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AN ANALYSIS OF THE ROMANIAN E-COMMERCE TRADE TRENDS IN EUROPEAN PERSPECTIVE

Abstract: *The paper employs regression analysis of relevance to outline significant differences in the perception of Romanian urban customers regarding the evolution of e-commerce, as the most dynamic sales channel, against the background of the econometric analysis of trends in e-commerce across 29 EU countries, based on selected information society macroeconomic indicators. The conclusions of the macroeconomic analysis can be checked for the consumers by an empirical survey, examining the consumer attitudes and preferences about the use of electronic commerce in Romanian urban areas. The analyzed sample comprised 385 young urban consumers, stratified by gender, age, income, employment status and level of education, which were directly interviewed, the questionnaire containing 20 items. Based on the macroeconomic data analysis, the results showed that Romania is occupying one of the last places of the hierarchy of countries according to the number of computers users per 100 inhabitants, due to the lack of computers in the rural areas. The empirical analysis showed that the low usage rate of the e-commerce is due, in the opinion of users, to fear for fraud, the lack of trust in the payment safety on the internet, ineffective web-sites and also due to the low promotion of e-commerce. The main conclusions of the analysis pointed out that, in the near future, new selling technologies are thought to spread globally in each country, company and household.*

Keywords: *E-commerce; correlation and regression analysis; ANOVA; competition; consumer; sustainable development.*

JEL Classification: C35, G11

1. Introduction

Once Romania joined the European Union in 2008, it has emerged, as a necessity, the efficiency increase of the services sector, particularly of services

for population with significant effects on Romania's *sustainable development strategy*. Therefore, a way to achieve this objective is to ensure a balance between the economic, environmental and social needs, which defines and characterizes the sustainability in a country. Currently, Romania is in a process of convergence in the economic and social plan, towards European Union system. Among the many gaps which should be recovered, one of the most important is the information and knowledge concerning the e-commerce (http://oeconomica.org.ro/files/pdf/120.pdf). Thus, Romania is in an early stage of the knowledge revolution, with a somewhat higher emphasis on computerization of society. Many companies present their products on-line, Automated Banking services can be used for invoices, on-line reservations, booking hotels and other services. E-commerce started to expand globally in 1994, with the first websites with commercial purposes (McKnight et al., 2011). The development of electronic commerce was the one that has improved in the online marketing activity. Therefore, developing a multichannel marketing strategies involves understanding how evolving consumer, technology and competition. Buying behavior has changed radically, thanks and power facilities offered (Pelau and Bena, 2010).

In this context, the scientific point of view, e-commerce is defined as "a modern technology business, which addresses the needs of organizations, traders and consumers to reduce transaction costs while improving quality of goods and services and increasing the speed of delivery. The term can also be used when using computer networks to search and retrieve information for supporting human and institutional decision" (CRCE, 2000). Electronic commerce conception Economic Cooperation Organization and Development (OECD) is „doing business via the Internet, the sale of goods and services taking place offline or online" (OECD, 2015).

This exponential growth of the IT sector in Romania and other European countries has been taken into account in the Research-Development Strategy for the period 2007-2014, designed in the Lisbon Strategy for the European Union. A reasonable conclusion of this strategy is that e-commerce, as an important component of the Internet could lead to a tender cost reduction through a number of mechanisms, and could increase the competitive ability of a company, implicitly the possibility of developing their own businesses.

Also in the context of the emergence of the economic crisis in 2008, the term "*sustainability*" has gained a significant meaning, as a way to become competitive in the market. The involvement of organization leaders in

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developing and implementing the strategy of competitiveness through *sustainability* becomes mandatory in the current period designated for consolidating the global position of the European Union for the areas of research, innovation and technology, according to the long plan strategy, the Framework Programmed for Research and Innovation "Horizon 2020" (http://ec.europa.eu/research/horizon2020/20). In this respect, the present paper had as a main objective characterizing the evolution and tendencies of the e-commerce trade in 29 EU countries, followed by the characterization of the consumer's preferences and attitudes towards e-commerce. This allows the investment for the development and extension of the e-commerce as a premise for the *sustainable development of the companies.*

Romanian small companies are facing difficulties to participate to the global electronic markets. For SMEs, the key issue in the development of electronic markets is choosing specific strategies,as strategic partnerships, sharing arrangements for segments market, and franchising. At the same time, developing a sustainability strategy can be a waste of effort if it does not aim the possible targets in relation to regulations(http://www.insse.ro).According to Lai and Turban (2008) consumers must have confidence in the technology they use and the people who designed it.

