

## THE DEVELOPMENT AND PERSPECTIVE OF ONLINE SHOPPING IN CONNECTION WITH TECHNOLOGY ACCEPTANCE

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### **Abstract:**

The rapid growth of e-shoppers has caused the growing interest of companies in using the online environment. Companies are trying to attract the attention of consumers and also trying to gain new customers. Therefore, in the situation when a company does not only create e-marketing but is also able to offer an online shopping channel, it is now likely that customers will use this option. The aim of this paper is to find the dependence between acceptance of technologies enabling online purchases and acceptance of online shopping itself and to estimate the percentage of individuals who will use the online environment when purchasing individual product categories on the Visegrad Group market. The secondary data from the Eurostat database were used to investigate in this research. The data synthesis shows the development of individuals purchasing products online since the beginning of 2004 until the end of 2018. Changes in customers' behaviour were found in the following product categories: groceries; household goods; books, magazines and electronic learning materials; clothing and sporting goods; electronic devices; tickets for events; and travel and holiday accommodation categories. The research outputs are intended for strategic managers or company owners to help them decide which market to choose when using a market development strategy. This paper can also help traditional retail companies deciding to switch to a hybrid or an e-tail company.

### **Key words:**

Customers' behaviour, online shopping, forecasting, retail, e-tail, hybrid companies

**JEL:** F17, L81, M30

### **1 Introduction**

Online shopping has become one of the fast-growing areas in many countries, e.g. in the United States (Lee et al., 2017), China (Akram et al., 2017), United Kingdom (Omar, 2005), Japan (Miyatake et al., 2016), Germany (Smith et al., 2013) or Czech Republic (Bauerová and Klepek, 2018). The world's largest markets for e-commerce is led by the United States, China, and the United Kingdom and global e-commerce sales are set to increase, although the rate of growth will slow (AT Kearney, 2015). In 2017, global retail e-commerce sales reached 2 304 billion U.S. dollars, but projections show up to 4 878 billion U.S. dollars by 2021 (Statista, 2018). Despite slowing the growth rate of e-commerce, there is still a huge potential for e-tailing due to the growing e-commerce sales.

Most of the studies oriented on online shopping examined which factors influence the technology acceptance of online shopping (Lim & Ting, 2012; Bauerová and Klepek, 2018; Wann-Yih and Ching-Ching, 2015). However, this paper examines the connection between acceptance of technologies enabling online purchases and acceptance of online shopping itself. Moreover, this paper deals with the situation where an e-tail company decides to use this potential in the growth of e-commerce and therefore chooses a market development strategy. The research outputs are intended for e-tail strategic managers, company owners or to traditional retailing when deciding to become a hybrid or an e-tail

company to help them decide which market to choose when using a market development strategy. Ansoff (1957) defines market development strategy as “a strategy in which the company attempts to adapt its present product line (generally with some modification in the product characteristics) to new missions”. Therefore, market development refers to the growth strategy which occurs when a retail company attempts to sell its existing products into new markets. The new market, in this case, can be a geographically different market, such as overseas or international expansion, or it can be a new customer market (Flouris and Oswald, 2006). One of the most challenging and unresolved problems in the companies strategies area is the apparently high percentage of organisational strategies that fail (Cândido and Santos, 2015). This problem may alleviate data collection and its subsequent analysis. Data collection can help e-shops build a more sophisticated sales strategy. The use of analytical tools and the consequent process optimization based on knowledge of customer behaviour should be a part of most marketing and sales activities. Proper customer behaviour prediction, timely identification of their decision-making and mapping their needs helps companies maintain customers even in the long run (Staňková, 2016).

