

INTERNET, E-COMMERCE AND E-GOVERNMENT: MEASURING THE GAP BETWEEN EUROPEAN DEVELOPED AND POST-COMMUNIST COUNTRIES

Jovana Zoroja*

Department of Informatics, Faculty of Economics and Business, University of Zagreb
Zagreb, Croatia

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ABSTRACT

The paper analyses the extent to which information technology is used in European developed and post-communist countries. Indicators such as internet usage, e-commerce and e-government are used to measure the gap between European developed and post-communist countries. Special focus is given to the analysis of the difference in the level of education of male and female inhabitants who use internet, e-commerce and e-government services in European developed and post-communist countries.

The main two assumptions of this paper are: (1) usage of information technology in three important areas: internet usage, e-commerce and e-government is lower in European post-communist countries than in developed countries and (2) male users with high level of education use information technology more than female users in European developed and post-communist countries. Lower usage and lower investments in information technology and also low level of education could be significant barriers towards further economic development of European post-communist countries.

Data from European Statistics Database, section Information Society Statistics, were used during research for this paper.

KEY WORDS

Internet usage, e-commerce, e-government, gender, European developed and post-communist countries, level of education

CLASSIFICATION

ACM: [J8] Internet Applications

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*Corresponding author, *η*: jzoroja@efzg.hr; +385 1 238 3276;
Faculty of Economics and Business, Trg J. F. Kennedyja 6, 10 000 Zagreb, Croatia

INTRODUCTION

Information technology is almost indispensable in most aspects of everyday life and work [1] and it is changing every aspect of life [2]. It is used in every aspect of society, politics, daily routines and lifestyle and economy: e-commerce, e-government, e-health, e-learning, e-finance [3]. Information technology can provide an opportunity for education, personal growth, re-define careers [4].

Based on Internet World Stats there were 1,9 billion Internet users worldwide in 2010 [5]. Iceland has the most Internet users per capita of any country in the world (over 86 % of residents use the Internet, compared with 69 % of Americans). Differences in using Internet between countries are still significant [6].

Information technology is growing rapidly and offers broad range of possibilities for businesses (e.g. reduced transactional costs, lower cost customer service) [7]. There are also positive effects on the competitiveness and efficient operations of all sectors of economy [1] and it has been accepted that information technology is significant input to economic growth [3]. Investments in development and usage of information technology could offer countries an opportunity to increase productivity and economic growth [6]. Indicators, such as investments and usage, have led to many initiatives by developed countries, United Nations, OECD, international organizations intended to increase information technology usage.

There is a great gap between European developed and post-communist countries and people in developed countries have better access to information technology and use it more than the people in post-communist countries [6]. Firms in European post-communist countries that have Internet access are more successful and they export more than firms that do not have Internet access. Firms that do not use information technology will soon be out of business [1]. Some of European post-communist countries made a big progress since the transition began, such as Slovenia and Estonia, but many others are lagging far behind such as Bulgaria, Romania and Hungary [8]. Information technology can accelerated the convergence of European post-communist countries with developed countries, but that depends on quality of the economic and institutional environment [9]. It was also confirmed that there is a strong positive correlation between information technology and economic development [7]. Despite of differences in using information technology, its use is beginning to increase in European developed and post-communist countries every year.

The main purpose is to analyse whether an information technology gap exists among European developed and post-communist countries in the three important areas: internet usage, e-commerce and e-government. As these areas are important for the economic development [10], the goal of the paper is to determine whether there have been positive shifts in the 2005 and then in 2010 in percentages of population that use them. Beyond this, the second goal is to define the difference of male and female users of internet, e-commerce and e-government services with low, medium and high level of education. Most important factors that influence the level of Internet usage are education, income and gender [11]. Differences between male and female users based on level of education are compared in European developed and post-communist countries.

The paper is organized as follows; at the beginning there is an introduction part. Section two defines research methodology and statistical analysis. Section three presents statistical data for all three categories: internet usage, e-commerce and e-government in European developed and post-communist countries. Discussion part explains our findings and results. Section five concludes the paper.

RESEARCH METHODOLOGY AND ANALYSIS

The research was conducted with the usage of Eurostat, Statistics Database, section Information Society Statistics. Data from three sub sections of section Information Society Statistics are used: Internet use and activities, Internet purchases by individuals and Individuals using Internet for interaction with public authorities.

Out of 34 European countries, 31 are used for analysis. There were no data for Lichtenstein and Switzerland. Turkey was left out from the analysis, because it is neither a European developed country nor could be considered as a European post-communist country. Other 31 European countries (Table 1) are divided into 2 groups: developed and post-communist countries.