The first part of the analysis emphasis the evolution of e-commerce for the group of 29 considered EU countries, between 2009-2014. For this, the Anova and regression analysis frame was presented. The research stages included observation and data selection, structuring and processing, data analysis and results interpretation. Concluding, in the last decade according to Kress (2002) we have witnessed a rapid growth of literature on the Internet developed around the concept. It was made by scientists from various fields such as computer science, telecommunications and engineering, but very few studies have been conducted by sociologists and even less by economic geographers. Finally, the conclusion was that, despite great advantages, the e-commerce, compared to the classic one, has a number of disadvantages, as possibilities of fraud; the Internet exposes companies to risks and uncertainties, no human contact, differential access to technology, and potential system failure (Xu, 2012).

2. Research methodology

The macroeconimc analysis results was completed with a survey research, aiming to identify the opinion and attitudes of the Romanian urban area consumer on e-commerce. Also the survey results are validating the macroeconomic analysis and the correlation results.

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2.1 Data Description

The secondary data were collected, from statistical publications of the National Institute of Statistics of Romania (2009-2014), International Telecommunication Union (2009-2014) and published data in other public reports as: National Bank of Romania between 2009-2014. The following macroeconomic indicators were used for characterizing the e-commerce trends in Europe: Total GDP index (GDPI), Number of fixed telephone lines per 100 inhabitants (NFT), Number of Internet users per 100 inhabitants (NIU), Number of Broadband Internet subscribers per 100 inhabitants (NBI). For the primary data collection, a target population was selected, made of people who occasionally use the internet, irrespective of their education or income level. In sample size estimation, the following factors were taken into account: funds for research (Nicolescu, Luminita; Dima, AlinaMihaela, 2010), number and education level of the survey participants (Dima, AlinaMihaela, 2009), complexity and duration of the survey. In designing the questionnaire, the funnel method was applied. Data were collected during May 28th 2015 – August 20th 2015, using an open questions questionnaire, and the main limitation of data collection process was the lack of cooperation of the persons surveyed. The main objectives of the study were: identifying age, gender, income and educational levels of the occupational respondents; identify the source of consumer information on using trade electronic; identification of the main reasons for the use of electronic commerce in the respondents' opinion; determine the advantages and disadvantages of electronic commerce; determining the degree of penetration of electronic commerce in Romania compared to EU countries; identifying prospects for development of electronic commerce in Romania in order to increase business sustainability.

The main assumptions of the study were: most of the respondents think that e-commerce is efficient; most of the respondents use e-commerce monthly or bimonthly; most of the respondents use e-commerce in market services; most of the respondents reach e-commerce through electronic payment terminals; most of the respondents like e-commerce because it is fast and simple. The assumptions were statistically tested further on in the analysis.

2.2 Method of analysis

2.2.1 Mathematical formalization for characterization of the electronic commerce trends at European level based on secondary data

The analysis and characterization data on trends shaping e-commerce in the 29 EU countries was based on the study of correlations that can be drawn as a result of the regression methods. The support software in processing the data

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it was used EViews. The choice of *regression* (Yule and Kendall, 1960), term introduced for the first time as a statistical concept in 1886 by the English statistician Francis Galton, in order to characterize the existing interdependencies between social economic variables, was determined by the objectives of identifying the shape function, correct IT, measuring the intensity and characterizing the type of correlation between indicators at European level. Multiple linear regression model used in the paper to analyze the dependency of a dependent variable / endogenous (GDPI), Y and k-1 independent variables / exogenous x_2, x_3, ..., x_k (fixed line number quantification of the effects of various factors that characterize the e-commerce as part of the per 100 inhabitants-NFT, number of Internet users 100 inhabitants-NIU, number of broadband Internet subscribers per 100 inhabitants-NBI) and a random variable described by the following set of equations (Andrei and Bourbonnais, 2008).

$$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + ... + \beta_k x_{ik} + \varepsilon_i \quad cu \ i = \overline{1, N}$$

$$GDPI = \beta_0 + \beta_1 NFT + \beta_2 NIU + \beta_3 NBI + \varepsilon_i \quad cu \ i = \overline{1, N}$$