The first step in developing a market development strategy is analysing the current and future state of the business environment, and identifying the strengths and weaknesses of the business (Moynihan and Titley, 2001). This paper will focus on changes in customers’ buying behaviour, which is a part of the business environment. Changes in demand for some goods and services may occur because for many reasons, such as changes in the number of money that consumers have available to spend over time, and changes in their attitudes, tastes and wants (Moynihan and Titley, 2001). Managers must consider the possible tradeoff between increased profit potential and increased mortality risk when deciding to enter a new market (Cool et al., 2009). The decision which foreign markets entering should be based on a number of criteria: the potential market size, the product fit, additional costs (Keegan and Schlegelmilch, 2001), economic strength, population, local purchasing behaviour, cultural factors, regional differences, competitive environment or political stability (Krafft et al., 2007). Gradual entry into international markets in the application of marketing development strategy begins with sporadic exports to nearby markets (Machková, 2015). In respect to these criteria, the Visegrad group market chose to examine to minimize the entry risk of companies. Among people in the EU who had used the internet for buying goods and services, 68% were e-shoppers in 2017 (Eurostat, 2018). Looking at the Visegrad group market, Eurostat states, almost 6 out of 10 e-shoppers in Slovakia (59%), Czech Republic (56%) and more than 4 out of 10 e-shoppers in Poland (45%), Hungary (39%) shopped online during 2017. Based on the literature review the first hypothesis was formulated as follows:

H1: The percentage of customers purchasing online products is changing in connection with the prior acceptance of technology enabling online purchases.

The aim of this paper is to find the dependence between acceptance of technologies enabling online purchases and acceptance of online shopping itself and to estimate the percentage of individuals who will use the online environment when purchasing individual product categories on the Visegrad Group market. It will be also possible to specify which Visegrad group markets are suitable to choose a market development strategy for each product category based on the research’ results. The estimating of the percentage of individuals who will use the online environment when purchasing individual product categories on the Visegrad Group market from 2019 to 2021 is also a part of the research. The literature review analysed the perception of online shopping and the possibility of a market development strategy in an online environment. The following part introduces the chosen research method. The next part of the paper describes and comments on the results provided. The following part of the paper defined the limits and discussed the findings. The last part of the paper summarised the core findings.

## 2 Methods

The states of the Visegrad group were selected for their geographical distance and cultural and consumer similarity. This assumption corresponds to the decision criteria for entering a new market using a market development strategy. The development of online shopping was analysed by customer preferences in selected product categories (clothes and sports goods, household goods, travel and holiday accommodation, tickets for events, food and groceries, electronic equipment, books, magazines and e-learning material) from 2004 to 2018 (2005 – 2018 in case of Hungary). This analysis can outline which market is suitable to choose when using a market development strategy for various products. It can be easier for marketing managers to estimate customer behaviour and choose the right market by analysing customer preferences trend. Therefore, estimating the percentage of individuals who will use the online environment when purchasing individual product categories is helpful for understanding the trend of online environment preferences. It was intended to use correction by the development of technology (that allow online shopping) acceptance to estimating. By regression analysis, it was found that there was a relationship between the variables examined, but it was found that the correction was not significant for use in models. Therefore the correction was not used in the models.

### *Data*

The secondary data from the Eurostat database was used to carry out the research. The Eurostat survey included all individuals in the age group 16 to 74 years purchasing products online and living in the Czech Republic, Hungary, Poland and Slovakia. The unit of measure is the percentage of individuals who ordered goods or services, over the internet, for private use in the last year. The data from the Eurostat database are collected annually by the National Statistical Institutes and are based on Eurostat's annual model questionnaires on Information and Communication Technologies usage in households and by individuals. The model questionnaire is generally used in the Member States with small differences (e.g. in translation). (Eurostat, 2019)

### *Statistical methods*

The first step was to examine the dependence of data. The missing values were found and replaced by linear interpolation. Linear interpolation fits a straight line between the endpoints of the gap and enables the missing values to be calculated straightforwardly employing the line equation (Junninen et al., 2004). Linear interpolation method was chosen with respect to gap length (one missing value in the time series of the Czech Republic, Poland and Slovakia). The regression analysis was used to examine the relationship between the variables. Individuals' online purchasing in the last 12 months as a dependent variable and computer use, internet use and mobile phone use to internet access as independent variables. The independent's variables were examined on one lag to inclusion the delay between technology acceptance of technology and online shopping acceptance.