Table 1. European developed and post-communist countries, Source: Eurostat.

| European developed countries | | European post-communist countries | | |
|--|-----------------------------------|---|----------------------|---------------------------|
| EU 15 | Other | EU members from 2004 | EU members from 2007 | EU candidate countries |
| Belgium, Denmark, Germany, Ireland, Greece, Spain, France, Italy, Luxembourg, Netherlands, Austria, Portugal, Finland, Sweden and UK | Norway, Iceland, Cyprus and Malta | Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Slovenia, Slovakia | Bulgaria and Romania | Croatia and FYR Macedonia |

Data are collected by National Statistical Institutes or Ministries, and are based on Eurostat's annual model survey on Information and Communication Technologies usage. Data relates to the first quarter of the reference year. Classification of data is: by age, by gender, by educational level, by occupation, by employment situation, by degree of urbanisation, by bandwidth and by region.

In this research we use data classified by gender (all users, male and female) and by educational level (low, medium and high) for both groups of countries. Percentage of individuals in a particular country (aged 16-74) that used Internet at least once within the last 12 months (*Internet use and activities*) was investigated. The same analysis was conducted for percentage of individuals in a particular country (aged 16-74) that made their last online purchase within the last three months (*Internet purchases by individuals*) and percentage of individuals in a particular country that used the Internet to interact with public authorities (*Individuals using Internet for interaction with public authorities*).

Mean and standard deviation at the country-group level were calculated. Mann-Whitney non-parametric test was used in order to test statistical significance of the differences between European developed and post-communist countries. SAS Software V9.1.3 was used for all statistical analysis.

INTERNET USERS

Table 2 presents percentage of individuals using the Internet divided by gender and level of education in the year 2005 and 2010. The goal of the research is to see whether there have been some positive changes after the five year period for both groups of countries.

The first part of Table 2 shows the percentage of internet users divided only by gender and it has increased in both groups of countries in 2005 and 2010 year. There is almost no difference in percentage of internet users in European post-communist countries in year 2005 (35 %) and 2010 (55 %). There is the highest percentage of male internet users in European

developed countries in both years. Mann-Whitney test showed that the difference between European developed and post-communist countries is statistically significant for both years, except for all users and female users in 2005.

Percentage of *internet users (all, male and female) with low level of education* has increased in both groups of countries from 2005 to 2010 (Table 2). The percentage of female Internet users is lowest in both groups of countries, in 2005 and 2010 year. In European developed countries, average percentage of all users was about one third of the population in 2005, and in year 2010 this proportion increased to one half. In European post-communist countries, average percentage of all users was about one quarter of the population in 2005, and in year 2010 this proportion increased to one third. Mann-Whitney test showed that the difference in

Table 2. Percentage of individuals divided by gender and level of education using the Internet. Source: Eurostat, analysis made by author.

| Year | Internet Users | Mean | | Standard deviation | | Mann-Whitney <i>U</i> | Exact Sig., 2-(1-tailed Sig.) |
|------|----------------|------------------------------|--------------------------|------------------------------|--------------------------|-----------------------|-------------------------------|
| | | European developed countries | Post-communist countries | European developed countries | Post-communist countries | | |
| 2005 | All Users | 50,7 % | 36,5 % | 20,4 % | 9,1 % | 46,0 | 0,160 |
| 2010 | | 71,3 % | 56,7 % | 16,5 % | 11,3 % | 56,5* | 0,018 |
| 2005 | Female | 46,2 % | 34,8 % | 19,8 % | 8,6 % | 49,0 | 0,216 |
| 2010 | | 68,3 % | 54,3 % | 17,4 % | 11,7 % | 58,0* | 0,023 |
| 2005 | Male | 55,3 % | 38,4 % | 21,0 % | 9,8 % | 39,5** | 0,070 |
| 2010 | | 74,3 % | 58,8 % | 15,7 % | 11,4 % | 51,5* | 0,010 |

Level of Education: LOW

| | | | | | | | |
|------|-----------|--------|--------|--------|--------|--------|-------|
| 2005 | All Users | 33,2 % | 24,0 % | 21,0 % | 10,3 % | 50,5 | 0,458 |
| 2010 | | 52,5 % | 36,7 % | 21,7 % | 14,6 % | 67,0** | 0,059 |
| 2005 | Female | 28,1 % | 17,3 % | 19,8 % | 5,9 % | 40,5 | 0,378 |
| 2010 | | 47,8 % | 32,7 % | 21,6 % | 13,6 % | 63,0* | 0,039 |
| 2005 | Male | 39,5 % | 25,2 % | 23,7 % | 7,5 % | 35,5 | 0,286 |
| 2010 | | 57,8 % | 41,4 % | 22,3 % | 16,1 % | 64,5* | 0,043 |