For each statistic,,,i '', each equations valid, resulting in a system of ,, Linear equations:
$$y_1 = \beta_0 + \beta_1 x_{11} + \beta_2 x_{12} + ... + \beta_k x_{1k} + \varepsilon_1$$

$$y_2 = \beta_0 + \beta_1 x_{21} + \beta_2 x_{22} + ... + \beta_k x_{2k} + \varepsilon_2$$

....

$$y_N = \beta_0 + \beta_1 x_{N1} + \beta_2 x_{N2} + ... + \beta_k x_{Nk} + \varepsilon_N$$

Y = (y_1,y_N) column vector of the endogenous variable, $i = \overline{1, N}$, size (N,1)
β= ($β_{1,...}$,$β_K$) = is a column vector of parameters (βj) of the regression model size
ε= ($ε_1$,…,$ε_N$) = is a random variable of the column vector
i=1, N where N is the number of units (in the application n = 174);

The values of the parameters estimators are obtained using the OLS method that assumes the minimization of the error function. Determination of the estimators of the parameters by OLS method, involves minimizing the sum of squared deviations of empirical values (y_i) and theoretical values derived from model. The intensity of the correlation between variables is analyzed according to the value of the ratio of correlation. Testing the validity of multiple model, we performed in our paper the Fisher-Snedecor test (1920, R.A. Fisher and Snedecor GW). Checking the hypothesis of independence of errors for multiple linear regression models, the Durbin-Watson test.To check the hypothesis of normality of errors Jarque-Berra, Breusch-Godfrey(Andrei et al., 2008) test was performed. This is an asymptotic test (applicable in case of a large volume sample), following

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a chi-squared distribution with a number of degrees of freedom equal to 2.The regression model drawback is the neglecting of the relationship between independent variables, so that the model is not affected by colinearity.

2.2.2 Statistical measures to establish the portrait of the typical e-commerce user from the urban environment in Romania, based on primary data

In terms of profiling the typical e-commerce user, this paper used descriptive statistical indicators such as the mean, variance and the coefficient of variation. Also, in order to establish the interdependency between variables included in the questionnaire indicators were used for measuring the intensity of correlation and association as: coefficient of association, coefficient of determination, the chi-squared test. TheChi-squared test, the population's parameters estimation is related to the OLS method developed by A. M. Legendre (1805) and C. F. Gauss (1809), associated with the normal distribution defined by Gauss – Laplace. Fisher and V. Pearson contributed in their paper "Statistic theory of estimation" in 1925 to the estimation theory development (Dobroesbeke, 1988). In the current survey, there is a simple selection procedure used.

3. Results interpretation

3.1 Analysis and Results based on secondary data

To check whether there is a relationship between the indicators mentioned above in the paper we used a multiple linear regression model. During 2010-2014 the situation of the number of Internet users per 100 inhabitants in Europe is presented in Table 1.

In the latest rankings of the European Union (http://www.itu.int/en/ITU-D/Statistics/Pages/publications/default.aspx) Scandinavian countries dominated the top positions regarding the use of electronic commerce.

Table 1 – The main indicators of Information Society in Europe 2010-2014

Number of users per 100 inhabitants					
Variation range	2010	2011	2012	2013	2014
40%-60%	Turkey, Romania Bulgaria Cyprus, Greece, Hungary, Italy, Portugal	Turkey, Romania Bulgaria, Cyprus, Greece, Hungary, Italy, Portugal	Turkey, Romania Bulgaria, Greece, Italy	Turkey, RomaniaBulgaria,Greece	Turkey, Romania