The next step was to use the AutoRegressive Integrated Moving Average (ARIMA) modelling to estimate the possible development of customers' product purchasing behaviour. The Expert Modeler with ARIMA models only criterion was chosen as a modelling method. In the case of ARIMA model construction, time-series stationarity is not required (Danel, 2004). The forecasting equation is (Nau, 2018):

$$\hat{Y}_t = \mu + \varphi_1 Y_{t-1} \quad (1)$$

The forecasting equation in this research has zero Y constant. Therefore the constant term was not included. If the slope coefficient  $\varphi_1$  is positive and less than 1 in, the model describes mean-reverting behaviour in which next period's value should be predicted to be  $\varphi_1$  times as far away from

the mean as this period's value. If  $\phi_1$  is negative, it predicts mean-reverting behaviour with alternation of signs, i.e., it also predicts that Y will be below the mean next period if it is above the mean this period. (Nau, 2018)

### 3 Paper results

This part of the paper presents the finding of development and perspective of online shopping on the Visegrad group market. The first part presented the results of the regression analysis. The next part includes the results of ARIMA modelling and analysis of customers' preference in purchasing products online. The forecasting the percentage of individuals who will use the online environment when purchasing products is helpful for understanding the trend of online product preferences. The analysis of customers' preference is oriented on the changes in customers' preferences for each online product category.

#### 3.1 The results of regression analysis

The regression analysis examined the relationships between individuals' online purchasing and computer use, internet use and mobile phone use to internet access. The relationships between variables were found ( $H_0$  in every case was rejected – Sig. < 0.05). In the case of the Czech Republic, Adjusted R Square (selected for interpretation due to a small sample) is 0.442, therefore 44% of the dependent variable variance is explained by the independent variables. This dependence has also been confirmed in other countries, and the values found are shown in the following table.

**Table 1. The regression analysis result**

Country	R	R Square	Adjusted R Square	Std. Error of the Estimate	Sig.
Czechia	.755	.571	.442	3.344	.032
Hungary	.975	.951	.938	4.040	.000
Poland	.962	.926	.906	3.730	.000
Slovakia	.967	.936	.917	4.240	.000

Source: own calculation.

Based on the regression analysis the first hypothesis cannot be rejected. Therefore the percentage of customers purchasing online products is changing in connection with the prior acceptance of technology enabling online purchases. Each technology acceptance that allows online shopping affects future online shopping. While in Hungary, Poland and Slovakia the 92% of the dependent variable variance is explained by the independent variables, only 44% of this dependent variable variance is explained in the case of Czechia. This may be caused by other non-examined variables. Nevertheless, it can be said that current customers' technology acceptance has a big impact on future online shopping.

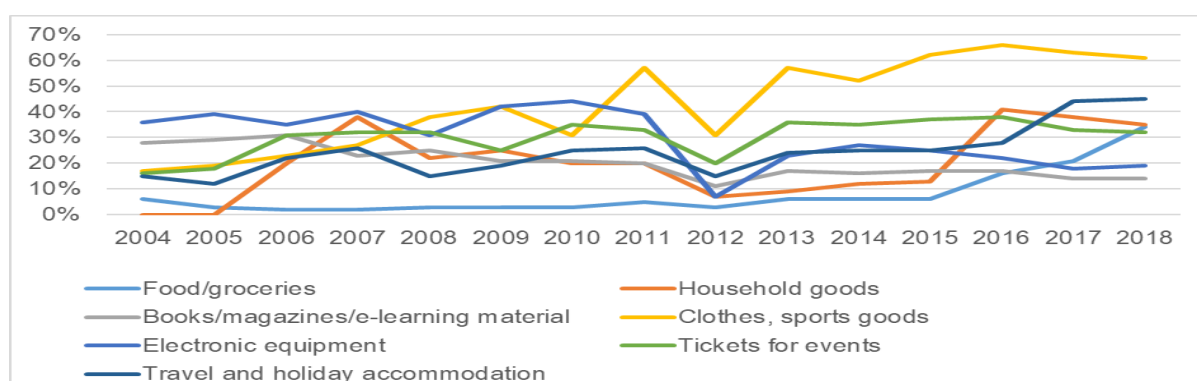
#### 3.2 The development of customers' purchases on the online market

