

Factors affecting customers' attitudes towards purchasing products online

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Abstract

The e-commerce became the regular way of conducting business and there is a massive adoption of purchasing products online. As changing potential sellers is easier than ever in the online environment, companies should optimize their website based on the customers' preferences in order to provide them with the experience that will drive the growth in purchases and generated profit. The main objective of this paper is to determine factors that affect the consumers' willingness to purchase product from an online store in the condition of Slovak market. We administered a survey questionnaire among 232 university students in order to make them evaluate the criteria they tend to when purchasing online. Afterwards, we conducted principal components analysis in order to reduce the number of these criteria and create meaningful factors (components). Although we needed to exclude several variables from analysis, we were able to extract 7 components that explains almost 80% of the variance in the data: the factor of price, availability, social proof, scarcity, product details, conditions and social media activity. In order to extract components, we used varimax rotation to remove ambiguity in results. We believe that extracted factors will help companies and marketing agencies optimize e-commerce stores to make them more favorable for their visitors. Although several variables were removed from analysis, we still consider them to be important and the future research should focus on gathering more data in order to assign them to factors more precisely.

Keywords: E-commerce, Online shop, Website optimization, Factor analysis, Principal components analysis.

JEL Classification: M31

1 Introduction

The development of the Internet and its unlimited worldwide impact were the basis to outreach the entrepreneurship to the new spheres. Electronic commerce (abbreviated e-commerce) allowed companies to sell without the necessity to set up brick-and-mortar stores. Moreover, the way of doing international trade has changed, too (Freeme & Gumede, 2012). E-commerce became the regular way of conducting business (Downing & Liu, 2014) while significantly contributes to the economic growth (Dumitriu, Voicu, & Dumitrescu, 2013). In the growing competition of online stores, it is inevitable to monitor factors that affect potential customers during their buying journey. By not doing so, companies put themselves to the risk of losing their customers in favor of their competitors. This paper provides the overview of customers' perception towards selected factors during online shopping. The contribution lies in the use of gathered knowledge by entrepreneurs

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(companies), as well as agencies focused on developing websites and online stores. While companies can take advantage of these information to optimize the running store, web agencies can take advantage of these information as a guideline during the development of new e-shops. Agencies can also use the information to build a selling strategy for their clients.

E-commerce is a form of business which is conducted in the online environment while the Internet behaves as an unified platform that connects buyers and sellers (Tan, 2013). Ullman (2013) consider e-commerce to the range of possible commercial transactions conducted online. Each website that is able to generate income (or its intention is to generate income) can be included in this category. Qin (2010) defines electronic commerce as social and economic activities between participants, while computer devices and the Internet is used. However, with the rapid development and penetration of mobile devices, this definition can be considered as outdated. Minculete (2013) states that e-commerce and e-business should give up the letter 'e' because the use of e-commerce technologies is on its rise and they became the regular part of marketing initiatives.

The core instrument used in e-commerce is undisputedly electronic shop (abbreviated e-shop). E-shop is a store operated in the environment of the Internet (Beyon-Davies, 2012). Currently, it is possible to develop the e-shop by using free platforms (such as WooCommerce) that can be implemented into content management systems (Beleščák, 2014). Pilík (2014) states that in Czech republic alone, there is an increase of 800 new e-shops every year. As was mentioned in the beginning of the paper, e-commerce has its benefits for small- and medium-sized enterprises. MacGregor and Vrazalic (2007) claim that these benefits are not noticeable in time of e-commerce implementation in companies but companies will start to notice them later. Trading via modern technologies allows a quick response to the emerging trends in purchased products. Thanks to this possibility, even small- and medium-sized companies are able to be more flexible and it gives them the competitive advantage over big corporations (Cantú et al, 2014). Seer, Berács and Pop (2012) discuss that use of e-commerce is important especially in companies located in developed and emerging countries.

While analyzing the current state of discussed issue, the analysis of already published research in the area is critical. Pilík (2013) conducted a questionnaire survey among 706 pseudo-randomly chosen respondents. The survey was conducted between June and September 2012, while the main purpose of the survey was to determine factors affecting online purchase. The results of the survey proved that 87.5 % of respondents used the Internet for product purchasing, while 32.7 % of respondents use the Internet to purchase products regularly. Based on this research, age and the Internet literacy affects the purchase in the most significant way. There was found a negative dependence between online purchase and the Internet literacy. The majority of respondents were mostly afraid of product testing, claims, problems with product returns and delivery of the wrong product.

