

INFORMATION AND COMMUNICATION TECHNOLOGY AND THEIR INFLUENCE ON BUSINESSES GROWTH IN SLOVAKIA

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Abstract: *Progress in information and communication technology (ICT) has caused many structural changes such as reorganizing of globalization, economics or trade extension. Personal computers and the Internet provide the equipment and connectivity that allows companies to benefit from ICTs. The impact of ICT on business efficiency is the subject of many studies and statistical surveys. Some studies demonstrate a clear return on investment in ICT. Other surveys show the benefits of ICT, but there are no specificities, that lead to ICT efficiency maximization.*

Information and communication technology is a broad area, so we will focus mainly on the use of computers and computer networks, the use of the Internet and the promotion through the web site, which are partial parts of our survey. The survey focused on the agriculture section, because other economic activities are mapped relatively well by official statistical surveys.

The findings of the research indicate progress in the use of computers and computer networks over a similar survey realized in 2009. It is also possible to claim this in the case of website promotion. However, it is still possible to conclude that agriculture is lagging behind in comparison with other economic activities.

Keywords: *ICT, computer networks, Internet, agriculture*

1. INTRODUCTION

Information and communications technology (ICT) refers to all the technology used to handle telecommunications, intelligent building management systems, broadcast media, audio-visual processing and transmission systems, and network-based control and monitoring functions [4]. ICT in its various forms is being used by businesses for a wide range of purposes. These purposes include maintaining effective level of communication among the workforce, sending marketing communication messages to current and potential customers, measuring the level of customer satisfaction, making sales, engaging in team building initiatives, increasing the level of employee morale etc. [1].

The deployment of information systems and information technology has become a prerequisite for the success of companies in all areas of economic activity today [3]. The information available from corporate data enables managers and employees to make decisions quickly and accurately so that they can manage operations effectively and respond rapidly to business opportunities or threats. ICT solutions can help organizations reduce costs, increase revenue and improve profitability. Cost reductions and revenue gains make an important contribution to

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overall profitability [7]. According [2] personal computers and the Internet provide the equipment and connectivity that allow individuals, households and companies to benefit from ICTs. The ability to access information quickly and easily is a major benefit for businesses. The Internet has just about every fact and piece of information immediately available that a business could need [5]. Information and knowledge have gradually become the necessary business resources that influence business management [8]. The impact of ICT on economic growth and development can be examined from the demand and supply aspect. ICT results in increased demand for new products and services and on the supply side, the growth of ICT and its skills results in the increased efficiency of production factors in economic activities [7]. Progress in ICT has caused many structural changes such as reorganizing of globalization, economics or trade extension. According some surveys, ICT plays a significant role in development of each economic sector. Personal computers and the Internet provide the equipment and connectivity that allow individuals, households and companies to benefit from ICTs.

2. DATA AND METHODOLOGY

Data for analysis was obtained from a questionnaire survey. This survey is part of project research which includes nine parts – using of computers and computer networks, using of company website and promotion through the website, using of information management tools, information about e-business, cloud computing and RFID technology, information about expenses and profits from ICT and using of social media. The survey focused on the agriculture section, because other economic activities are mapped relatively well by official statistical surveys. For this paper we selected data about use of computers and computers networks, the use of the Internet and the promotion through the website.

The reliability of the items was analyzed using multidimensional survey techniques to judge the quality/reliability of the measurement procedure (e.g. the questionnaire scale) and to identify suspicious questionnaire items. One of the ways to directly estimate reliability is the Cronbach's Alpha Coefficient

$$\hat{\alpha} = \frac{m}{m-1} \cdot \left(1 - \frac{\sum s_j^2}{s^2} \right) \quad (1)$$

where m is the number of items in the questionnaire, s^2 is the questionnaire scale variance, and s_j^2 is the variance of the j item in the questionnaire.

