ORIGINAL ARTICLE

Using the UTAUT model to analyze user intention to accept electronic payment systems in Serbia

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Abstract

This study applies The Unified Theory of Acceptance and Use of Technology (UTAUT) to explain the acceptance of electronic payment systems in Serbia. We used extended model that incorporates several external variables, such as perceived security, trust, privacy, convertibility and financial costs, along with basic UTAUT predictors. The sample comprised of 457 respondents. We applied structural equation modelling to develop the model and draw conclusions. The results showed that performance expectancy, perceived security, trust and social influence had strong positive effects on behavioral intention. Conversely, we found behavioral intention, convertibility and financial costs to be significant drivers of user behavior. We consider the inclusion of convertibility in the model and proving its significance to be the main practical implications of our research, and also suggest to be considered as a factor in models designed for countries with low purchasing power of national currency.

Keywords UTAUT · Convertibility · Performance expectancy · Serbia · Electronic payment systems

JEL Classification M10 · M15 · M30 · M39

1 Introduction

The development of information and communication technology (ICT) has resulted in a number of business processes shifting to an electronic basis, creating the need to improve the payment process. Simultaneously, computerized payment systems have been created. The e-commerce process is realized through electronic payment systems (EPS), which enable automation and greater electronic payment security. In recent years, the Asia–Pacific region has seen the largest growth of EPS use

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worldwide, with growth rates of 11% recorded in 2017 and 2018 (Bansal et al. 2018). The electronic payment market in the European Union is at a mature stage, thus, the growth rate of EPS usage in 2018 was 7.9%, which was slightly below the world average, and it continued to decrease until 3.7% in 2020 (European central bank 2021). Growth rates of EPS use in the Republic of Serbia are extremely high. EPS are experiencing a delayed expansion relative to global trends. During the three-year period between 2016 and 2019, the number of online transactions increased exactly 7 times, while in the 2020 the number of transactions doubled (Narodna banka Srbije 2021). The factors that influence users' decisions regarding the use of EPS are a common subject of analysis. Users make decisions about using EPS based on the key features of the systems offered. Over the last three decades several models have been developed for analytical purposes, which researchers can further tailor to research needs.

The research subject of this paper is user attitudes towards the functional characteristics of the EPS they have used. Authors used The Unified Theory of Acceptance and Use of Technology (UTAUT) to determine the key drivers of user intentions to accept and use electronic payment systems. The survey conducted covered the general population in the Republic of Serbia and the main part of the research was undertaken via physical questionnaire distribution between the dates of 16th and 28th November 2019. The aim of the study is to identify the key drivers of behavioral intention and to determine its effects and the effects of the other variables included, on user behavior.

The paper is structured as follows: the first section provides the theoretical background to the research through the analysis of acceptance of electronic payments problem and the introduction of the UTAUT model; section two outlines a new research model as an extension to the basic UTAUT, with a focus on additional variables, as well as presenting the research hypotheses; section three introduces structural equation modelling as the key analytical tool for obtaining results and the demographic structure of the research is also presented; in the fourth section the results of the research are presented for both the measurement model and the structural model; and in the final section, the main implications of the results, research limitations and suggestions are discussed.

2 Theoretical background

Very high growth rates of electronic payments in Serbia are primarily due to very low starting points. Although the number of online transactions has increased more than 14 times in four years, the average is still very low at around 2 transactions per capita. Both indicators are a consequence of the delays of the electronic payments market in Serbia in the light of world trends. At the end of the second decade of the twenty-first century, electronic payments in Serbia are at the similar point where the payment card market in developed countries was half a century earlier (Vuksanović 2009). A smaller group of users tends to use electronic payments frequently, while most users show resistance to adopting this type of service. While the COVID-19

pandemic may have a stimulating effect on users to adopt electronic payments faster, a number of factors are slowing down their adoption.

A significant number of users do not give value the performances of electronic payments because they are not interested in e-commerce. Excessive effort to learn the proper usage can be important aggravating factor, because similarly to many other countries, information literacy of the elderly population in Serbia is quite limited on average (Wang and Yi 2012). Related to the lack of understanding of use, there is a subjective fear of high usage costs (Bolt et al. 2018). In situation where there is a free alternative, users in Serbia have a particularly pronounced aversion towards services that are charged extra. An important factor for the adoption rate of new technological achievements is the impact the environment creates on the user (Karsen et al. 2019). If an innovation is used exclusively by a small circle of users, non-users remain outside its influence. Therefore, they do not have the social pressure to start using it themselves, nor do they have anyone in their own circle to turn to in case of misunderstanding. Finally, the problem of financial data privacy is globally relevant in the context of raising awareness about the present abuses (Pešterac and Tomić 2020).