Level of Education: MEDIUM

| | | | | | | | |
|------|-----------|--------|--------|--------|--------|--------|-------|
| 2005 | All Users | 57,1 % | 34,9 % | 17,6 % | 12,1 % | 18,0** | 0,002 |
| 2010 | | 79,3 % | 57,3 % | 13,4 % | 12,6 % | 28,5** | 0,000 |
| 2005 | Female | 53,2 % | 33,1 % | 17,2 % | 10,8 % | 25,5** | 0,008 |
| 2010 | | 76,8 % | 54,6 % | 14,4 % | 11,9 % | 29,5** | 0,000 |
| 2005 | Male | 60,9 % | 36,6 % | 12,9 % | 13,5 % | 16,0** | 0,001 |
| 2010 | | 81,6 % | 59,4 % | 12,6 % | 6,2 % | 26,5** | 0,000 |

Level of Education: HIGH

| | | | | | | | |
|------|-----------|--------|--------|--------|-------|--------|-------|
| 2005 | All Users | 77,4 % | 68,0 % | 13,4 % | 5,1 % | 31,0** | 0,055 |
| 2010 | | 91,4 % | 86,4 % | 7,1 % | 3,8 % | 52,5* | 0,011 |
| 2005 | Female | 72,8 % | 63,9 % | 15,2 % | 4,9 % | 37,5 | 0,125 |
| 2010 | | 89,4 % | 85,9 % | 7,9 % | 3,9 % | 55,0* | 0,025 |
| 2005 | Male | 82,3 % | 72,8 % | 12,6 % | 6,2 % | 24,0** | 0,062 |
| 2010 | | 92,3 % | 86,8 % | 6,4 % | 5,0 % | 47,5** | 0,009 |

*statistically significant at 5 % level

**statistically significant at 1 % level

percentage of individuals using Internet between European developed and post-communist countries is not statistically significant for all users, male and female users in 2005. Mann-Whitney test also showed that the difference in percentage of population of Internet users between European developed and post-communist countries is statistically significant for all users, male and female users in 2010 year.

Percentage of *internet users (all, male and female) with medium level of education* has increased in both groups of countries between 2005 and 2010. The lowest usage of Internet is among female population in European post-communist countries, and the highest usage is among male population in European developed countries. During the study period, the European developed countries had an average growth of 23 % of female internet users and 21 % of male internet users, and the opposite situation was in the European post-communist countries which had an average growth of 23 % of male internet users and 21 % of female internet users. Mann-Whitney test showed that the difference between percentage of inhabitants with middle level of education that use Internet in European developed and post-communist countries is statistically significant for all users, male and female users in both 2005 and 2010 year.

Percentage of *internet users (all, male and female) with high level of education* has increased in both groups of countries between 2005 and 2010 (Table 2). There is almost no difference of percentage of internet users in European developed countries in year 2010 for all users, male and female users. During the study period, the European post-communist countries had the highest average growth of 22 % in female internet users. Mann-Whitney test showed that the difference between percentage of population with high level of education that use Internet in European developed and European post-communist countries is not statistically significant only for female users in 2005 year.

E-COMMERCE USERS

Table 3 presents percentage of individuals that use Internet to buy goods or services divided by gender and level of education in the year 2005 and 2010 in European developed and post-communist countries.

In the first part Table 3 shows the percentage of individuals that use Internet to buy goods or services divided only by gender and it has increased in both groups of countries in 2005 and 2010 year. However, the difference between European developed and post-communist countries is huge. In year 2005 only 4,4 % of all users in the European post-communist countries used Internet to shop online, compared to 19,85 % of the population in European developed countries. Based on data from the Table 3, the European developed countries had an average growth of 16 % in female individuals that use Internet to buy goods or services and the European post-communist countries had an average growth of only 7 %, which is less than double in the five year period. Mann-Whitney test showed that the difference between European developed and post-communist countries is statistically significant for both years and genders.

Percentage of *individuals that use Internet to buy goods or services (all, male and female) with low level of education* has increased in both groups of countries from 2005 to 2010 (Table 3) and quite significant growth is seen in European developed countries. The percentage of female who use Internet to buy goods or services in European post-communist countries is only 1 % in 2005, and in the same period there was 8,1 % of female users who shopped online in European developed countries. Average growth of individuals who shopped online increased in both groups of countries in the five year period but with big differences. European post-communist countries achieved average growth of 4 % of male who use Internet to buy goods or services, while European developed countries achieved an average growth of 8,4 %, which is more than a double. Mann-Whitney test showed that the

Table 3. Percentage of individuals divided by gender and level of education using the Internet to buy goods or services. Source: Eurostat, analysis made by author.