##### *Online customers' purchasing changed in the Czech Republic*

Despite the fact that online shopping is constantly increasing, it is evident from figure 1 that there are categories for which online sales are declines. The electronic equipment and books, magazines and an e-learning material are categories with these declines. If we focus on customers' buying behaviour of electronic equipment category, there is slowly growing to 2010 with 44.00 % of individuals purchasing this product, but there was a huge drop in 2012. This fall could be caused by the consequences of the

economic crisis. However, a slow increase to 19.00 % in 2018 may also indicate a market saturation. Unlike the previous category, in books; magazines and e-learning material category was found customers' losing interest in online shopping continuously, with no significant drops, with only 14% of individuals purchasing it online in 2018. The other categories examined are characterized by continuous growth with slight or more pronounced declines (clothes and sports goods; tickets for events). The biggest change in purchasing behaviour is evident in the clothes and sports goods category. Very interesting in terms of changes in customer behaviour is the households category, there we can see a large discrepancy between the increase in the number of individuals purchasing these products online. The online food/grocery category has a high growth potential, where we can see a big change in customers' buying behaviour appearing only in the last three years of data series. From 2015, this category has grown to 34% of individuals purchasing food/grocery online in 2018.

**Figure 1: Percentage of individuals purchases products online in the Czech Republic**

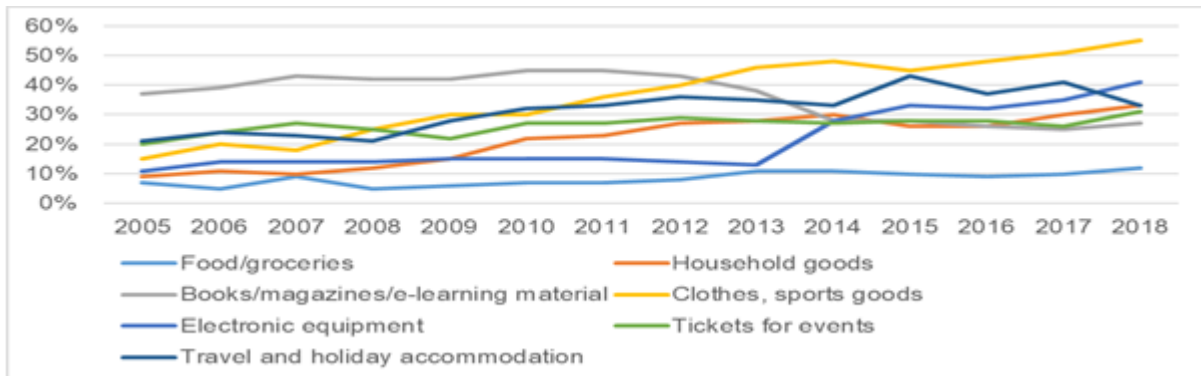


Source: own visualisation based on CSO database

### *Online customers' purchasing changed in Hungary*

The analysis of figure 2 shows that only the books/magazines/e-learning material category has a decline in individuals' purchases products. If we focus on customers' buying behaviour in the category, there is slowly growing to 2010 up to 45.00 % of individuals purchasing these products, but the purchases decline up to 24.00 % in 2018. If we focus on the other categories, there is a continuous growth of individuals' purchases. The biggest change in purchasing behaviour is evident in the clothes and sports goods category from the original 15.00% in 2005, the number of individuals purchasing these products grew up to 55.00 % in 2019. Very interesting is the development of the electronic equipment category, where we can see a large discrepancy between the increase in the number of individuals purchasing these products online (these products are bought by 13% of individuals in 2013, but it was already complete 27 % of them in 2014). This development can indicate the entry of a new e-tailer into this market.