The adoption of electronic payments is a process that does not take place without obstacles and slowdowns. This claim is confirmed by the research conducted by Kabir et al. (2015). Using the Google Scholar service and based on key words, the authors found a total of 188 academic papers dealing with the problem of adopting electronic payments, of which 51 were empirical researches. Among them, UTAUT was identified as the dominant research model. The strength of the UTAUT model is that in its basic form it includes most of the listed factors that can occur as obstacles of the electronic payments adoption: performance expectancy, effort expectancy and social influence. The basic model can also be easily supplemented by additional factors.

The researches that inspired this paper were conducted by Gholami et al. (2010), Kim et al. (2010), Venkatesh et al. (2012), Thomas et al. (2013), Martins et al. (2014), Oliveira et al. (2016), Tahrini et al. (2016), Cao and Niu (2019), Savić and Pešterac (2019), Sivathanu (2019), Gunawan et al. (2019), Patil et al. (2020) and Tusyanah et al. (2021). All of them have in common the use of the UTAUT model for explanation the adoption of electronic payments in the developing countries, i.e. those markets that, like Serbian one, show high growth rates with low starting bases.

Venkatesh et al. (2003) formulated the Unified Theory of Acceptance and Use of Technology (UTAUT) as an extensive theory designed to include the technology acceptance model (TAM), the theory of reasoned action (TRA), the theory of planned behavior (TPB), the diffusion of innovation theory, socio-cognitive theory, the motivation model and the model of personal computer utilization (MPCU). The basic form of the model is shown in Fig. 1. The UTAUT model is based on four constructs – performance expectancy, effort expectancy, social influence and facilitating condition. Performance expectancy refers to the level at which individuals expect the implementation of technological solutions will improve their business results. Effort expectancy relates to the ease of use of the innovative solution. Social influence represents the degrees to which individuals believe those in their social environment expect them to use an innovative technological solution. Facilitating
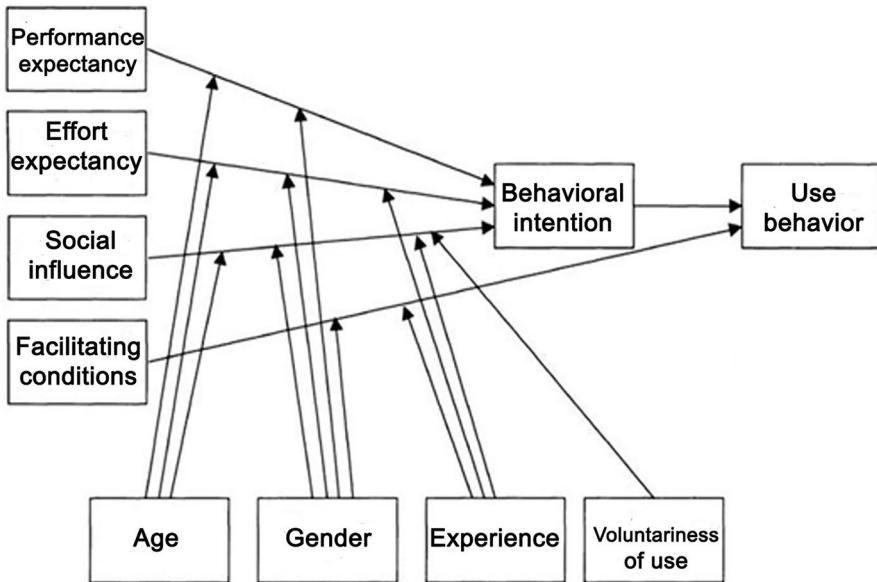
Fig. 1 Basic form of the UTAUT model. Source: Venkatesh et al. (2003)

condition relates to the existence of organizational and technical infrastructure to facilitate the use of new technology.

The key difference between the UTAUT model and the other models is that the UTAUT model incorporates four moderating variables: gender, age, experience and voluntariness of use. Therefore, the research does not only determine the attitudes of the respondents towards the observed characteristics, but it is also adapted to identify the differences in the attitudes of individual groups determined by the moderators. However, this model has often been criticized as too complicated for research (Bagozzi 2007).

3 Adoption factors for electronic payment systems

Performance expectancy (PEX) is one of the original variables of the UTAUT model. It relates to the user's feeling that the use of new technology will increase performance. A rational user takes usefulness into consideration – the potential positive effects of using a new ICT solution. In this case, it is important for the user to estimate whether adopting a particular technological solution will assist in the more efficient performance of their role. Of course, the higher the estimated usefulness, the higher the chances the user will opt to use it.

The greater the applicability of the EPS – those that can be used with multiple merchants or that make payments faster – will be found more useful by users. Perceived usefulness has been found to have a major positive effect on the intention to

use different ICT products, such as mobile phone entertainment content (Lee et al. 2012), mobile credit cards (Chang 2014), mobile payments (Lee et al. 2016) and eGovernment services (Hamid et al. 2016). High payment performance expectancy using NFC technology is a result of quicker payment speed and the ability to use a mobile channel not only to pay, but to collect bonus points, use loyalty programs and store electronic coupons or passes (Chen and Chang 2011). This is especially useful for quick payments, such as dining at restaurants, movie theaters or paying at a gas station.