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	Austria, Belgium, Czech Republic, Estonia, Ireland, Latvia, Lithuania, Malta, Poland, Slovakia, Spain, Slovenia, United Kingdom	Austria, Belgium, Czech Republic, Estonia, Ireland, Latvia, Lithuania, Malta, Poland, Slovakia, Spain, Slovenia, France, Hungary	Cyprus, Czech Republic, Estonia, Hungary, Ireland, Latvia, Lithuania, Spain Malta, Poland, Slovakia, Croatia, Slovenia, Portugal	Cyprus, Czech Republic, Hungary Malta, Lithuania, Italy, Poland, Croatia, Slovakia, Spain, Slovenia, Portugal	Italy, Spain, Slovenia, Malta, Poland, Portugal, Cyprus, Hungary Lithuania, Greece, Croatia, Bulgaria
60%-80%					
Over 80%	Denmark, Finland, Germany, Luxembourg,Netherlands, Sweden, France	Denmark, Finland, Germany, Luxembourg, Netherlands, Sweden, United Kingdom	Austria, Belgium Denmark, Finland, France, Germany, Luxembourg, Netherlands, Sweden, United Kingdom	Austria, Belgium Denmark, Latvia Finland, France, Germany, Luxemboug, Netherlands, Sweden, United Kingdom, Estonia, Ireland	Denmark, Austria, Netherlands, Slovakia, Latvia France, Germany Luxembourg, Ireland, Estonia, Belgium, Finland Czech Republic, Sweden, United Kingdom

Source: International Telecommunication Union (ITU, 2009-2014)

What distinguishes these from other countries is the amplitude with which the Internet has entered the market and redefined the commercial transactions as well as the public interest for Internet technology in everyday life. In contrast to their Northern European neighbors, the *Southern Europeans* continue to be skeptic with the Internet. Recent years in the field of information science and was one of the most dynamic in Romania, still a significant gap between our country and European level. In addition we shall state that the discrepancies in Romania are also significant between *urban and rural areas,* between branches, between the economic activities between firms by their size.

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As a conclusion, it can be stressed that the purchasing power in *rural areas* is low due to the low incomes, the lack of access to modern tools of marketing of goods (the Internet) and the mental barriers that persist in the rural areas. It is estimated an increasing number of Internet users in the European Union and the world. In the period 2012-2014 the computer networks have expanded and developed mainly in a variety of areas such as: banking, public administration, health care, tourism, transport, etc. (Dinu, 2014).

For the regression analysis, the GDPIindeces was considered as the dependent variable (y) influenced by a set of three independent variables (regressors), which are the number of fixed telephone lines per 100 inhabitants (x_1), the number of Internet users per 100 inhabitants (x_2) and the number of broadband Internet subscribers per 100 inhabitants (x_3), as independent variables. Multiple regression analysis covered the following stages, the development of the regression model, estimating model parameters and check the accuracy of the results. From correlation chart, it can be appreciated that network points chart (**Figure 1 and Figure 2**) are uniformly distributed without gaps between them, so it is concluded that the correlation between the factorial variables which characterize the European electronic trade and GDPI indices in 29 EU countries, is a linear direct one.
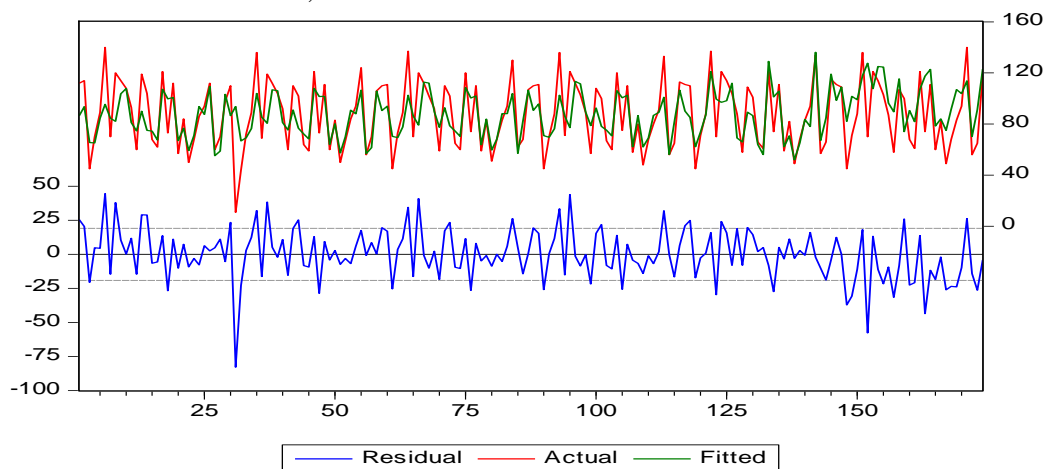