**Figure 2: Percentage of individuals purchases products online in Hungary**

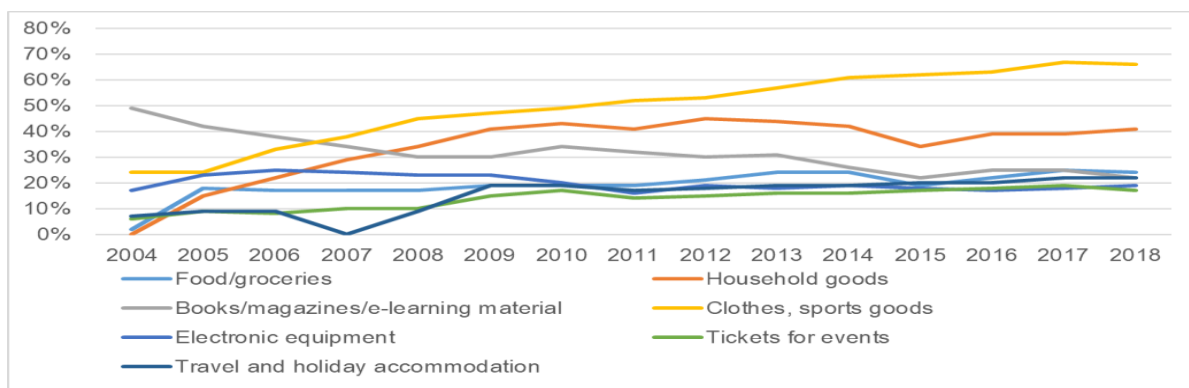


Source: own visualisation based on CSO database

*Online customers' behaviour changes in Poland*

The growth in the number of individuals purchasing online products on the Polish market is without significant falls or increases. There is only one category of goods on the Polish market with a decline in the percentage of individuals' purchases products by analysing the figure 3. The books, magazines and an e-learning material category is the category with the declines. There is a continuous growth with a slight or more pronounced decline (travel and holiday accommodation) in the rest of the analysed categories. The biggest change in purchasing behaviour is evident in the clothes and sports goods category when from the 24.00% of individuals purchasing these products in 2004, the number of individuals purchasing these products grew up to 66.00 % in 2018. Polish customers like to purchases these items online because almost every seventh person in Poland is buying clothes and/or sports goods online. The second biggest change is evident in the case of household goods category with 41% of individuals purchasing products online in 2018.

**Figure 3: Percentage of individuals purchases products online in Poland**



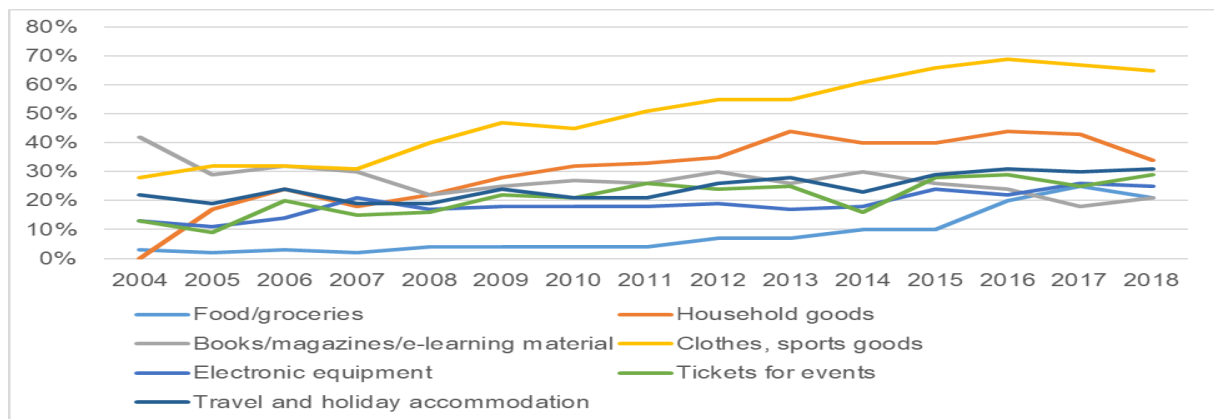
Source: own visualisation based on CSO database