Performance expectancy often has the most pronounced effect of all observed variables. Hence, the following hypothesis is proposed:

> H1: Performance expectancy significantly influences user behavioral intention to use EPS.

Effort expectancy (EEX) is one of the original variables of the UTAUT model. It is defined as the subjective feeling about the difficulties in using a new technological solution. Efforts can be made when learning how to use it, when using the new technology itself, or when understanding the effects of using it. This subjective attitude is of particular importance in the adoption of ICT products. The simpler the information system is to use, the higher the technology acceptance rate. Users find that they are less likely to make a mistake when they have a good understanding of how technology works and of course, they would rather choose a service that they fully understand.

Some studies highlight the considerable importance of effort expectancy on ICT products. Effort expectancy has a significant impact on the intention to use GPS devices (Sun et al. 2013), e-commerce (Ghalandari 2012; Alshehri et al. 2012) and mobile payments (Wang and Yi 2012). Lower effort expectancy, or greater ease of use, bring more significant user intent and a higher actual use of EPS. Therefore, the following hypothesis is proposed:

> H2: Effort expectancy significantly affects user behavioral intention to use EPS.

Perceived security (PES) is one of the key factors in the usage of all financial management systems. All parties in the transaction process are interested in security – customers want their money to reach merchants, merchants want customers to pay so that the transfer is irrevocable and intermediaries – including banks and third-party institutions – want as few complaints and refunds as possible. In addition to objective security, which depends on the investments made in technical protection mechanisms, perceived security plays a very important role in the adoption of EPS. Customers do not always perceive security according to the technical solutions which are implemented, but their perception depends on subjective attitudes. Security elements when paying, such as a guaranteed refund in the case of an issue, have a greater positive impact on the likelihood of a customer choosing to send money online than merely

cryptographic techniques. Security is often in conflict with other features, such as anonymity and privacy, because the ability to cancel a transaction involves monitoring participants.

Perceived security is not a fundamental variable of the UTAUT model, but it is likely to have a significant impact on user adoption. A number of papers which incorporate security into the model confirm this assumption, including studies by Teoh et al. (2013), Oney et al. (2017) and Liebana-Cabanillas et al. (2018). Kim et al. (2010) split security into two components: technical protection (objective security) and security statements (perceived security). The following hypothesis is proposed concerning the influence of perceived security:

H3: Perceived security significantly influences user behavioral intention to use EPS.

Trust (TRS) is an important factor in making decisions about using EPS. One of the definitions of trust refers to the belief in the accuracy and truthfulness of the views and characteristics expressed by the other party. Customers trust a company if they value its integrity and competencies. In order to trust the products in the class of information systems, users must be convinced that the systems operate in accordance with predetermined principles, that they are always accessible and that data is not altered during transmission. Trust in EPS is even more difficult to achieve because, in addition to system integrity and accessibility, it is also dependent on the subjective sense of the system's financial security (Pavlou 2003). If the system is often inaccessible, subject to frequent changes in service prices and usage rules, or causes disputes frequently, users will not trust it. It can be concluded that trust is the most unstable of all the above characteristics, as it is easily subject to change in estimation.

Trust has been included in several of studies, including Tai and Liu (2015), Kalinić and Marinković (2016), Marinković and Kalinić (2017), Liebana-Cabanillas et al. (2017) and Oney et al. (2017). The following hypothesis is proposed:

H4: Trust significantly affects user behavioral intention to use EPS.

An important factor in EPS acceptance is *social influence* (SOI) – the influence of the community on the user. It is a highly subjective factor concerned with the feeling that the community wants the user to adopt a specific behavioral pattern. This sociological and psychological phenomenon has often been studied and its manifestations go beyond the use of ICT products and EPS. Users feel compelled to start using a particular service or product based on the fact that most other people in their environment use it. It may result in a feeling of pressure or obligation to follow certain behavior (for example, if most people known to a person use instant messaging services, it is likely to lead to a user using them for communication) or to use a particular product. In addition to the immediate environment or the general community, the user can adopt behavior from individuals whose opinion they consider important, such as family members or close friends. Singh et al. (2010) proved that

the environment is of great importance for the adoption of mobile banking services, emphasizing that mobile phone users are not only users of new technology but of a new social system. Tahrini et al. (2016) showed that the social environment strongly influences user intentions to use internet banking services. Celik (2016) studied the factors that affect e-commerce and discovered that the social component has a statistically significant and the single largest influence on intention to use. In line with this, the following hypothesis is proposed:

H5: Social influence significantly affects user behavioral intention to use EPS.