| Year | E-commerce | Mean | | Standard deviation | | Mann-Whitney U | Exact Sig., 2-(1-tailed Sig.) |
|------|------------|------------------------------|--------------------------|------------------------------|--------------------------|----------------|-------------------------------|
| | | European developed countries | Post-communist countries | European developed countries | Post-communist countries | | |
| 2005 | All Users | 19,85 % | 4,4 % | 12,6 % | 2,1 % | 21,0** | 0,003 |
| 2010 | | 34,4 % | 10,4 % | 16,9 % | 6,4 % | 25,0** | 0,000 |
| 2005 | Female | 16,8 % | 3,4 % | 11,2 % | 1,5 % | 23,0* | 0,014 |
| 2010 | | 32,1 % | 10,0 % | 17,0 % | 6,1 % | 31,5** | 0,000 |
| 2005 | Male | 22,9 % | 4,4 % | 14,4 % | 1,9 % | 13,5** | 0,001 |
| 2010 | | 36,9 % | 11,2 % | 17,0 % | 6,9 % | 24,5** | 0,000 |

Level of Education: LOW

| | | | | | | | |
|------|-----------|--------|-------|--------|-------|--------|-------|
| 2005 | All Users | 10,2 % | 1,3 % | 8,0 % | 0,5 % | 19,0* | 0,018 |
| 2010 | | 18,5 % | 5,9 % | 13,7 % | 3,1 % | 44,7** | 0,005 |
| 2005 | Female | 8,1 % | 1,0 % | 6,3 % | 0,7 % | 16,0* | 0,039 |
| 2010 | | 17,7 % | 4,0 % | 12,3 % | 2,8 % | 40,5** | 0,005 |
| 2005 | Male | 13,1 % | 1,7 % | 10,4 % | 1,2 % | 15,0** | 0,007 |
| 2010 | | 21,5 % | 5,7 % | 13,8 % | 4,0 % | 35,0** | 0,002 |

Level of Education: MEDIUM

| | | | | | | | |
|------|-----------|--------|--------|--------|-------|--------|-------|
| 2005 | All Users | 21,1 % | 3,9 % | 12,2 % | 2,0 % | 13,5** | 0,001 |
| 2010 | | 36,6 % | 10,6 % | 16,9 % | 5,9 % | 17,5** | 0,000 |
| 2005 | Female | 18,0 % | 3,2 % | 11,2 % | 1,9 % | 15,0** | 0,007 |
| 2010 | | 34,2 % | 9,6 % | 17,4 % | 5,6 % | 22,5** | 0,000 |
| 2005 | Male | 23,9 % | 5,0 % | 13,4 % | 3,3 % | 9,0** | 0,001 |
| 2010 | | 38,9 % | 11,3 % | 16,6 % | 6,4 % | 13,5** | 0,000 |

Level of Education: HIGH

| | | | | | | | |
|------|-----------|--------|--------|--------|--------|--------|-------|
| 2005 | All Users | 33,4 % | 9,9 % | 15,7 % | 4,5 % | 11,5** | 0,001 |
| 2010 | | 51,9 % | 20,9 % | 18,3 % | 11,0 % | 15,5** | 0,000 |
| 2005 | Female | 28,9 % | 8,2 % | 15,0 % | 4,0 % | 13,5** | 0,004 |
| 2010 | | 48,5 % | 20,4 % | 19,4 % | 10,1 % | 25,5** | 0,000 |
| 2005 | Male | 38,0 % | 12,7 % | 16,6 % | 6,1 % | 10,0** | 0,002 |
| 2010 | | 55,7 % | 24,0 % | 17,2 % | 11,7 % | 14,0** | 0,000 |

*statistically significant at 5 % level

**statistically significant at 1 % level

difference between European developed and post-communist countries is statistically significant.

Percentage of *individuals that use Internet to buy goods or services (all, male and female) with medium level of education* has increased in both groups of countries between 2005 and 2010. There are almost no differences in percentage of individuals divided by gender who shop online in 2010 in European post-communist countries, and it used to be around 10 %. The highest difference between countries is in male users who shop online. In 2010 year in European post-communist countries there was only 11,3 % of male users who bought goods or services over the Internet, while in European developed countries there was 38,9 %. Mann-Whitney test showed that the difference between European developed and post-communist countries is statistically significant.

Percentage of *individuals that use Internet to buy goods or services (all, male and female) with high level of education* has increased in both groups of countries from 2005 to 2010 (Table 3). In year 2005 there was 20,9 % of all users in the European post-communist countries who used Internet to shop online, compared to 51,9 % of the population in European developed countries. Average growth of male and female Internet users who shop online is the same in European post-communist countries while in European developed countries there was highest average growth of female users who shop online than of male users. Mann-Whitney test showed that the difference between European developed and post-communist countries is statistically significant.

E-GOVERNMENT USERS

Table 4 presents percentage of individuals that use Internet to interact with public authorities divided by gender and level of education in the year 2005 and 2010 in European developed and post-communist countries.