Basic statistical methods were used for the evaluation as well as the Chi-Square test of Independence. The Chi-Square test of Independence is used to determine if there is a significant relationship between the two nominal (categorical) variables. We are interested in examining if the two categorical variables are related or associated (i.e. dependent). First, we have to calculate the expected value of the two nominal variables. After calculating the expected value, we can apply the following formula to calculate the value of the Chi-Square test of Independence:

$$\chi^2 = \sum_{i=1}^y \sum_{j=1}^c \frac{(O_{ij} - E_{ij})^2}{E_{ij}} \quad (2)$$

where

χ^2 = Chi-Square test of Independence

O_{ij} = observed value of two nominal variables
 E_{ij} = expected value of two nominal variables

Hypotheses for testing are:

H₀: In the population, the two categorical variables are independent.

H₁: In the population, two categorical variables are dependent.

In our survey, we set out the following hypotheses regarding Internet connectivity and the use of company own website:

Hypothesis 1: The use of the Internet connection is not dependent on the agricultural category.

Hypothesis 2: The use of business's own website is not dependent on the agricultural category.

The questionnaire was sent to 1185 companies from the agriculture area. The questionnaire return was 51,3%. Article presents some selected results of the project survey.

3. RESULTS AND DISCUSSION

Computers and their applications changed the face of most traditional occupations including agriculture. From computerized milk collection and seed estimators to weather predictions and automated farmland assessment, computers have revolutionized farming practices. Computers are used for record-keeping of information related to costs involved in production, transport, agricultural processes, and in the estimation and calculation of profit and/or loss. According to our survey results almost 98% of all companies used computers.

There is a huge potential, and the need to induct new and innovative technologies involving computers and related fields in the entire agriculture value chain from production to food on the table: enhance production efficiency; improve inputs use; conserve the resource base, reduce its pollution and carbon footprint in production, processing, storage, packaging and transport, retail distribution, and consumption; reduce food wastage in all forms; make it resilient to climate change (climate-smart agriculture), and enhance its ecological services. These different factors are all interconnected and interact in a highly complex manner. This is where computers and related software programs come into play to make agriculture highly efficient and productive, profitable, resilient to climate and sustainable over long-term.

Today it could be argued that having a reliable Internet connection in the world of business is just as important as having electric to run your computers and phones. The majority of businesses rely heavily on their Internet connections in order to carry out their day to day tasks and vital communications. In our survey, the companies were included into six categories of agriculture production. These categories are:

- agricultural mechanics,
- agricultural cooperative,
- services for agriculture,
- crop production,
- livestock production – breeding, services,
- livestock production – equipment, devices.

Generally, 74% of all companies has Internet connection, but according to the categories, the highest number of companies with Internet connection is in category of crop production and the lowest number of companies with Internet connection is in category of agricultural cooperative. According to our survey, the problematic category is agricultural cooperative, where 47% of all cooperatives are not connected to the Internet. Complete situation is shown on figure 1.