The research conducted by Masínová and Svandová (2014) was conducted on the sample of 167 respondents. The results shown that product description, solving the claims, product photos, payment options and time to response are among factors that affects customers' satisfaction in the major way. These factors happened to be important especially for the Internet users purchasing clothing. Moreover, Bucko and Vejačka (2011) discuss that one of the factors affecting the purchasing online is trust and security of the environment and connected identification of users (or communicating parties). In their research, Vilčeková and Sabo (2014) analyzed the sample of 1,067

respondents, while research was conducted between January and April 2013. Based on the results of the survey, the factor analysis was conducted. As a result, 6 factors describing the relationship towards the country of origin of purchased product. Based on the research results, it was found that country of origin matters more to the older respondents compared to younger ones. The topic of factors influencing online shopping can be also found in papers by Novotný and Duspiva (2014), Štefko, Dorčák and Pollák (2011) and Bačík, Szabo and Fedorko (2014).

2 Sample, methods and procedures

The main objective of this paper is to determine factors that affect the consumers' willingness to purchase product from an online store in the condition of Slovak market. Our goal was to eliminate the number of criteria affecting the online purchase and create new latent variables (factors) that could gather summarized information within.

In order to achieve our objective, the survey questionnaire was conducted. The general sample consisted of all Internet users located in Slovak republic. For the purpose of our study, the sample was not selected randomly – we selected the sample purposely. As we consider Generation Y (born between 1980 – 1995) to be the major group of Internet users with purchasing potential, our focus was aimed to this particular group. As we were looking for a group of people with the higher level of the Internet literacy (as we wanted to avoid the entropy in terms of theory of marketing communication), we selected university students to be appropriate subjects for our study.

The survey was administered in February and March 2015, and in December 2015 via questionnaire consisting of 17 items. We focused on responses provided to one particular item: *'How important are the following criteria for you during the online purchase?'* The evaluated criteria was as follows: price of the product, shipping, discounts and special offers during the purchase, price comparison with brick-and-mortar store, payment method, delivery time, reviews about product, reviews about seller, limited product quantity, time-limited offers, free shipping, security certificate, product details, product photos, website graphics, easy-to-use navigation, customer service before the purchase, position in search engine results page, mobile optimization of the website, ease of accessibility of terms and conditions, ease of accessibility of shipping conditions, website activity, social media activity, number of followers on social media, seller's country of origin. Respondents selected their answers from the modal options in the interval from 1 = very important to 5 = not important at all. Criteria (or options, factors) were selected based on the previous researches.

In order to achieve the objective set in the beginning of this part of the paper, the exploratory factor analysis will be used to analyze the data gathered from the survey. The main purpose of factor analysis is to evaluate the structure of mutual relationships among variables. Subsequently, it is important to find out if there is a possibility of splitting variables into groups while correlations within the group would be significant and at the same time, correlations between groups wouldn't be significant. By applying factor analysis, new variables called factors are created from the original variables (Stankovičová & Vojtková, 2007).

Basic assumption for use of factor analysis is the existence of sufficient correlations among data in the data matrix. To analyze this correlations, it is possible to use various tests:

- **Bartlett sphericity test:** null hypothesis assumes the correlation matrix to be an identity matrix.

- **Kaiser-Mayer-Olkin test (KMO):** compares sizes of experimental correlation coefficients to sizes of partial correlation coefficients. It is highly recommended that KMO value is higher than 0.5 (Meloun et al., 2012).
- **MSA:** provides the level of degree of inner correlations between original tokens and expresses how they are predicted by other tokens. It is recommended to not conduct factor analysis when MSA is lower than 0.5 (Coussement et al., 2011).

If the assumption is met, the next step is to estimate parameters of the factor model. In this phase, principal components analysis will be used. It is a statistical method that uses orthogonal transformation to convert the set of correlated observations into set of observations with no correlations among them. If k is the number of principal components and n is number of variables, then $k \leq m$ (Wu, 2016). The next step is the determination of common factors. As Král' et al. (2009) and Meloun et al. (2012) explains, the number of common factors should be based on certain criteria. We will use the principle of Eigenvalues (factors with Eigenvalues higher than 1 are considered to be significant) and criterion of explained variance (selected factors should explain as high proportion of total variability as possible).