Privacy (PRV) is a request to prevent the misuse of data by parties involved in a transaction. The information may be used for bookkeeping purposes and as evidence, but third parties should not have access to it. Regulations prevent banks and payment processors from selling or transferring any data collected to a third party and personalizing data in order to provide additional services. Certain systems prevent the payee, or the merchant, from accessing the payment method for the transaction by providing *proxy numbers* instead of actual card numbers. Yet, many EPS enter into usage agreement provisions that allow them to manage any data collected more freely.

Pousttchi and Wiedemann (2013) cited an example of the privacy variable, in the form of *perceived confidentiality*. They regard this variable as subjective and define it as the user's attitude to the confidentiality of the data they share with the merchant and payment intermediary. Martins et al. (2014) used the risk of privacy loss as a component of estimated risk, concluding that it has a strong impact. The following hypothesis is therefore proposed:

H6: Privacy significantly affects the user behavior.

Convertibility (CON) could also affect a user's preference for using EPS. It concerns the user's willingness to perform cross-currency transactions. Unlike the previous features, which were generally applicable to ICT, convertibility is directly applicable to payment systems. Satisfaction with convertibility criteria enables the global use of EPS, meaning it is not restrictively tied to a single national economy or currency. Most modern systems satisfy this characteristic, but the way in which currency transactions are performed is different. The fewer official currencies a system uses, the higher the percentage of payments that will require currency conversion – it will be necessary for the buyer to purchase the currency in which the goods are offered for sale. This can create additional hidden costs. Electronic money systems do not have these problems – once purchased, electronic money is acceptable in the same form by all merchants using the system, although recently the issue of the convertibility of different cryptocurrencies has been raised.

It is unknown to the authors if previous studies have considered this variable. Motivation for its introduction is the unofficial "*euroization*" of the Serbian economy. The informal practice of presenting the prices of a large range of products in

euro has exposed domestic customers to this currency. Therefore, it is reasonable to assume that the ability to convert currencies at payment would be a desirable feature. As a result, the following hypothesis is proposed:

H7: Convertibility significantly affects user behavior.

Financial costs (FC) have a major impact on final customer attitudes about a product. The financial cost of innovation is important, especially when it comes to implementing a new payment method. By lowering these costs, customers will be more prepared to adopt new solutions. SMS messages prove this assertion as the low cost of texting was the key reason for the adoption and acceptance of the behavior by a large number of consumers. In the EPS context, financial cost refers to costs such as payment for access to a particular system (if any), subscription (if any), collection of service fees and conversion costs. The amount of costs incurred from using EPS determines whether users will accept them, as it is understood that they are more likely to accept them if the benefits outweigh the costs they generate. A greater amount of costs can, therefore, have a negative impact on behavioral intention. This is especially evident with low-income populations, as their basic needs, food and housing, can be realized without significant use of information and communication technology.

Jeong and Yoon (2013) used *perceived financial costs* in their studies, introducing the variable into a modified TAM model – a step which was then mirrored by Bhatiasevi (2015) and Oliveira et al. (2016) – assuming its negative effect on mobile banking services. Considering the ever-present costs of using technological advancements, Wu and Wang (2005), as well as Kuo and Yen (2009) concluded that expected costs may diminish an individual's willingness to use technology. In line with these assumptions, the following hypothesis is proposed:

H8: Financial costs significantly affect user behavior

Behavioral intention (BI) is considered a variable that has a decisive effect on *use behavior* (UB). Customers who are more intent on using ICT will certainly adopt it earlier than other customers. In the UTAUT model, behavioral intention is a mediator – it is dependent on the effects of a number of variables. All variables that influence behavioral intention reflect a user's belief or personal attitude. Exogenous variables that do not depend directly on user behavior, but on the wider environment, have no influence on behavioral intention. In most studies, the impact of behavioral intention on use behavior is significant and positive. Ma et al. (2010) and Im et al. (2011) obtained such results when examining user attitudes to e-banking, as did Yu (2012) when examining user attitudes to mobile banking. Hence, the following hypothesis is proposed:

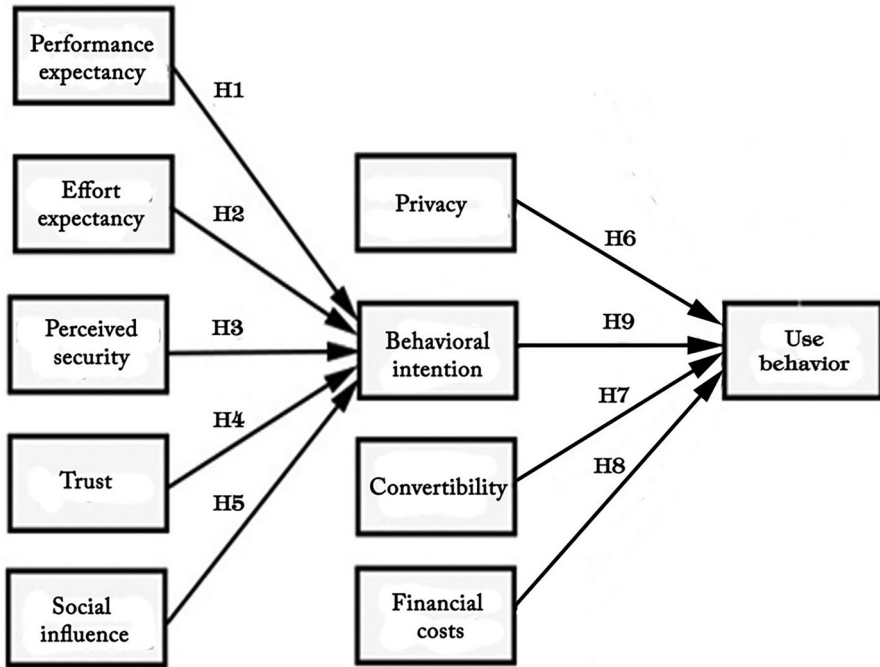H9: Behavioral intention significantly affects user behavior.

Fig. 2 Modified UTAUT model in the study. Source: Authors based on reviewed literature

Therefore, based on the theoretical assumptions of the UTAUT model, the literature review and the specific nature of Serbia as the country of the analysis, a modified UTAUT model is presented in Fig. 2.

4 Research methodology

Structural equation modeling (SEM) was the statistical method deployed for the research. More broadly, it serves to test the hypothesis that the proposed theoretical model fits the data collected (Lei and Wu 2007). The most common form of SEM analysis is the so-called *path analysis*, which is a more sophisticated form of multiple regressions because it allows the simultaneous use of multiple, different regression models. It examines the direct impact and causal relationships between a number of variables. The advantage of this method is that one variable can be endogenous (dependent on the impact of other variables) and exogenous (affects other variable[s]) simultaneously. Such a variable is called a mediator. In the model constructed for the purposes of this research, *behavioral intention* is the mediator. The analysis first assumes that the values of the variables observed are determined without error. Although this assumption cannot be sustained in most research, it is a prerequisite for the development of complex models, because the inclusion of errors can lead to unpredictable inference bias (Bollen 1989).

The data in the sample was collected by means of a questionnaire, structured in two parts. The first part consists of demographic questions – relating to the gender, age, education and previous EPS use experience of respondents. The survey inclusion criterion was a minimum of one instance of some form of use of EPS. Although respondents were asked for basic demographic information, the survey was anonymous. The second part contains a total of 30 questions answered through a five-point Likert scale. The questions contain clearly defined statements (Sekaran 2003) that relate to a particular EPS feature and respondents mark one of the numbers with which they express their agreement with the given statement. Number *1* indicates total disagreement and number *5* indicates complete agreement with the given statement. McDaniel and Gates (2006) state that the Likert scale is the best solution for cases in which respondents need to express their opinion on a given statement. The experience of previous research has been used in constructing the statements. The questionnaire is included in its entirety as an Appendix to the paper.

For research purposes, a questionnaire was constructed, first tested by trial data collection. The purpose of trial collection is to determine whether the questions included allow users to express their views in the right way. A poorly structured questionnaire produces incorrect results, which further lead to erroneous conclusions (Hair et al. 2006). If low values of Cronbach's alpha test or low values of the fit indices are found during the sample testing, certain corrections should be made to the questionnaire structure. The testing was conducted in the period between 2nd and 9th November 2019 and 84 completed questionnaires were collected. As the key tests showed a good fit of the questions formulated, there was no need for structural changes. The main part of the research was carried out by physical questionnaire distribution in the period between 16 and 28th November 2019. Out of the total of 500 questionnaires distributed, 457 complete responses were collected, which gives a high response rate of 91.4%. Table 1 shows the key aspects of the demographic structure of respondents.

Testing was conducted on the SPSS 22 and Amos 23 statistical packages. The data collected was updated using Microsoft Excel. It was then transferred to SPSS, which was used to construct question-based variables, compute mean values, standard deviations and Cronbach's alpha parameters, as well as to prepare a usable dataset for Amos. The values of descriptive statistics for all variables are presented in Table 2.

Cronbach's alpha values are above the minimum acceptable value of 0.70 for all the variables (Taber 2018). Also, all the variables have maximal values when all questions are included, which confirms the conclusion during the trial testing of the suitability of the questionnaire.