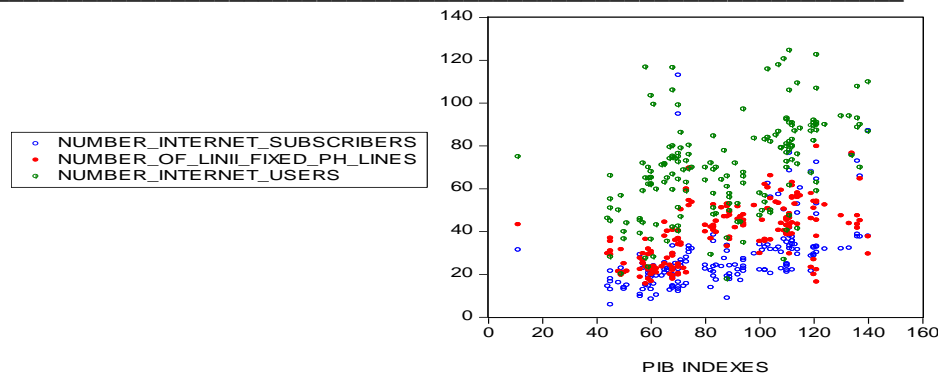**Figure1. Actual, Fitted, Residual Graph**

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Figure 2. Scatter diagram

By applying a multiple linear regression model using EViews (EViews, User Guide,and Version 7.0) software package the following output of results, concerning the intensity of the correlation the model obtained for the sample of data, the validity of the model (Fisher test), the possibility of results extension and the residual analysis (checking the normality of the errors distribution and the independence of errors), summarized in **Table 2** were obtained.

Table 2 Correlations of GDPI indices and changes in broadband Internet subscribers, number of fixed telephone lines, and Internet users

Dependent Variable: PIB INDEXES
Method: Panel Least Squares
Sample: 2009-2014
Total panel (balanced) observations :174
PIB_INDEXES=C(1)+C(2)*NUMBER_INTERNET_SUBSCRIBERS+C(3)*NUMBER_OF_FIXED_PH_LINES +C(4)* NUMBER_INTERNET_USERS

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	21.42375	5.730983	3.740195	0.0004
C(2)	0.342082	0.108111	3.304181	0.0018
C(3)	0.831488	0.110347	7.262905	0.0000
C(4)	0.357993	0.071136	5.063960	0.0000
R-squared	0.561166	Mean dependent var		88.36161
Adjusted R-squared	0.552010	S.D. dependent var		25.6017
F-statistic	60.10256	Durbin-Watson stat		2.20684
Prob(F-statistic)	0.000000	Standard Error		17.99

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Analysing the evolution of total GDPIindices during 2009-2014, according to the independent variables (number of broadband Internet subscribers per 100 inhabitants, the number of fixed telephone lines per 100 inhabitants, the number of Internet users per 100 inhabitants) the following results were obtained for the multiple regression function using the multifactorial linear regression model (see **Table 2**): $\hat{Y} = 21.42 + 0.34x_1 + 0.83x_2 + 0.35x_3$ with the standard errors of the regression coefficients: (0.10), (0.11), (0.07) .

The model estimation results were statistically significant for a significance level of 5% for all independent variables included in the model. OLS assumptions are checked for the same level of significance, except the hypothesis of errors autocorrelation, tested with Durbin-Watson test. The statistics value DW = 2.20, which is compared it with the critical statistical values for α = 0.05, p = 3 and n = 174; d1=1.63 and d2 =1.72 suggests that errors are positive autocorrelation. Using the software package EViews further to calculate Jarque-Berra test (Figure 3) is found that p(JB)= 0.00, so it can be consider that the assumption of normality of errors is rejected. The intensity of the relationship between the variables of this model is measured by a multiple correlation ratio $R_{y/x_1,x_2,x_3}$ equal to 0.75; the relationship between variables is of medium to high intensity and direct one. The independent variables included in multiple linear correlation models explain 56% of variation in GDPI indices, the difference of 44% representing the influence of other factors. The correlation is depicted by a valid model.