The first part of Table 4 presents the percentage of individuals that use Internet to interact with public authorities divided only by gender and it has increased in both groups of countries in 2005 and 2010 year. In 2010 there is the same percentage (22 %) of all users, female and male that use Internet to interact with public authorities in European post-communist countries. Percentage of female individuals (22,7 %) is a little bit higher than of male users (22,3 %) in 2010 in European post-communist countries. Comparing to other two tables this is the only situation where percentage of female individuals that use Internet to interact with public authorities is higher than that of male users for both groups of countries. Mann-Whitney test showed that the difference between European developed and post-communist countries is statistically significant for both years, except for female users in 2005.

Percentage of *individuals that use Internet to interact with public authorities (all, male and female) with low level of education* has increased in both groups of countries from 2005 to 2010 (Table 4). European developed and post-communist countries achieved the same average growth of 7 % of male individuals who use Internet to interact with public authorities. The percentage of female individuals who use Internet to interact with public authorities in European post-communist countries is only 2,8 % in 2005, and in the same period there was 10,6 % of female individuals who use Internet to interact with public authorities European developed countries. Mann-Whitney test showed that the difference between European developed and post-communist countries is statistically significant for both years, except for all users in 2005.

Percentage of *individuals that use Internet to interact with public authorities (all, male and female) with medium level of education* has increased in both groups of countries from 2005 to 2010. There are almost no differences in percentage of individuals (all users, male and female) who use Internet to interact with public authorities in 2005 (13,5 %) and in 2010 (20,8 %) in European post-communist countries. The highest difference between countries is in male individuals who use Internet to interact with public authorities. In year 2010 in European post-communist countries there was 21 % of male individuals who interact with public authorities over the Internet, while in European developed countries there was more than double, 42,6 %. The same situation was with female users in 2005 year. Mann-Whitney test showed that the difference between European developed and post-communist countries is statistically significant.

Table 4. Percentage of individuals divided by gender and level of education using the Internet to interact with public authorities. Source: Eurostat, analysis made by author.

| Year | E-government | Mean | | Standard deviation | | Mann-Whitney <i>U</i> | Exact Sig., 2·(1-tailed Sig.) |
|------|--------------|------------------------------|--------------------------|------------------------------|--------------------------|-----------------------|-------------------------------|
| | | European developed countries | Post-communist countries | European developed countries | Post-communist countries | | |
| 2005 | All Users | 26,7 % | 15,4 % | 15,5 % | 8,2 % | 36,0** | 0,093 |
| 2010 | | 37,2 % | 22,5 % | 17,4 % | 12,8 % | 56,0* | 0,018 |
| 2005 | Female | 23,3 % | 14,8 % | 13,7 % | 7,0 % | 42,5 | 0,192 |
| 2010 | | 34,4 % | 22,7 % | 17,0 % | 13,7 % | 70,0** | 0,078 |
| 2005 | Male | 30,2 % | 15,9 % | 17,9 % | 9,5 % | 29,5* | 0,032 |
| 2010 | | 39,8 % | 22,3 % | 18,0 % | 12,2 % | 48,5** | 0,006 |

Level of Education: LOW

| | | | | | | | |
|------|-----------|--------|--------|--------|-------|--------|-------|
| 2005 | All Users | 12,6 % | 5,0 % | 11,5 % | 4,3 % | 27,5 | 0,134 |
| 2010 | | 20,3 % | 9,5 % | 15,0 % | 8,5 % | 57,5* | 0,042 |
| 2005 | Female | 10,6 % | 2,8 % | 9,9 % | 1,8 % | 16,5** | 0,066 |
| 2010 | | 18,4 % | 8,6 % | 14,2 % | 8,0 % | 57,0* | 0,042 |
| 2005 | Male | 15,7 % | 4,0 % | 13,9 % | 1,7 % | 15,0* | 0,053 |
| 2010 | | 22,6 % | 10,5 % | 16,0 % | 8,9 % | 53,5* | 0,026 |

Level of Education: MEDIUM

| | | | | | | | |
|------|-----------|--------|--------|--------|--------|--------|-------|
| 2005 | All Users | 29,6 % | 13,9 % | 14,2 % | 8,3 % | 24,0* | 0,013 |
| 2010 | | 39,9 % | 20,8 % | 17,4 % | 13,0 % | 40,5** | 0,002 |
| 2005 | Female | 26,1 % | 13,0 % | 12,3 % | 7,6 % | 25,5* | 0,016 |
| 2010 | | 36,8 % | 20,8 % | 17,0 % | 13,3 % | 52,0* | 0,011 |
| 2005 | Male | 32,7 % | 14,7 % | 16,5 % | 10,3 % | 22,0* | 0,022 |
| 2010 | | 42,6 % | 21,0 % | 17,9 % | 13,1 % | 36,0** | 0,001 |