5 Analysis of results

5.1 Measurement model

Measurement model is used to confirm the reliability and validity of the set model. For the purposes of this research, the answers to individual questions in the questionnaire were used. Based on testing, *factor loadings* (FL) values were obtained

Table 1 Demographic structure of respondents

Category	Forms	Number of observations	Frequency
Gender	Male	214	46.83%
	Female	243	53.17%
Age	18–25	150	32.82%
	26–35	142	31.07%
	36–45	93	20.35%
	Over 45	72	15.75%
Education	High school	50	10.94%
	Student	98	21.44%
	Bachelor's degree	224	49.01%
	Master's degree, Postgraduate degree or PhD	85	18.60%
Previous experience with EPS	Payment by card in retail	260	56.89%
	Payment by card online	121	26.48%
	EPS use	76	16.63%

Source: Authors based on research

for each of the questions used to determine the *average variance extracted* (AVE) and *construct reliability* (CR) values. All values are presented in Table 3. It can be seen that the values of AVE and CR are in line with the recommendations given by Fornell and Larcker (1981), that is, all FL values exceed 0.5, all AVE values exceed 0.50 and all CR values exceed 0.60 (CR values for all variables exceed 0.70). AVE values were also used to construct the matrix of correlation variables.

The matrix of correlation variables is presented in Table 4. Its purpose is to show that there is no over-correlation among the variables that would compromise the impartiality of the research. The matrix diagonal contains the values obtained as the square root of AVE for the respective variables. These values are in presented in

Table 2 Descriptive statistics of variables

Variables	Arithmetic mean	Standard deviation	Cronbach's α
PEX	4.168	0.809	0.841
EEX	3.802	0.847	0.814
PES	3.815	0.829	0.811
TRS	3.756	0.845	0.828
SOI	3.574	0.885	0.809
PRV	3.489	0.927	0.740
CON	4.144	0.863	0.817
FC	3.993	0.842	0.851
BI	4.134	0.885	0.801
UB	4.318	0.960	0.888

Source: Authors based on research

Table 3 Determining the reliability and validity of the model

Variables	Questions	FL	AVE	CR
Performance expectancy	pex1	0.688	0.582	0.847
	pex2	0.788		
	pex3	0.845		
	pex4	0.722		
Effort expectancy	eex1	0.792	0.605	0.820
	eex2	0.829		
	eex3	0.707		
Perceived security	pes1	0.801	0.599	0.817
	pes2	0.817		
	pes3	0.698		
Trust	trs1	0.775	0.632	0.837
	trs2	0.861		
	trs3	0.744		
Social influence	soi1	0.685	0.515	0.904
	soi2	0.730		
	soi3	0.730		
	soi4	0.725		
Privacy	prv1	0.612	0.504	0.750
	prv2	0.834		
	prv3	0.665		
Convertibility	con1	0.866	0.696	0.820
	con2	0.801		
Financial costs	pfc1	0.776	0.671	0.859
	pfc2	0.896		
	pfc3	0.779		

Source: Authors based on research

bold to make them more easily visible in the table. The variable correlation matrix determines the discriminant validity of the model. To meet this criterion, values on the diagonal need to be higher than all values below them (Hair et al. 2006). As this

Table 4 Correlation matrix of variables

Variables	PEX	EEX	PES	TRS	SOI	PRV	CON	PFC
PEX	**0.763**							
EEX	0.537	**0.778**						
PES	0.606	0.676	**0.774**					
TRS	0.632	0.551	0.585	**0.795**				
SOI	0.592	0.473	0.442	0.548	**0.718**			
PRV	0.352	0.343	0.274	0.333	0.385	**0.710**		
CON	0.713	0.539	0.546	0.505	0.541	0.360	**0.834**	
FC	0.562	0.573	0.576	0.548	0.446	0.449	0.594	**0.819**

Source: Authors based on research

Table 5 Model fit indices

Indicators	Values	Recommended values	Fitness
χ^2	94.652	/	/
df	8	/	/
χ^2/df	11.831	<5(3), Carmines and McIver (1983)	No
NFI	0.968	>0.90(0.95), Bentler and Bonett (1980)	Yes, recommended
CFI	0.970	>0.90(0.95), Bentler (1990)	Yes, recommended
GFI	0.961	>0.90 Jöreskog and Sörbom (1986)	Yes
SRMR	0.024	<0.10(0.08), Bentler (1995)	Yes, recommended

Source: Authors based on research

condition is fulfilled in Table 4, it can be stated that the model satisfies the criterion of discriminant validity.

The next step in the research is to determine the type and significance of the correlation between the model's variables. The first part is the analysis of measures of fit, which serve to numerically confirm the assumption that the applied model fits the collected data. The basic indicator, the quotient of χ^2 test and the number of degrees of freedom does not show good fitness, as it has a value considerably above five (Carmines and McIver 1983). However, this is a very common problem in large-sample studies because the χ^2 test is non-resistant to deformations caused by the number of observations (Vandenberg 2006; Schermelleh-Engel et al. 2003). Therefore, four other indicators of model fitness are used in addition to this: NFI, CFI, GFI and SRMR. All show not only a satisfactory fitness, but also the recommended values. This suggests that the model is constructed in an adequate manner and that the data fits the model. A complete overview of fit indices values and their recommended values are presented in Table 5.