Checking the accuracy of the multiple regression models and of the multiple correlation ratios, based on "Fisher" criterion, leads to the following conclusion: because the probability Sig. F is less than 0.05 the regression model is valid, with a significance level of 0.05.Also we consider that the independent variables included in the model have an influence on the variation of the dependent variable (GDP indices) contributing to its average annual growth rate. The main conclusion of the regression model was that e-commerce variables are influencing a significant share of 56% of the indices of GDP for the group of 29 countries.
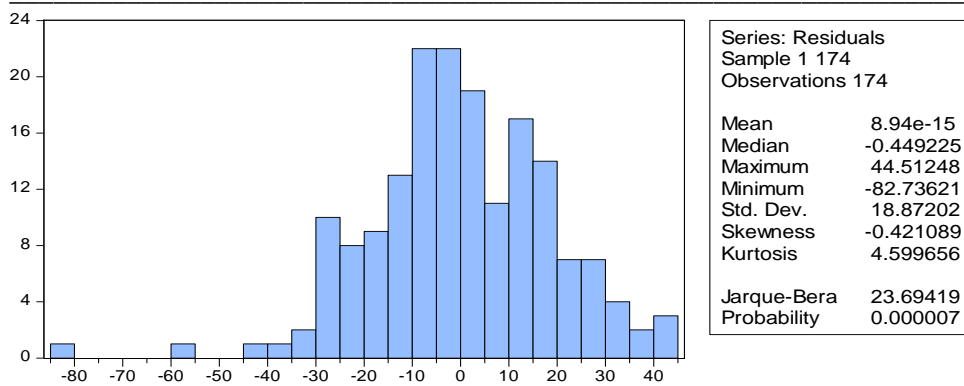
Figure 3. Errors normality distribution for multiple regression model

To detect errors autocorrelation using empirical methods that test Breusch-Godfrey. With this test will analyze the existence of autocorrelation of order k, k ≠ 1. It is assumed that the error of the regression model is given by the equation:

$$\varepsilon_t = \rho_1 \varepsilon_{t-1} + \rho_2 \varepsilon_{t-2} + ... + \rho_k \varepsilon_{t-k} + v_t \text{ , for t = k,...,n, but } v_t \sim N(0, \sigma_v^2)$$

In order to evaluate the statistical presence of an autocorrelation of the order k to be used the following statistical hypotheses:

$H_0: \rho_1 = \rho_2 = ... = \rho_k = 0$;the residuals are not correlated

$H_1: \rho_1 \neq 0$ or $\rho_2 \neq 0$ or $\rho_s \neq 0$; the residuals are correlated

It is seen by applying statistical software (EViews) statistical probability F is 0.42 (high) model does not show autocorrelation of order 2 (see Table 3).

Table 3. Breusch-Godfrey Test for multiple regression model

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.871670	Prob. F(2,168)	0.4201
Obs*R-squared	1.787058	Prob. Chi-Square(2)	0.4092

As a result of systematic statistical data on e-commerce activities in 29 EU countries during 2009-2014 were determined derived indicators, which enable a first form of macroeconomic indicators that characterize this area (see Table 4).

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Table 4. Determination of the central tendency, variation and asymmetry for the regression model variables which influence the e-commerce activity for 29 UE countries

Indicators	GDP indexes	Number of broadband Internet subscribers	Number of fixed telephone lines	Number of Internet users
Mean	87.78161	29.39805	39.18724	69.54555
Median	88.00000	24.35000	40.28500	70.00000
Maximum	140.0000	113.0000	79.80000	124.6000
Minimum	11.00000	5.900000	15.60000	17.80000
Std. Dev.	26.20017	16.63724	13.37699	22.12312
Skewness	0.009543	2.063844	0.246802	0.113519
Coefficient of homogeneity-%	29.84	56.58	34.12	31.80
Observations	174	174	174	174

The annual average of **number of broadband Internet subscribers** in 29 EU countries in the period 2009-2014 amounted 30 numbers per100 inhabitants/year which has a very low representativeness, slightly over the threshold of 35%, caused by a sample variation degree of 276.55 which makes the high and positive value of the asymmetry coefficient (2.06 numbers per100 inhabitants) indicate a value of a number of broadband Internet subscribers with a small amount above its average value of 24.35 numbers per100 inhabitants/year. The annual average of **GDPI indexes** in 29 EU countries in the period 2009-2014 amounted 88 % has low coefficient of homogeneity (26.2%), which can also be seen in the value of the maximum range of variation (129%). The skewness is positive and small in value (0.009). The maximum range of variation of 64.2 numbers per 100 inhabitants/year is low, leading to a low and positive skewness (0.24). Between 2009-2014 the annual average of **number of Internet users** was no higher than 69.54 numbers per 100 inhabitants/year, with a low coefficient of homogeneity (31.8%), which can also be seen in the value of the maximum range of variation (106.8 numbers per 100 inhabitants/year,). The asymmetry is positive and small in value (0.11).