Level of Education: HIGH

| | | | | | | | |
|------|-----------|--------|--------|--------|--------|-------|-------|
| 2005 | All Users | 49,9 % | 38,9 % | 16,6 % | 13,8 % | 40,5 | 0,153 |
| 2010 | | 58,3 % | 45,9 % | 15,7 % | 15,7 % | 63,5* | 0,039 |
| 2005 | Female | 44,5 % | 36,1 % | 15,1 % | 12,8 % | 45,5 | 0,264 |
| 2010 | | 54,6 % | 45,0 % | 15,9 % | 16,0 % | 76,5 | 0,130 |
| 2005 | Male | 55,6 % | 41,4 % | 18,1 % | 17,3 % | 31,0 | 0,103 |
| 2010 | | 62,3 % | 46,9 % | 15,9 % | 15,7 % | 55,5* | 0,016 |

*statistically significant at 5 % level

**statistically significant at 1 % level

Percentage of individuals that use Internet to interact with public authorities (all, male and female) with high level of education has increased in both groups of countries from 2005 to 2010 (Table 4). In European developed countries the percentage of individuals (all users, male and female) who use Internet to interact with public authorities in 2005 and 2010 is more than 50 %, while in European post-communist countries the percentage is slightly less than 50 %. Average growth of female individuals who use Internet to interact with public authorities is the same (9 %) in European developed and post-communist countries in 2005 and 2010, while average growth of male individuals who use Internet to interact with public authorities is slightly higher in European developed (7 %) than in post-communist countries (5 %). Mann-Whitney test showed that the difference between European developed and post-communist countries is not statistically significant except for all users and male users in 2010.

DISCUSSION

Comparing data from Table 2, Table 3 and Table 4 on usage of information technology in three important areas: internet usage, e-commerce and e-government it is clear that Internet is used more in European developed than in post-communist countries.

INTERNET USERS

Internet usage continues to increase worldwide, and the same occurred in the observed European countries. Based on the high percentage of individuals who use Internet we could conclude that during observed period European countries invested in economy, development and education, so more and more people have access to Internet.

There is a big difference between Western and Third World countries in the Worlds: in Canada and US 68,2 % of the population is connected to the Internet and in Africa less than 2,7 % of the population is connected [5].

Some of European post-communist countries, like Estonia, Slovenia and Czech Republic made a great progress in Internet usage, but there is a great decline in usage of Internet in Romania, Bulgaria and Hungary. The digital literacy index for European developed countries is 0,8, while for the European post-communist countries it is 0,3, on a scale of 3 (in the USA the index is 1,5). Estonia and Slovenia have again the highest scores (0,7 points) in European post-communist countries (the same level as Italy and Spain). Romania, Bulgaria, Hungary have only 0,3 points. In many countries there is not a big difference in percentage of individuals with low and medium level of education, but there is a big difference between those with high level of education [8].

It is also important to mention that there are differences in list of priorities for Internet usage in developed and developing countries. Highest on the list of priorities of developing countries are basic telecommunications, basic access, human capacity building and affordable access; while highest on the list of developed countries is privacy, intellectual property rights protection, cross border certification and consumer protection [8].

Data analysis has shown that the highest percentage of individuals (all users, male and female) in both groups of countries and in 2005 and 2010 is in the area of internet users (Table 2). There are a higher percentage of individuals that use Internet in European developed than in post-communist countries, but there are no big differences between the percentages for both groups of countries. Analysis also confirms that unequal access of Internet usage is connected with social and economic development of the country [8]. What could be done is to invest in information technology infrastructure and to encourage female individuals to participate actively in business and social activities, which will lead to use Internet more. It is important to increased access to Internet all over the countries' areas [12] and to launch their national e-strategy implementations [3]. That will help the country in accelerating economic development and reducing the poverty and it will become more competitive on the global market [13].

The percentage of male Internet users is higher in both groups of countries in 2005 and 2010, but percentage of female internet users is not far behind. The reason for that could be that a significant large number of men are employed in computing jobs [14]. It is important to highlight that there is a higher average growth of female and male internet users with high level of education in European post-communist than in developed countries. Male and female individuals do not use Internet for the same purpose. Female individuals use Internet for making new friends or meeting their partner, accessing information and advice, studying online, shopping and booking travel online; while men use Internet for expanding career and

having positive socio-political effects [15]. There is more than a double of individuals with high level of education than those with low level of education who use Internet. Education plays an important role for further development and usage of all aspects of information technology. It was also confirmed that Internet usage is higher for young people and that Internet access increases significantly with education. In their research they also confirmed that countries with low levels of education are likely to be characterized by relatively low levels of Internet access [2]. Education plays a significant role of a divide within countries, and it is much easier for a well educated individual to find information on the Internet [11].