*Online customers' behaviour changes in Slovakia*

There is only one category of goods with a decline in the percentage of individuals purchasing, which is clear from figure 4. As in the previous case, the books, magazines and e-learning material category is the most declining category. If we analyse the customers' buying behaviour in this category, we find an alternate the short periods of growth and decline. Ultimately, there is 17 percent of the decrease in 2018 in comparison with the beginning of the time series. It can be concluded that

customers losing their interest in buying books, magazines and e-learning material online. There is continuous growth with a slight decline in other analysed categories. The biggest change in purchasing behaviour is evident in the household goods category. The second biggest change is evident in the case of clothes and sports goods with 65% of individuals purchasing products in this category online in 2018. Slovak customers like to purchase these items online as well as Polish customers because almost every seventh person in Slovakia is buying clothes and/or sports goods online.

**Figure 4: Percentage of individuals purchases products online in Slovakia**



Source: own visualisation based on CSO database

### 3.3 The results of the ARIMA modelling

The results of the ARIMA models for all the countries surveyed show Table 2. The product's categories in the table are defined as numerically as follows. The food and groceries category was defined as number 1. The household goods category was defined as number 2. The books, magazines and e-learning material category was defined as number 3. The clothes and sports goods category was defined as number 4. The electronic equipment category was defined as number 5. The tickets for events category was defined as number 6 and the last category is travel, holiday and accommodation numbered as 7.

**Table 2. The ARIMA Model Parameters (the estimate in percentage)**

Country	Products category	Estimate	SE	t	Sig.	The estimates (Type of the model)		
						2019	2020	2021
CZECHIA	1	-.646	.264	-2.449	.031	42 (1,2,0)	53 (1,2,0)	62 (1,2,0)
	2	20.000	3.482	5.744	.000	20 (0,0,0)	20 (0,0,0)	20 (0,0,0)
	3	-1.000	1.059	-.945	.362*	-	-	-
	4	3.350	1.308	-2.561	.025	68 (1,1,0)	69 (1,1,0)	74 (1,1,0)
	5	29.800	2.764	10.781	.000	30 (0,0,0)	30 (0,0,0)	30 (0,0,0)
	6	30.200	1.818	16.608	.000	30 (0,0,0)	30 (0,0,0)	30 (0,0,0)
	7	2.143	1.966	1.090	.296*	-	-	-
HUNGARY	1	7.800	.794	9.823	.000	8 (0,0,0)	8 (0,0,0)	8 (0,0,0)
	2	2.357	.856	2.755	.016	35 (0,1,0)	38 (0,1,0)	40 (0,1,0)
	3	1.929	2.856	.675	.511*	-	-	-
	4	3.929	1.165	3.373	.005	59 (0,1,0)	63 (0,1,0)	67 (0,1,0)
	5	2.929	1.303	2.248	.043	44 (0,1,0)	47 (0,1,0)	50 (0,1,0)
	6	2.214	1.538	1.440	.174*	-	-	-
	7	2.357	1.923	1.226	.242*	-	-	-
POLAND	1	19.133	1.424	13.438	.000	19 (0,0,0)	19 (0,0,0)	19 (0,0,0)
	2	-1.000	1.593	-.628	.542*	-	-	-
	3	-1.929	.842	-2.291	.039	20 (0,1,0)	18 (0,1,0)	16 (0,1,0)
	4	3.000	.734	4.088	.001	69 (0,1,0)	72 (0,1,0)	75 (0,1,0)
	5	19.585	1.433	13.670	.000	19 (1,0,0)	19 (1,0,0)	19 (1,0,0)
	6	.786	.536	1.465	.167*	-	-	-
	7	1.071	.737	1.453	.170*	-	-	-
SLOVAKIA	1	1.286	.886	1.451	.170*	-	-	-
	2	2.429	1.753	1.385	.189*	-	-	-
	3	27.200	1.445	18.825	.000	27 (0,0,0)	27 (0,0,0)	27 (0,0,0)
	4	2.643	1.003	2.634	.021	68 (0,1,0)	70 (0,1,0)	73 (0,1,0)
	5	.857	.851	1.008	.332*	-	-	-
	6	-.502	.240	-2.094	.056*	-	-	-
	7	.643	1.003	.641	.533*	-	-	-