In conclusion, we can say that the model is correctly specified, that **number of broadband Internet subscribers, number of fixed telephone** and **number of Internet users** are significant factors for GDPI indexes, since the estimators are significantly different from zero and correctly identified as the model explains most of the variation for GDPI indexes.

3.2 Analysis and results based on primary data

*Horizontal analysis.*The profile of the e-commerce consumer, as drawn from the analysis, involves a masculine gender (55%), an average age of 30 years, persons which have enough experience in their fields of business, with an average monthly income, for frequent users, of 450 euros (http://www.bnr.ro/Cursul-de-schimb-3544.aspx). The occupational structure of the respondents pool shows that most of them have liberal professions (students, owners, freelancers), and about half of them are clerks. Most of them have graduated from college, or at least high school and 75% hold a managerial position. For most of the respondents, internet has more than one purpose, being a communication, information, socialization tool.

In general the use of electronic commerce in Romania focuses on recreational and cultural services, those aimed at leisure time because this form of marketing offers a wide range of attractive consumer information regardless of gender, age, employment status, income, etc. The top three reasons that determine the consumers to use e-commerce services are a*n appropriate payment system (credit card) - 35%*, *the time saved* 30%, *income* for 19% and *certain programs of Electronic Security* for and 12%. The category „*other"* was listed the following reasons: the influence of friends, speed the deployment process, the existence of several Romanian virtual shops, to complete insurance against fraud on the Internet with insignificant percentages. They consider expansion and development of this form of marketing and sales is not enough known and used fact that results from the data at European level in terms of Internet usage, where Romania, is located on the last places. A main cause of this trend of low population accessing the information and communications technology is the development disparities between regions in Romania. The favorable opinion on increasing the sustainability companies in Romania using electronic commerce is resulting from the very basic pillars of *sustainability concerning the following key issues: increasing competitiveness through innovation and transfer of new technologies and organizational development and integration of IT in the companies, developing IT personnel*(http://oeconomica.org.ro/files/pdf/120.pdf). Among the main advantages of using electronic commerce respondents listed mainly stands: *convenience* (40%), *speed and lack of intermediaries* (17-18%), *accessibility* (15%). The three benefits, in the opinion of those surveyed, are the main ways that should develop IT companies in Romania. Another way of expanding and diversifying the means of selling the business, would be building sites more efficient, attractive and effective information. As regards the main disadvantages of using electronic commerce it was obtained the following distribution of responses: 30% *fall-servers*; 27% *low connection speed*; 22% *Possibilities of fraud*; *Offset too high after its receipt* at the *checkout* -18%. The category "*Other*" answers were

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mentioned such as: failure to update the site, inadequate presentation of the product, etc.

*Vertical analysis (relationships between variables).*This analysis intended to characterize the statistical associations and correlations between variables in order to draw some essential characteristics such as sample homogeneity, association, variation and intensity of correlations. Thus, the overall corporate average age of respondents who practice e-commerce is 30.6 years with a coefficient of homogeneity below 30%, suggesting that this community is homogeneous and the average age of is representative for the sample (**Table 5**). In terms of the average net monthly income this is 450 Euro with a coefficient of variation of 28%, the average being a representative value to characterize the respondents.

To verify the existence of the association between the respondents' gender and the main factors that influence to use electronic commerce, the chi-squared test was used. In order to evaluate the level of association between gender and the factors charactering the e-commerce use (preferred payment method, the time saved and the income) the following hypothesis were defined, the null hypothesis as, the factors characterizing the e-commerce use are similar for men and women vs. the alternative hypothesis, stating that the level of the factors characterizing the e-commerce are different for men and women.