Countries with higher living standard like European developed countries use Internet more intensively [6], which implies that families with high living standard can afford better education and Internet access to their households. That could also be one of the reasons why well educated people use Internet more. Further research confirmed that Internet users are more likely to be male, well educated and have higher incomes than non-users [16]. Higher income and higher level of education are most important reasons why Internet use still constitutes an indicator of social and economic diversification [17].

Lesser usage of Internet is more common in the peripheral areas of the country, and that is especially seen in post-communist countries where countries are not equally developed. European developed countries prepared strategy with key targets and organize funds to help less wealthy countries [2].

E-COMMERCE USERS

Data analysis has shown very low percentage of individuals in European post-communist countries who use Internet to buy goods or services and the biggest difference is observed between European developed and post-communist countries in the field of e-commerce (Table 3). Average growth of individuals in European developed countries is more than double than in European post-communist countries for users with low or medium level of education. Like in every other area of Information technology, there are a higher percentage of male individuals who use Internet to buy goods or services. Previous research confirmed that men are significantly more likely to use Internet for e-commerce and e-banking than female individuals [2]. There is also low percentage of well educated individuals who use Internet to shop online.

In this area of Information technology it is not education that is very important; also number of firms that do business online is crucial. If inhabitants are not aware of possibilities of online purchase they do not buy online. It could be said that online shopping is still not a common notion among the population in European post-communist countries and there are not enough companies that do business online, thus the idea of purchasing online remains an unknown notion. In European post-communist countries there are many possibilities for development of entrepreneurship over the Internet and doing business online, and firms should use these benefits, because e-commerce is creating significant changes in many industries [10]. Many companies have strengthened their competitive position after developing electronic commerce [18]. According to [19], there are more than half of companies that generate international sales via their online stores, and 58 % of all consumers included in the survey have bought from an online company located in a foreign country. E-commerce does not offer opportunities for only new companies but also for companies that are already doing business. Companies have a chance to reposition themselves and to take advantage of new possibilities created by the Internet and e-commerce [20]. E-commerce is on extremely low level in European post-communist countries, where the average of individuals having purchased on the Internet is 3,4 %, while the average for European

developed countries is 16 %. The highest scores in European post-communist countries are those of Slovenia (10,8 %), Czech Republic (9,9 %) and Estonia (5,9 %) [8].

There is also one important benefit when buying online and that is time consuming [19]. These days, people are just trying to find ways to save time. Everybody prefers to buy whenever they wish and nobody likes to be constrained by store opening hours. That is very common in European developed countries where many people work for multinational companies settled on other continents so they have to work early in the morning or late in the night. There are some other benefits of e-commerce that should be mentioned [21]. E-commerce enables companies to attract consumers which do not have time to go shopping, to offer loyalty programmes for their customers, to easier and quicker adjust to new trends and demands of the consumers. E-commerce is fundamentally changing the way business is conducted. Everybody prefers service tailored just for them and e-commerce offers the opportunity to personalize products and services [21].

This research has confirmed that female individuals use Information technology to a lesser extent in all areas. Female users lag to the male population in the field of e-commerce to the greatest extent compared to Internet and e-government usage. It was also confirmed that there is a very strong male domination in online purchase [19]. Therefore, supply side for products and services that are attractive to female users should be strengthened and more promoted. Entrepreneurs in European post-communist countries should take into account that there are huge market possibilities for offering products and services for female users online.

E-GOVERNMENT USERS

The results of our analysis for both European developed and post-communist countries show that percentage of individuals who uses Internet to interact with public authorities is increasing with higher level of education in 2005 and 2010. The level of education has the highest impact on all users that use Internet to interact with public authorities in European post-communist countries. Only in area of e-government there is a slightly higher percentage of female than male individuals who use Internet to interact with public authorities in 2010.

Governments of developing countries already have a high percentage of individuals who use Internet and they have well developed information technology infrastructure so it is quite easier for them to implement e-government. They invest a lot of money to prepare strategies for further development of e-government and an increasing number of initiatives are being employed in order to provide improved delivery of public services to the people [22]. In European post-communist countries the situation is different. They still do not have appropriate information technology infrastructure and there are less people who have Internet access so their governments are still working on developing and implementing e-government services.

Previously, internet usage in Greece was researched [14]. It was found out that the higher level of formal education increases the number of frequent users. Respondents also indicate few reasons why they use Internet and interacting with public services is on fourth place. The authors concluded that low usage of e-government could be because people are not familiar with public services that could be found online and public service is not widely available.

Governments have two goals when implementing electronic governments: to enhance their service delivery and to minimize the operating costs [23]. Many governments are trying to develop their own models in order to satisfy the needs of their citizens and to offer them the best service. One of ways to meet citizens' needs is personalization of product or customization of service [10]. Governments should provide greater satisfaction with higher efficiency for their citizens in order to empower democracy and reduce distance between citizens and government [24].

