (0.05). Given that the *p*-value is lower than 0.05, we evaluate the model as statistically significant.

For CFA, the average variance extracted value [AVE > 0.5 (0.7)] and the composite reliability value [CR > 0.5 (0.7)] were calculated (Hair et al., 2014). These values were used to assess the suitability of latent variables. As shown in the Tab. 3, all CR values are higher than 0.7, which is an acceptable rate. However, the IMS and PB factor slightly exceed the upper limit of the optimal interval (0.9). Nevertheless, the factors can be accepted. If the AVE values exceed the limit of 0.5, this is an acceptable value. Ideally, the values should be higher than 0.7. However, as shown in the Tab. 3, and given the circumstances, we can consider both conditions acceptable.

Factor loadings [> 0.5 (0.7)] were calculated to assess manifest variables in CFA. The ideal factor loadings value should be higher than 0.7, the acceptable value is 0.5. Tab. 3 shows that in all cases (except CO_32, PR_23), the value is higher than 0.7. We consider the outputs to be acceptable and a factor structure suitable for the evaluation of the structural model.

Tab. 3: CFA indicators – Part 1

	Factor loadings	Cronbach's alpha	Composite reliability (CR)	Average variance extracted (AVE)
Perceived use (PU)				
PU_1	0.854	0.83	0.89	0.66
PU_2	0.825			
PU_3	0.787			
PU_4	0.778			
Perceived ease of use (PEOU)				
PEOU_7	0.730	0.85	0.90	0.64
PEOU_8	0.847			
PEOU_9	0.841			
PEOU_10	0.721			
PEOU_11	0.835			
Subjective norm (SN)				
SN_12	0.760	0.77	0.85	0.59
SN_13	0.810			
SN_14	0.742			
SN_15	0.766			
Attitude to mobile shopping (AMS)				
AMS_18	0.871	0.77	0.87	0.69
AMS_19	0.841			
AMS_22	0.769			

Tab. 3: CFA indicators – Part 2

	Factor loadings	Cronbach's alpha	Composite reliability (CR)	Average variance extracted (AVE)
Perceived risk (PR)				
PR_23	0.685	0.81	0.88	0.64
PR_24	0.784			
PR_25	0.844			
PR_26	0.873			
Intention to mobile shopping (IMS)				
IMS_27	0.827	0.89	0.92	0.69
IMS_28	0.840			
IMS_29	0.842			
IMS_30	0.835			
IMS_31	0.822			
Customized offers (CO)				
CO_32	0.659	0.83	0.88	0.60
CO_33	0.783			
CO_34	0.834			
CO_36	0.819			
CO_37	0.771			
Price benefits (PB)				
PB_38	0.785	0.88	0.91	0.68
PB_40	0.831			
PB_42	0.807			
PB_43	0.830			
PB_44	0.862			

Source: own

3.3 Evaluation of the structural model

Based on the outputs of previous analyses, we constructed a model using the method of structural equation modelling – partial least squares (SEM – PLS) in order to evaluate hypotheses and quantify relationships. The analyses hereunder made use of main research data (with 627 observations). The structural scheme of the model was defined by the principle of path weighting scheme (PW). Reliability, which we calculated using the DG rho method, is essential for the application of the mentioned model. The outputs do not show any value lower than 0.7. Therefore, we state that the condition of reliability was met. Because PLS is a predictive-oriented method, the measurement of the coefficient of determination (R^2) is the basic criterion for evaluating the structural model, as it represents the amount of explained deviation of the endogenous latent variable. Although there are no general data regarding high or low levels of R^2, Chin (1998) and Henseler et al. (2009) describe R^2 values up to 0.67 as strong, up to 0.33 as medium and up to 0.19 as weak. R^2 values were estimated using the bootstrap method. The average saturation of factors (average communality) is at the level of 0.65 and the average value of the coefficients

Tab. 4: Effects of beta coefficients on partial and overall effects

	Beta effect		Overall effect	
	Attitude to mobile shopping (AMS)	Intention to mobile shopping (IMS)	Attitude to mobile shopping (AMS)	Intention to mobile shopping (IMS)
Attitude to mobile shopping (AMS)	–	0.276	–	0.276
Subjective norm (SN)	–	0.149	–	0.149
Perceived use (PU)	–	0.288	–	0.288
Perceived ease of use (PEOU)	–	0.114	–	0.114
Perceived risk (PR)	–	−0.067	–	−0.067
Customized offers (CO)	0.308	0.048	0.308	0.133
Price benefits (PB)	0.253	0.149	0.253	0.219

Note: Trajectories of relationships that we do not assume in this study are marked as no value.

Source: own

of determination (R^2) is at the level of 0.44. It could be stated that the outputs are sufficient and acceptable. Tab. 4 presents the basic output of the quantification of the relationship trajectories that defined the hypotheses presented in the previous part of the paper. The first part of Tab. 4 presents the effects of the beta coefficient, and the second part presents the total effects of the beta coefficients, i.e., the sum of the coefficients along the trajectory. A coefficient greater than or equal to 0.1 is generally considered to be significant.