\*not significant forecasts

Source: own calculation.

The three future years were estimated for these categories. The type of model is specified in parentheses. These ARIMA models was used: (1,2,0) as differenced the second-order autoregressive model ; (0,0,0) as time series only containing a constant and white noise ; (1,1,0) as differenced first-order autoregressive model; (0,1,0) as random walk; (1,0,0) as first-order autoregressive model. Some of the models have not the significant forecasting, therefore these results were not included in the table.



### *The estimate of individuals purchasing products online in Czechia*

ARIMA modelling was used to estimate the potential of the online market in selected categories. The percent of individuals purchasing online products is estimated for the future three years. The prediction can help companies maintain customer even in the long run. The results of the ARIMA models estimating for all countries show table 2. An estimation analysis showed that there could be a reduction in the number of individuals buying online products in books, magazines and e-learning material category and tickets for events category. The continuous growth in the percentage of individuals is estimated in the case of food and groceries category and clothes and sports goods category. In the case of electronic equipment category, there is an increase up to 30% of individuals estimated.

### *The estimate of individuals purchasing products online in Hungary*

An estimation analysis showed that there could be a reduction in the number of individuals buying online products in the food and groceries category. Another finding is that in the case of the following categories the number of individuals purchasing these products is possible to continuous increase: household goods category; clothes and sports goods category and tickets for events category.

### *The estimate of individuals purchasing products online in Poland*

An estimation analysis showed that there could be a reduction in the number of individuals buying online products in the following two categories: food and groceries category and books, magazines and e-learning material category. Another finding is that in the case of the following category the continuously increasing number of individuals purchasing products online is estimated. This category is clothes and sports goods category. In the case of electronic equipment category, no change is estimated.

### *The estimate of individuals purchasing products online in Slovakia*

There was only two estimated significant in the case of Slovakia. It is evident from forecasting that a slight increase of percent of individuals purchasing online is in the case of books, magazines and e-learning material category. The continuous increase is significant in the case of clothes and sports goods category.

## **4 Discussion and limitations**

This paper analysed how customers' behaviour has changed in connection with online shopping acceptance in the Visegrad group market. Whereas the correct prediction of customer behaviour, early identification of their decision-making and mapping their needs helps companies maintain their customers in the long run as Stařková (2016) claims, an estimate of the percentage of individuals purchasing online products from 2019 to 2021 was made in this paper. The estimates were made the time series prediction using the ARIMA model. In examining customers' changes in purchases on individual markets, it was found that between 2004 and 2018 there was a fluctuation in online shopping preferences of individual products. As the largest negative change stated the development of the percent of individuals purchasing the category of books, magazines and e-learning material. This is claims in the fact that at the beginning of the time series this category was the largest in Poland, Hungary and Slovakia (in the second place in the Czech Republic), but about a half fewer individuals purchased products of this category in 2018. In the case of the market development strategy, there may not be much customers' interest in this category, but given the prediction, this strategy could be well

realized with the potential not to increase competitive pressures. Another significant change is evident in the category of clothes and sports goods. Customers' behaviour has changed so much, that this category is the largest category in the online market in all countries examined. In the case of market development strategy, all markets are appropriate due to the same customer popularity of this product and estimates of a continuous increase of individuals' percent purchasing these products online.