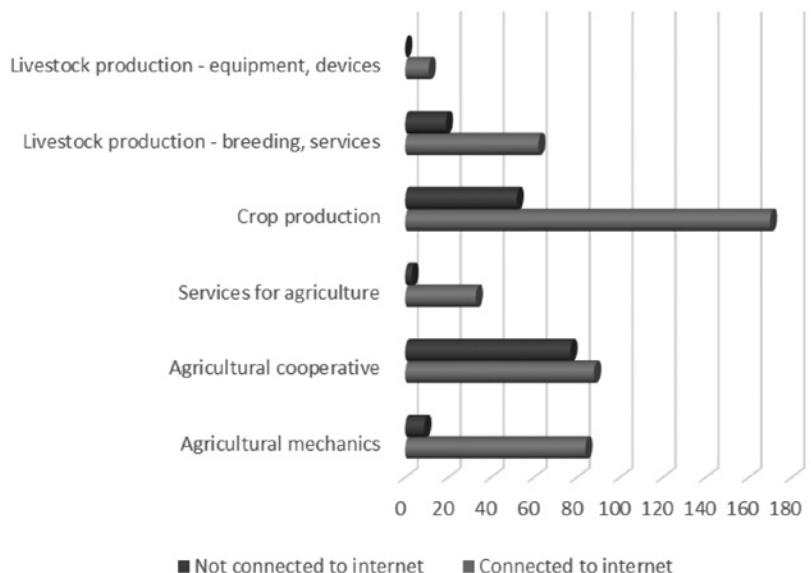


Figure 1: Connection to the Internet according categories of agriculture

Most consumers are looking online for information that will help them make smarter purchasing decisions. If a company don't have a website, it is losing out a great opportunity for business. A website is more environmentally friendly when it comes to advertising and marketing. There are lots of ways to advertise company products or services through the Internet. Our survey shows that agriculture companies don't appreciate the importance of the promotion through their own website. Only 42% of all companies has their own website. The worst situation is in category of crop production and agricultural cooperatives. There is 39% of companies in crop production category and 37% companies of agricultural cooperatives which do not have their own website. Complete situation is shown on figure 2.

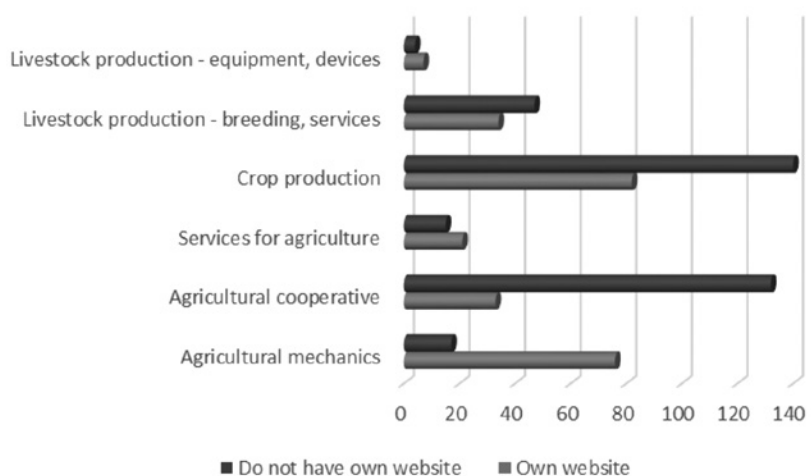


Figure 2: Agriculture companies and their promotion through the website

Regarding the use of the Internet and own companies' websites were within our research set the research hypotheses. The hypotheses were tested by the Chi-square test of independence. First hypothesis was that the use of the Internet connection is not dependent on the agricultural category. Second hypothesis was that the use of business's own website is not dependent on the agricultural category. Since the calculated test characteristics of the chi-square test is greater than the tabulated value in both hypotheses can be observed as a significant association between the use of the Internet connection, own company website and agricultural category of companies. This means that we reject the null hypothesis and accept the alternative hypothesis in both cases. Result is in table 1.

Statistics	Categories of agriculture production	
	Internet connection	Company website
Chi-Square	11,2069	5,289
Table value	2,99146	1,578

Table 1: Result of testing both hypotheses

4. CONCLUSION

Computers and their applications changed the face of most traditional occupations including agriculture. Computers are used for record-keeping of information related to costs involved in production, transport, agricultural processes, and in the estimation and calculation of profit and/or loss. The importance of using computers and the Internet is also confirmed by the results of our research. As we mentioned above, almost 98% of all companies used computers. Internet generally brings new information resources and can open up new communication channels for rural communities and agricultural organizations. According to our survey 74% of all companies have Internet connection. It should be noted that today, when the majority of the population is using the Internet, this percent should be much higher. The Internet provides great opportunities to promote the business. If the business wants to become more prominent on the market, it should have its own website promoting its products and services. Our survey shows that only 42% of all companies have their own website. A website itself can be used to accomplish many marketing strategies to help businesses growth. It is important to increase the number of companies with own website. ICT has a significant and ever-growing influence on the economy and employment therefore should be among the priorities of all companies to increase the ICT using.

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