Tab. 5 shows the relationships of latent variables. Based on these, we were able to arrive at the outcomes of established hypotheses as well as the strength of individual trajectories (outlined in Tab. 5). Based on the above, it could be stated that at the alpha level of 0.05, only the trajectory under the *H6* hypothesis is not statistically significant. In this regard, we reject

Tab. 5: Hypothesis testing results and expected strength

Hypothesis	Path	Estimate	*t*-value	Bias	Std. error	Lower CI	Upper CI	Result
H1	AMS → IMS	0.2743	6.9796**	−0.00165	0.0393	0.1899	0.3563	Accepted
H2	SN → IMS	0.1497	5.0746**	0.00141	0.0295	0.0961	0.2106	Accepted
H3	PU → IMS	0.2889	7.6631**	−0.00251	0.0377	0.2139	0.3629	Accepted
H4	PEOU → IMS	0.1144	3.7386**	0.00074	0.0306	0.0558	0.1817	Accepted
H5	PR → IMS	−0.0676	−2.6932**	−0.00397	0.0251	−0.1232	−0.0253	Accepted
H6	CO → IMS	0.0479	1.4830+	0.00250	0.0323	−0.0153	0.1167	Rejected
H7	CO → AMS	0.3087	7.2126**	0.00278	0.0428	0.2218	0.3949	Accepted
H8	PB → IMS	0.1495	4.5579**	3.45E-05	0.0328	0.0840	0.2128	Accepted
H9	PB → AMS	0.2532	6.0000**	−0.00045	0.0422	0.1699	0.3321	Accepted

Note: Significance – $^{+}p < 0.1$, $^{*}p < 0.05$, $^{**}p < 0.01$; the results are based on the bootstrap re-sampling procedure with 5,000 samples; lower/upper CI – lower/upper confidence interval; *t*-value – measures the size of the difference relative to the variation in sample data; the greater the magnitude of *T*, the greater the evidence against the null hypothesis.

Source: own

the hypothesis *H6*. As shown in the Tab. 5, in all other cases, the basic hypotheses were accepted. According to the coefficient of determination (R^2), the explanatory power of AMS can be described as weak (0.24) and the strength of the latent variable IMS can be described as strong (0.65).

4. Discussion

Customized offers and price benefits, as new integrated factors, have a higher impact on the attitude towards mobile shopping than a on the intent to use mobile phone to shop online. In addition, it turned out that the intent to use mobile phone to shop online is not determined by customized offers. On the contrary, we recorded the most intense impact (0.309) on the trajectories of the customized offers and attitudes towards mobile shopping constructs.

The results of the analyzes presented above yielded interesting findings. Although the statistically significant effect of the customized offers on the mobile shopping intent has not been demonstrated, the trajectory between the mobile shopping attitude and the mobile shopping intent appears to be significant (0.274). Based on the results above, it could be stated that the intention to use mobile devices to buy products is determined by how the consumer perceives this way of shopping. The positive connection between attitudes and intention was also manifested to a very significant extent in the study by Groß (2015) carried out on a sample of 286 students from German university. Zhang et al. (2012) also pointed out the very high correlation between mobile shopping attitude and the mobile shopping intent. The authors (Hsiao et al., 2015) of a study conducted in Asian countries declare that the attitude towards mobile shopping plays an important role in respect to consumer behavior.

In the structural model of our study, perceived usefulness proved to be the strongest predictor of behavioral intent (0.289). It was found that if a consumer evaluates a mobile shopping platform as useful for making better purchasing decisions or improving the quality of their purchases, they are likely to use it. Our findings are also supported by the empirical results of Kalinic and Marinkovic (2016) and Rouibah et al. (2011). For example, the research by Hung et al. (2012) conducted on a sample of 244 university students in Taiwan concluded that perceived usefulness significantly influences students' intention to adopt mobile shopping. However, Zhang et al. (2012) and Manzano et al. (2008) came to a different conclusion. They stated that perceived usefulness does not increase users' intention to shop using mobile devices. He justifies this fact by saying that consumers will shop on mobile phones even if they do not experience any special useful benefits of mobile shopping.

It turned out that the easier the mobile shopping is for the consumer, the greater the interest in it. The reported effect reached strength of 0.11, so it appears to be a weaker predictor of intent, which is consistent with Wu and Wang (2006). The results of the study by Saprikis et al. (2018), however, did not show any significant effect of this construct on the mobile shopping intention. In contrast, Yang (2010) used the UTAUT model in a sample of 400 American consumers and found that the perceived ease of use is the strongest determinant of the intention to use mobile phone to shop online (Bigné et al., 2005).