According to the results, it is also possible to propose the most suitable market for the application of a market development strategy for each product category. Poland and Slovakia can be recommended as appropriate markets for the clothes and sports goods category in view of a high number of individuals purchasing these goods online (65% and 66%) and a prediction (continuous increase in the percentage of individuals). Hungary can be recommended as the appropriate market for the electronic equipment category in view of a high number of individuals used to purchase it online (41%) without significant fluctuations in the time series and continuous increase estimated. Hungary can be also recommended as the appropriate market for of household goods category (33%) due to no significant fluctuations in the time series and continuous prediction of future individuals' percent of purchasers. Some of the product categories can not be recommended due to no significant estimates.

There are some limitations to the research. One of them is calculated with only annual data of customer online purchases. The secondary data sorted by a shorter time series are not available. This situation caused no possibility to estimate seasonal trends. Therefore, it would be advisable to conduct primary research and verify the results. Based on primary research, changes in shopping behaviour could also be explored more deeply. For example, creating a segmentation of, online customers across markets will be possible or define a typical customer for each market, which would help to optimize the marketing communication strategy. The next limitation is the ARIMA model itself because there can be other factors, which can influence the estimations. The model in this research did not calculate with other external factors in modelling. The analysis does not refute the importance of searching culturally or otherwise close countries in the case of internationalization of the first degree. However, scientifically proves that although the countries examined in this paper are culturally and in most cases linguistically close, the demand for online products is significantly different.

## 5 Conclusion

In conclusion, this paper has explored the development of online customers' behaviour, respectively changes in the percentage of individuals' purchasing products online. It was found that over time series some online categories lost the interest of customers (books, magazines and e-learning material category; electronic equipment category), while the other categories became very popular (clothes and sports goods category; household goods category).

According to the literature review, online shopping is still growing fast, but an estimate of the development from 2019 to 2021, using ARIMA modelling, has shown a possible stagnation of percent of individuals purchasing online products in some categories. The estimated stagnation may be caused by barriers that still exist in the online shopping environment. For example, these barriers include delivery barriers, infrastructural and cultural barriers (Nuseir et al., 2010), lack of skills and knowledge of computers and the internet (Chiu et al., 2009), political and economic barriers (Nabot et al., 2014). However, given the paper's topic, there are also specific factors related to online cross-border shopping, such as shopping costs, delivery time and return shipping costs (Huang and Chang, 2017). Managers have to include these barriers, among to the other things (e.g. choose of market entry strategy, budget, web design, marketing mix), in their strategic decisions in connection with the implementing a market development strategy for e-commerce in the Visegrad Group market. The choice of new market entry is dependent on many factors and many analyses. This paper analysed the development of customers' purchases to uncover the changing in preferences of online shopping across product categories. This is only one part of the aggregate analysis when considering entering a new market. This analysis brings

practical knowledge for managers by completing an overview of the current situation in the examined markets.

Based on ARIMA modelling and the analysis of changes in online customers' purchases behaviour, the individual markets of the Visegrad group can be recommended for each product category when considering the market development strategy from 2019 to 2021. In the case of clothes and sports goods category, the Polish and Slovak online markets appear the most suitable. Hungary online market seems to be the most suitable also in the case of electronic equipment category and household goods category. For all other online categories, it is not possible to determine the appropriate market precisely due to non-significant estimates of the time series predictions made. Business organization managers could also use other tools to capture all possible estimates when predicting future demand. However, they could also include the development of individuals' purchasing products online at a deeper level (e.g. analyse the factors that affected the observed fluctuations in time series) into multi-criteria decision-making. It was found that accepting of new technology (useful for online shopping) have an impact on the acceptance of online shopping. Strategic managers should note this situation and support and strive to create applications to enable online purchases of their products through new technologies (such as virtual or augmented reality, smart TV).

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