5.2 Structural model

The key research results are summarized in Table 6. The *exogenous variable* column shows the independent variable and the *endogenous variable* column, the dependent variable in a specific correlation. The *p-value* is crucial in terms of determining the statistical significance of the impact. The coefficient column shows the regression coefficients of the two observed variables. The variance in behavioral intention explained by exogenous variables was moderately high at 66%, while the explained variance in use behaviour was 61%.

The analysis confirms the statistically significant influence of *performance expectancy*, *perceived security*, *trust* and *social influence* on *behavioral intention*, as well as the statistical significance of *behavioral intention*, *convertibility* and *financial cost* on EPS use behavior. This conclusion is based on the *p-value*, in which the low values indicate a high level of statistical significance. In cases where there are

Table 6 Correlation between exogenous and endogenous variables

Exogenous variable	Endogenous variable	Coef	S.E	*p*-value
Performance expectancy	Behavioral intention	0.565	0.046	****
Effort expectancy	Behavioral intention	0.007	0.042	0.872
Perceived security	Behavioral intention	0.163	0.045	****
Trust	Behavioral intention	0.145	0.042	****
Social influence	Behavioral intention	0.113	0.037	0.002
Privacy	Use behavior	−0.031	0.032	0.338
Convertibility	Use behavior	0.299	0.042	****
Financial costs	Use behavior	0.144	0.032	****
Behavioral intention	Use behavior	0.584	0.038	****

Source: Authors based on research

****statistical significance for $p < 0.001$

asterisks in this column, the *p-value* is very low – lower than 0.001 – and is indicative of the fact that statistical significance is at a confidence level of higher than 99.9%. With *social influence* confidence is slightly lower, but still very high, at a level of 0.002. The overall hypothesis acceptance score does not change substantially with the change in the selected confidence level, since the conclusion is the same regardless of whether a standard 95% level or a more rigorous level of 99% is taken as a criterion. A summary of the accepted and rejected starting hypotheses is given in Table 7.

Out of a total of nine starting hypotheses, seven are supported, while two hypotheses remain unsupported. Figure 3 provides a graphical presentation. The solid line indicates statistically significant influence, while dashed lines point to influence without statistical significance. The numbers next to the lines indicate the values of the regression coefficients.

The coefficient values indicate influence direction and intensity. When *behavioral intention* is the dependent variable, *performance expectancy* has the greatest influence, which is in line with studies by Rosen (2005), Lee et al. (2012), Sun et al.

Table 7 Status of hypotheses

| Hypothesis	Correlation	Outcome
H1	Performance expectancy – Behavioral intention	Supported
H2	Effort expectancy – Behavioral intention	*Unsupported*
H3	Perceived security – Behavioral intention	Supported
H4	Trust – Behavioral intention	Supported
H5	Social influence – Behavioral intention	Supported
H6	Privacy – Use behavior	*Unsupported*
H7	Convertibility – Use behavior	Supported
H8	Financial costs – Use behavior	Supported
H9	Behavioral intention – Use behavior	Supported

Source: Authors based on research
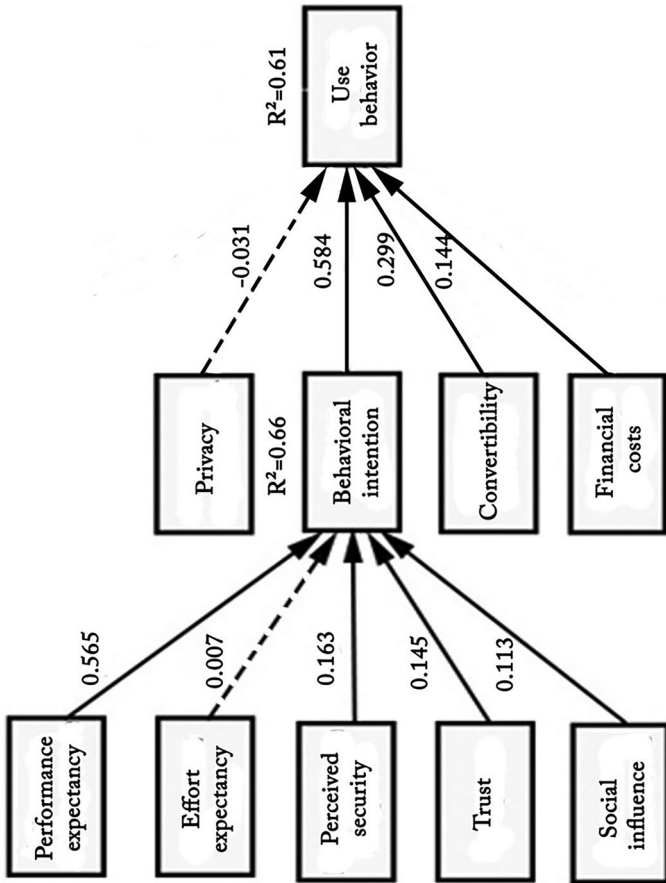
Fig. 3 Statistical significance and regression coefficients for all individual variable relations. Source: Authors based on research