When number of factors is determined, we can compute the factor saturations. During this computations, the situation connected to ambiguity of the results might happen – one variable can correlate with more factors. In order to maximize differences between factors, the rotation is used. Thanks to the rotations, factor loadings (correlations between variable and factor) get into the shape that allows more exact and easier explanation. We distinguish between orthogonal rotation (e. g. varimax, equamax, quartimax) and oblique (e. g. oblimin, promax) (Ronco & De Stéfani, 2012). In our analysis, both orthogonal and oblique rotation will be used in order to find the best possible explanation of factors.

3 Results and discussion

232 respondents joined the survey, however, we analyzed only 221 cases after the removal of missing and extreme values. The average age of the respondents was 21.72 years (in the interval between 18 do 26 years) and median of age was 21 years. The sample consisted of students attending study at Faculty of Management, University of Prešov in Prešov (78), Faculty of Public Administration, Pavol Jozef Šafárik University in Košice (88), and Faculty of Arts, Pavol Jozef Šafárik University in Košice (55). 24.89 % of the respondents stated their gender was male, 75.11 % of respondents stated their gender was female.

Table 1 describes the descriptive statistics (mean, median, standard deviation) of the criteria we measured in the survey. It is possible to see that price of the product is the most important criterion when purchasing goods online. Discounts, price comparison with brick-and-mortar stores, payment method, delivery time, and reviews about the product, product description and pictures can be also considered to be among the most important evaluation criteria when conducting such a purchase. In Table 1, it is also possible to see that criteria such as number of social media followers, social media activity, website activity, mobile optimization, search engine positions, and limited quantity of the product are considered to be of less importance for the participants of our survey. However, the descriptive results of this survey are not the primary purpose of this study, so we are not going to dive deeper into these results.

Table 1 Criteria of online purchase (characteristics)

Criterion	Mean	Median	Standard deviation
Price of the product	1.34	1.00	0.564
Shipping	2.05	2.00	1.048
Discounts and special offers during the purchase	1.93	2.00	0.941
Price comparison with brick-and-mortar store	1.80	2.00	0.919
Payment method	1.91	2.00	1.065
Delivery time	1.81	2.00	0.933
Reviews about the product	1.90	2.00	0.907
Reviews about the seller	2.06	2.00	0.968
Limited quantity of the product	3.07	3.00	1.138
Time-limited offer	2.99	3.00	1.183
Free shipping	2.08	2.00	1.188
Security certificate	2.57	2.00	1.247
Product details	1.98	2.00	0.988
Product photos	1.59	1.00	0.988
Website graphics	2.67	2.00	1.154
Easy-to-use navigation	2.22	2.00	1.095
Customer service before the purchase	2.07	2.00	1.020
Position in search engine's results	3.11	3.00	1.186
Mobile optimization of the website	3.36	3.00	1.216
Accessible terms and conditions	2.47	2.00	1.178
Accessible shipping conditions	2.36	2.00	1.142
Website activity	3.08	3.00	1.177
Social media activity	3.08	3.00	1.137
Number of social media followers	3.46	4.00	1.189
Seller's country of origin	2.45	2.00	1.281

Source: Own processing

As a first step in our analysis, we need to determine if use of factor analysis is the suitable method to analyze our data matrix. In the beginning, we created correlation matrix which showcased many small and moderate correlations between variables. It is a sign that data might be suitable for the analysis, however, we have to confirm it by using abovementioned Bartlett's sphericity test and KMO test.

As was mentioned, Bartlett's sphericity test tests tries to accept or reject the following null hypothesis:

H_0 : The correlation matrix is an identity matrix.

H_A : The correlation matrix is not an identity matrix.

With p-value of $2.2e^{-16}$, we can reject the null hypothesis on the significance level $\alpha = 0.05$. The correlation matrix is not an identity matrix. Kaiser-Mayer-Olkin test with overall MSA value of 0.79 means that factor analysis is suitable for our data.