Research hereunder showed that the impact the social norm has on the consumer intention is statistically significant (0.15). This testifies to the fact that family, acquaintances, friends and the environment have a positive impact on mobile shopping. The results correspond to the study by Ovčjak et al. (2015) and are also consistent with those of Nysveen et al. (2005), who indicated in a sample of 375 Norwegians that the normative pressure determines the user's intention to adopt services offered by mobile phones. The findings of our study are also supported by the results of Yang and Forney (2013), who conducted a study on a sample of 400 Texas consumers. According to our findings, the effect of the social norm on the intention to use mobile phone to shop online is weaker than the attitude to mobile shopping. This is in agreement with Armitage and Conner (2001).

Given the structural equations, the construct perceived risk proved to be a negative predictor of mobile shopping intent. However, the results suggest that the extent of this effect is not significant (−0.068), which contradicts some previous studies. For example, Natarajan et al. (2017), who conducted a study on a sample of 675 respondents in India claim that perceived risk plays a major role in person's decision to use mobile shopping applications (Yang, 2012). We relate with the findings by Marriott and Williams (2018) and Wong

et al. (2012), who also consider the overall risk as a negligible predictor of the intention to use mobile phone to shop online.

4.1 Managerial implications

The number of mobile Internet users is increasing rapidly, mainly due to the rapid technological progress. These technologies are slowly being integrated into all aspects of people's lives and significantly change the quality of life as such. The ubiquitous nature of mobile devices allows the field of m-commerce to improve the customer experience and at the same time contribute to the goals of sustainable development at all its levels – financial, social and environmental. Since digitization is a key aspect of sustainability, the m-commerce is what marketers should pay more attention to. M-commerce provides merchants with better consumer data, more effective communication, long-term customer loyalty and, last but not least, the status of an innovative and flexible company that follows the trends.

One of the predictors of the consumer's intention to shop via mobile devices is a positive attitude towards this type of shopping channel. However, merchants should take into account the fact that the value of mobile shopping does not lie in the service itself, but in the mobile shopping experience, which is advantageous for the consumer, especially from a cognitive point of view. It is important that merchants not only innovate, but also convince the customer that he will be given a strong, customer-oriented shopping experience.

Social media, along with mobile devices, can be described as supporting pillars in building a positive attitude towards mobile shopping. These platforms appear to be an irreplaceable source of consumer behavior influence even in the field of m-commerce.

According to the findings presented in the previous part of this study, the perceived usefulness factor is the strongest determinant of the mobile shopping intention. It is therefore essential that merchants are proactive in developing new mobile technologies and that they take full advantage of all the features and capabilities of mobile shopping platforms.

Purchase process simplicity is also a prerequisite for the mobile shopping intention. Reducing the steps necessary to complete the whole process to the bare minimum and especially the clarity of the shopping cart is what merchants should pay attention to.

One of the biggest uncertainties consumers feel about mobile shopping is the fear of providing sensitive information to third parties. The determinant of security means the creation of a set of all security measures, which include, among others, an information policy and a personal data protection policy. Merchants should provide customers with true information about the brand and guarantee compliance with personal data protection in accordance with applicable legislation.

Thanks to the intimacy and individuality of mobile devices, merchants are close to using these devices to provide relevant offers based on personal preferences, location and other very personal consumer data in real time. This means creating offers based on the specific habits of the individual, not on a broad algorithm. It is advisable to launch relevant offers in mobile applications based on GPS technology, or to send a message to the consumer based on his purchase history, the products sought or other habits and preferences.

Merchants should adapt their business strategies so that the consumer feels that shopping with a mobile phone is economically advantageous for him. Financial benefits can increase sales, support impulsive purchases, ensure a lower drop-out rate for online shopping carts, and last but not least, increase customer loyalty to the brand and mobile shopping.

Conclusions

Based on the results presented in the previous sections of this paper, it could be concluded that this study supports the existing theory of factors explaining consumer behavior in mobile shopping. It also follows that new, stimulating factors integrated into the theoretical framework of these models have proven to be direct as well as indirect predictors of the intention to use mobile phone to shop online.

Although this research aimed at presenting an overview of the factors that explain consumer behavior, there are certain limitations that point the way to further potential research. First, the sample is limited to people with a university degree. It is, therefore, possible to assume that more educated people are adopting new technologies faster and are more open to new shopping channels than those with a lower level of education. Another limitation is the disproportionate representation of respondents from a gender perspective. Therefore, the results

of this study cannot be generalized to the entire population of Slovakia. The results cannot be generalized to students around Europe or around the world either.

As the research sample was made up of respondents who use mobile phones to shop online, the further research may focus on consumers who do not have the given experience. This research could help us understand the reasons why the sample in question chose not to use a mobile device as a purchasing channel, and at the same time to explain the factors that are capable of changing this behavior. Variables related to monetary benefits could also enter into the conceptual model of the research. Specific forms of monetary rewards and their significance in relation to the intention of mobile shopping could also be addressed. It is also necessary to monitor the possibilities new technologies bring to further research the concept of models employed. By doing so, we will be able to explain the behavior of consumers in adopting new forms of shopping channels.

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