(2013) and Tahrini et al. (2016). All other variables, regardless of their statistical significance, do not have as significant an impact on *behavioral intention*. This result is not in line with expectations, because high statistical significance is often accompanied by a high value of coefficients. When *use behavior* is used as a dependent variable, *behavioral intention* has the highest coefficient (slightly less than 0.6), which is in line with the majority of studies (Yu, 2012; Tahrini et al. 2016). Therefore, the mediator is used to achieve a high indirect impact of the variables from the first part of the model on the dependent variable. *Convertibility* is also relatively high, while *financial costs* have a slightly lower positive regression coefficient. Although logic dictates that *financial costs* have a negative effect on the EPS *use behavior*, in this case the coefficient has a positive value because the statements users evaluated have been formulated to affirm EPS as free of charge to end users.

6 Conclusion

The research has shown that the choice of UTAUT model is completely appropriate for the subject under analysis. The model has been successfully modified by including new variables. Most of these variables have been shown to have an impact on *behavioral intention* and *use behavior*. The results on the impact of *perceived security* and *trust* are in line with studies by Kim et al. (2010) and Oney et al. (2017) but contrary to the conclusion reached by Teoh et al. (2013). *Financial costs* significantly affect *use behavior*, which contradicts the results obtained in studies by Jeong and Yoon (2013), Bhatiasevi (2015) and Oliveira et al. (2016). Given the apparent importance of these variables, it seems likely that they may become part of a basic model in the future. The key contribution of the paper in theoretical terms is the introduction of *convertibility* into the model. As previously mentioned, the authors are unsure as to whether prior studies have used this variable. As predicted, convertibility has a high direct impact on EPS use. This variable's relative importance may be significantly different if the study covered a developed economy, such as one of the EMU member states. Since there is no major instability problem and no low currency purchasing power in these countries, the results of the survey would probably show that *convertibility* is not significant. However, studies in developing countries with volatile currencies should include this variable as part of the model.

There have been very few similar studies in Serbia. Therefore, the results will serve future researchers as a basis for comparison, not only in the field of EPS but also in related fields of electronic and mobile banking and electronic and mobile commerce. The model is broad enough to include all key variables, but not too broad to show no fitness or a large number of variables with no significance. This allows for high comparability with future research.

The results of the research provide guidance to system engineers and managers for technical and commercial development of EPS. The high impact of *performance expectancy* on *behavioral intention* indicates that e-commerce companies should focus on the benefits of using the system in their campaigns. Also, the statistical significance of *perceived security* and *trust* and the insignificance of *privacy* indicate

that financial security is more important to the users than data protection when performing such transactions.

Certain research limitations may arise in view of the variables selected. First of all, the basic UTAUT model is complemented by variables thought to have a significant impact on user attitude related to EPS use. The research conducted for the purposes of the paper has been the first of its kind conducted by its authors, so there was no opportunity to use previous experience gained from other research. It is possible that other variables would give different results and prove to be significant when analyzed. The EPS generalization has eliminated the possible use of *mobility* as a variable, the introduction of which would make sense in the case of mobile payment analysis. Another significant variable not included in the model is *self-efficacy*, as a personal understanding of one's own ability to perform certain actions. Furthermore, the model does not include *attitude to innovativeness*, in terms of user propensity to use new technological solutions. Nevertheless, the inclusion of two or three new variables would raise the possibility of model saturation and reduce the possibility for users to express their views correctly. Too many statements to score would reduce accuracy of the answers, especially those that appear in the latter part of the questionnaire.

Limitations also arise regarding sample selection. The sample is formed from the general population to create an idea of the views of a wide range of potential users. However, there is no guarantee that the sample structure truly reflects the structure of the general population. In demographic terms, the sample does not reflect the population of the Republic of Serbia, neither in terms of average age of respondents nor in terms of education. The share of the younger population (18–24 and 25–34 years) in the sample by far exceeds its share in the total population of the Republic of Serbia. Also, the share of those who have been university-educated exceeds the level of those with higher education in the total population of the Republic of Serbia. The rationale behind this is that the sample should reflect the population of Internet and electronic payment users, not the entire population of the Republic of Serbia. A significant part of the population is computer illiterate and does not even use payment cards. The elderly are the dominant population in this group, but it does not consist solely of them. The inclusion of all groups mentioned in the sample would deform the research results. Therefore, it can be said that while the sample does not represent the population demographically, it does in terms of those with previous use of EPS and those with potential for future use of EPS.

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