Before principal components analysis was conducted, we needed to decide how many factors will serve as an outcome of the analysis. Based on Eigenvalues higher than 1.0, we selected 8 factors to become the outcome of the initial analysis. As factor saturations were not clear enough, we used orthogonal method varimax to rotate the factors. The results of the analysis shown that two

variables (position in search engine results, country of seller’s origin) had lower communality (h^2) than recommended value 0.5. We decided to remove these variables and repeat the procedure. When the procedure was repeated, we found another variable (customer service before the purchase) to has lower communality than 0.5. Moreover, we found that factor loadings for other 7 variables (price comparison in brick-and-mortar store, free shipping, safety certificate, website graphics, easy-to-use navigation, optimization of website for mobile devices and website activity) were not clear and variables correlated with more than one factor. We decided to remove all these variables from analysis and repeat the procedure one more time.

We again performed Bartlett’s sphericity test and KMO test to determine if the data are still suitable for factor analysis despite many variables were removed. We were able to reject null hypothesis in Bartlett’s sphericity test with the p-value of $2.2e^{-16}$. Overall MSA in KMO test was still above 0.5 at the level of 0.64. These two test proved we can continue in our analysis. To determine how many factors will be used, we conducted initial principal components analysis and analyzed Eigenvalues and explained variance. Figure 1 displays scree plot with Eigenvalues.

Principal components analysis (Eigenvalues)

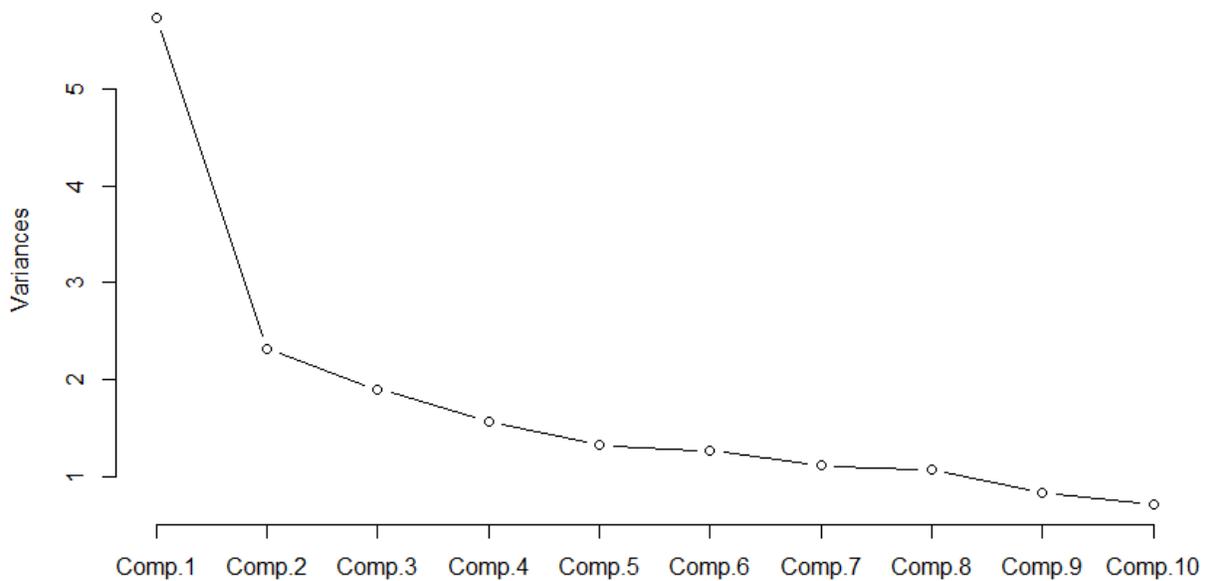


Figure 1 Scree plot (Eigenvalues)
Source: Own processing in R

Based on the Eigenvalues, we found 7 factors will be sufficient number of factors for our analysis. This number of factors explained 79.71% of variance in the data. As non-rotated solution was not sufficient – the results were not clear, we decided to try varimax, equamax and quartimax rotation. We did not try oblique rotation as we didn’t want factors to correlate between each other. All rotation types provided us with almost similar results. We decided to stick to varimax. Table 2 displays generated rotated components (RC) and factor loadings.