Table 5. Descriptive Statistical Measures

	N	Minim	Maxim	Average	Sample Variance		Coefficient of homogeneity
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	
Age (years)	385	15	60	30.6	7.47	0.38	0.23
Average net monthly income (RON)*	385	500	3000	2050.12	331923	29.36	0.28

*1 EUR= 4. 44 RON, http://www.bnr.ro/Cursul-de-schimb-3544.aspx

Source: Authors, based on the survey

The first association used to decide if the preferred payment method is the same or not for men and women, **chi-squared** calculated value is 21.25, result that is compared with chi squared critical value of 6.63, identified according to the degrees of freedom and the significance level. It can state that the men prefer a different payment method, by credit card, than the women, mostly preferring to

pay cash. Concerning the existence of the association between the gender respondents and duration of transaction when using e-commerce, chi-squared calculated value is 8.70 and the critical one is 6.63, meaning that the men are using faster the internet when buying compared to women.

Measuring the intensity of the association between respondents' gender and the factors characterizing the e-commerce use, with Yule coefficient, the result shows an average intensity direct association (0.6). The case study finds a user profile of a typical Romanian urban e-commerce showing that the majority of e-commerce users are falling into the middle-income class is males and highly educated, they do not hold managerial positions and they have a relatively stable job.

4. Discussions and conclusions

The core conclusions are that in Romania the gender is a determining factor differentiating the use of electronic commerce. The age is also a significant factor, because the older people are not using the Internet in Romania. The training level and the education level are other significant factors of influence because the higher education provides a better adaptability for users to the new technologies Location is another important factor for internet use, due to the fact that there is a gap between the urban and the rural areas. One of the main conclusion that can be drawn is that the transition from the classical trade to e-commerce needs to be done gradually. The technology cannot be used by untrained consumers and providers (Kotler et al., 2009). Another conclusion of this paper highlighted the impact that the e-commerce will have on the life's of consumers and companies. It will reduce the *distance* between seller and buyer, allowing the knowledge of individual customer profile and performing marketing on the new bases and also it will provide the *sustainability of global growth*(Gay et al., 2007). Chen and Zhang (2015) underline that within the process of globalization and sustainable development through technology, ,,electronic commerce as a new business model has an effect on peoples lifes'more and more ".

The proposals that the authors suggest at end of the paper can be summarized as follows. Firstly, as most part of the population does not have yet a personal computer, the easiest way to generalized access to Internet is to focus on the communities and institutions, through schools, public libraries, Internet cafes and community access other positions. A suggestion to this effect could be to connect all schools to the Internet both in urban and in rural areas where access to information technology is still low in Romania compared to the set of 29 EU countries. Another suggestion, from a similar older research, is to implement and promote programs to educate people of any age, occupation, educational level and

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in any social environment in order to ease computers and Internet use(Ciobotar, at all, 2015).

Also, encouraging companies to present their business on the Internet and attract potential consumers, to ensure access to information necessary for building and developing a web site, in order to lead to a successful online business represents a recommendation of the authors. Therefore access to information technology has become a necessity both in personal and professional interest. Another aspect that should be considered is trying to reduce the lack of trust of consumers in terms of data security on the Internet as well as the need for their protection. Looking ahead, we witness that in many areas, consumers face increasingly more complex environments, and this trend will likely continue in the future as a result of the technological developments.

Other examples include the development of electronic commerce (which extends its range of products available and weakens the influence of advertising, reversing the trends we knew in classic consumer markets), the intensification of globalization, and the option for sustainable and responsible consumption. Thus, the conclusions of our study may be regarded as an anticipation of these trends, which significantly alter the consumption patterns and, consequently, the consumer choices.

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Appendix 1

Matrix multifactorial model results are as follows:

X^{-1} *X (**the inverse matrix***matrix unit)

$$
\begin{bmatrix}
174 & 5115.555 & 6818.58 & 12100.965 \\
5115.555 & 198291.2447 & 217197.0172 & 385541.5868 \\
6818.58 & 217197.0172 & 298158.6408 & 482210.6389 \\
12100.965 & 385541.5868 & 482210.6389 & 926245.1404
\end{bmatrix}
$$

X^{-1} (The inverse matrix)

$$
\begin{bmatrix}
0.10136022 & 0.00032518 & -0.00122967 & 0.00081940 \\
0.00032518 & 0.00003225 & -0.00001486 & 0.00000993 \\
-0.00122967 & -0.00001486 & 0.00003996 & 0.00000145 \\
-0.00081940 & -0.00000993 & 0.00000145 & 0.00001517
\end{bmatrix}
$$

X^{t} (transposed matrix)

$$
\begin{bmatrix}
15374 \\
492518.845 \\
636507.55 \\
1115886.645
\end{bmatrix}
$$