European Union is making a lot of effort to improve e-government services for their citizens. Countries of the European Union share one of the main constitutional problems of implementing e-government services and that is the lack of a legal basis in the secondary community laws [25]. Another problem which could be mentioned is that electronic services do not offer a user centric approach and they give too much attention to technology and their use [24]. Because of problems mentioned above European Union decided to determine goals of establishing and developing e-government. The first initiative about establishing e-government in European Union was at The European Summit in 2000 in Lisbon where they set four tasks to achieve. The first task was to develop Internet based service to improve access to public information; the second was to improve transparency of public administration by using the Internet, the third was to exploit information technology within the public administration and the fourth was to establish e-procurement [25]. There are many positive impacts of e-government on management, stakeholder involvement, needs and collaboration and procurement in American cities [26].

CONCLUSIONS

The article explores usage of information technology in three important areas: internet usage, e-commerce and e-government in European developed and post-communist countries based on level of education and gender.

Based on the European Statistics Database-Eurostat, section Information Society Statistics, European developed countries have significantly better access and use Internet more intensively than people in European post-communist countries. That is especially seen in the section e-commerce and e-government. At the same time the number of users is growing faster in European developing countries. It could be concluded that although European post-communist countries have become EU members and they have made a significant development progress of telecommunications, technology and economy, the number of Internet users is still lower and the impact is weaker in European post-communist than in European developed countries. One of the problems in European post-communist countries is also the difference between areas in the same country. Some areas, like industrial areas or area around capital city are more developed but in peripheral areas use of information technology services is much more reduced. European developed countries made an effort to provide information technology infrastructure for European post-communist countries, but living standards and the laws of a particular country can make a huge barrier for further information technology development.

In terms of gender the data do not show big difference in European developed and post-communist countries. Percentage of male users is higher in both groups of countries and in all of the variables examined (internet usage, e-commerce and e-government). The only exception is the number of female users of the e-government services that outdrove the number of male users in that area in 2010.

Based on level of education, both groups of countries have a significant higher percentage of individuals (all users, male and female) with high level of education than with low. This implies that individuals who are more educated use information technology in all areas (internet usage, e-commerce and e-government services) more than those who are less educated. European post-communist countries could direct their efforts to ensure the usage of information technology during formal education, from primary school to university education.

The same research can be made in five year period in order to see if there still are quite significant differences between European developed and post-communist countries or there has been made a progress to modernize information technology infrastructure which will enable its higher usage in all areas. As women entrepreneurs are poised to lead the next wave

of growth in global technology ventures, it could be expected that future research will result in higher percentage of women users of Internet, e-commerce and e-government. Investments in information technology will definitely contribute European post-communist countries with improvements in productivity and economic growth. It will also be interesting to determine if European post-communist countries have made some information technology strategies or initiatives for further development.

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INTERNET, E-TRGOVINA I E-VLADA: MJERENJE RAZLIKA IZMEĐU EUROPSKI RAZVIJENIH I POST-KOMUNISTIČKIH ZEMALJA

Jovana Zoroja

Ekonomski fakultet, Sveučilište u Zagrebu
Zagreb, Hrvatska

SAŽETAK

U članku se analizira opseg korištenja informacijske tehnologije u europski razvijenim i post-komunističkim zemljama. Pokazatelji informacijske tehnologije kao što su: korištenje interneta, kupovanje dobara i usluga putem interneta i komunikacija putem internet servisa s organima vlasti koriste se kako bi se utvrdila razlika između europski razvijenih i post-komunističkih zemalja. Naglasak je na analizi razlika u stupnju edukacije osoba muškog i ženskog spola koje koriste informacijsku tehnologiju.

Dvije glavne pretpostavke su: (1) korištenje informacijske tehnologije unutar tri važna područja kao što su: internet, e-trgovina i e-vlada je manje u europski post-komunističkim zemljama nego u razvijenim zemljama i (2) osobe muškog spola s visokim stupnjem obrazovanja koriste informacijsku tehnologiju više nego osobe ženskog spola i u europski razvijenim i u post-komunističkim zemljama. Slaba primjena i smanjeno ulaganje u informacijsku tehnologiju, kao i nizak stupanj obrazovanja mogu predstavljati značajne prepreke prema budućem ekonomskom razvoju europskih post-komunističkih zemalja.

U svrhu provođenja istraživanja u radu su korišteni podaci iz europske statističke baze podataka, poglavlje Informacijsko društvo-Statistika.

KLJUČNE RIJEČI

internet, e-trgovina, e-vlada, edukacija, spol, europski razvijene i post-komunističke zemlje