Table 2 Principal components analysis

Variable	RC1	RC2	RC3	RC5	RC4	RC7	RC6	h2
Price of the product	-0.02	0.85	-0.04	-0.11	0.03	0.02	0.02	0.73
Shipping	-0.01	0.74	0.00	0.09	-0.08	0.10	0.32	0.67
Discounts and special offers	0.10	0.74	0.11	0.25	0.18	-0.04	-0.05	0.67
Payment method	0.02	0.20	0.01	0.09	0.04	0.14	0.80	0.71
Delivery time	0.15	0.01	0.18	0.11	0.14	-0.02	0.77	0.68
Reviews about the product	0.04	0.05	0.91	-0.03	0.08	0.10	0.11	0.87
Reviews about the seller	0.04	-0.02	0.90	0.08	0.08	0.15	0.00	0.86
Limited quantity of the product	0.04	0.01	0.09	0.10	0.91	0.00	0.04	0.84
Time-limited offer	0.09	0.07	0.08	0.14	0.87	0.15	0.08	0.83
Product details	0.20	-0.02	0.20	0.18	0.04	0.81	0.01	0.76
Product photos	0.10	0.07	0.12	0.00	0.13	0.87	0.09	0.81
Accessible terms and conditions	0.94	0.01	0.04	0.15	0.04	0.10	0.00	0.92
Accessible shipping conditions	0.95	0.02	0.03	0.10	0.07	0.10	0.09	0.93
Social media activity	0.24	0.02	0.01	0.86	0.08	0.10	0.08	0.82
Number of social media followers	0.08	0.06	0.04	0.90	0.17	0.04	0.06	0.85

Source: Own processing

Based on the table above, it is possible to define components (factors) as follows:

- **RC1 – The factor of price:** this factor merges variables that affects the price of the purchase`
- **RC2 – The factor of availability:** this factor covers variables associated with ease of the ordering process itself;
- **RC3 – The factor of social proof:** this factor covers people’s urge to confirm the product they are going to purchase is good;
- **RC4 – The factor of scarcity:** this factor merges variables that affects the speed of people’s choice. Together with social proof, scarcity is among Robert Cialdini’s (2006) Weapons of Influence;
- **RC5 – The factor of product details:** this factor merges variables connected to the presentation of the product;
- **RC6 – The factor of conditions:** this factor merges variables associated with easiness to access various conditions;
- **RC7 – The factor of social media activity:** this factor merges variables connected to store’s activity on social media.

Table 3 Principal components analysis

	RC1	RC2	RC3	RC5	RC4	RC7	RC6
SS loadings	1.94	1.87	1.77	1.75	1.72	1.52	1.38
Proportion Variance	0.13	0.12	0.12	0.12	0.11	0.10	0.09
Cumulative Variance	0.13	0.25	0.37	0.49	0.60	0.70	0.80
Proportion Explained	0.16	0.16	0.15	0.15	0.14	0.13	0.12
Cumulative Proportion	0.16	0.32	0.47	0.61	0.76	0.88	1.00

Source: Own processing

Table 3 showcase that rotated component 1 explains the highest proportion of variance in the whole reduced dataset (13 %) and 16 % of variance among all components – perhaps because it consists of 3 variables and rest of the components includes only 2 variables. On the contrary, rotated component 6 explains only 9 % of the proportion variance for the whole data set and 12 % of the variation among factors.

4 Conclusion

As online shopping became the regular part of people’s lives, optimization of e-commerce stores is crucial in order to provide the experience expected by website visitors (potential customers). The positive experience might result in higher revenues, the negative one might result in permanent loss of customers. The main objective of this paper was to determine factors that affect the consumers’ willingness to purchase product from an online store in the condition of Slovak market. Based on the theoretical background, we conducted survey questionnaire among university students and afterwards analyzed the perception of selected criteria by users when purchasing products online. When conducting factor analysis, we initially needed to reduce the size of analyzed data matrix because of low communalities or ambiguity in results of principal component analysis. Afterwards, we were able to extract six rotated components explaining almost 80% of variance in the data – the factors of price, availability, social proof, scarcity, product details, conditions and social media activity. The factor of price explained the largest part of variance in the data. We assume the price is especially important for university students, as in majority of cases, they are not employed and thus, their financial budget is limited. Although several variables were removed from analysis, we still consider them to be important criteria when purchasing products online and should not be overlooked when optimizing e-commerce store. The area of future research should focused on collecting more data in which it might be possible to find more clear patterns and assign these variables into factors. The limitation of this study might lie in the size and structure that was available for analysis, the data collection term (as customers’ perceptions and attitudes change quickly in this dynamic environment), and the methods of factor analysis and rotation used to conduct this analysis.

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