

# ARE FARMERS READY FOR CHANGES THAT INTERNET AND SOCIAL MEDIA BRING?

*Maja Ćirić<sup>1</sup>, Boris Kuzman<sup>2</sup>*

## Abstract

*There are more and more scientific researches and practical experiences which prove the fact that the agricultural sector is changing due to the advancing information technologies and the internet. Innovations such as mobile telephones, social media, agricultural drones, Internet of Things (IoT), big data, and cloud computing presented new challenges and opportunities for agribusinesses. The role of the Internet and social media becomes more and more important, especially in the diffusion of knowledge and innovation within the agricultural sector. Having in mind these trends in agriculture, we wanted to find out whether and to what extent farmers in Serbia use Internet and social media. The preparation of this paper involved using the survey method on a sample of 167 respondents on the territory of Serbia. The results that we obtained helped us check whether farmers in Serbia have made the first step in the improvement of their agribusinesses. Naimely, we discovered the extent to which they use Internet and social media and whether they are ready and sufficiently prepared for the changes they bring.*

**Keywords:** *Internet, Social media, Innovation, Farmers, Agriculture*

## Introduction

Development of ICT and the exponential growth of internet use, as in developed as well as in developing countries, led to numerous changes in business in almost all industries, and agriculture as well. Many states, multinational companies, SMEs and start-ups in recent years invest huge efforts in finding ways to implement the ICT innovation in agricultural sector in order to increase its competitiveness. Large countries such as USA, India, China, but also some smaller countries in South Africa, Israel,

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<sup>1</sup>Maja Ćirić, Ph.D, Associate Professor, Faculty of Economics and Engineering Management in Novi Sad, Cvecarska 2, Novi Sad, Phone: +38121 400 484, E-mail: [majacic79@yahoo.com](mailto:majacic79@yahoo.com)

<sup>2</sup>Boris Kuzman, Ph.D, Associate Professor, Institute of Agricultural Economics, Belgrade, Volgina 15, Phone +381 63 299 111, E-mail: [kuzmanboris@yahoo.com](mailto:kuzmanboris@yahoo.com)

Turkey and Switzerland, single out by the research and investments extent in the application of information technology in agriculture. Considering the strategic significance of food, and therefore the agricultural sector, for each country, it is quite logical and reasonable effort to look for ways of improving the entire value chain in agriculture through the application of the newest ICT achievements. However, a fact which numerous researches have confirmed is that regardless in which extent some innovation was extraordinary and useful, there were still occurred obstacles in the process of its implementation. There are also studies which show that always must take into consideration characteristics and specificities of a local market in which implements, when implementing innovation. Therefore the goal of this research was to determine what the situation regarding the connection between the agricultural sector and ICT in Serbia is, and in which extent are farmers in Serbia ready for innovation and changes which the internet and technological innovation bring.

In accordance to the FAO statistical data in 2015, even 44.4% of Serbian population is rural population. In the year 2014, 35.064,000 ha was agricultural area, forest 27.186,000, and other land 2.521,000, which shows the importance of development and improvement of agriculture for the entire development of a country. Besides, *according to the Statistical Yearbook of Republic of Serbia 2016*, we can see the share of agriculture, forestry and fishery in the year 2014 was 7.7% of gross domestic product, processing industry was 15.7%, and the average earnings in these two sectors were below the average earnings in Serbia. It points out to unsatisfying situation of employees in these sectors and a need for some changes in them. It is inevitable to notice that professional, scientific, innovation and technical activities were present with only 3.2%, and informing and communications with 4.3% of gross domestic product. Thus, Serbia within the purview of ICT should do much more in order not to come to the current situation improvement, which is not satisfactory. According to quotations of the Institute for Biosens in Novi Sad (p 14), there are 631.552 farms in Serbia. An average farm is relatively small, with a size between 2 and 5 hectares. Most of households are family farms. Since their share on market is negligible, family households are forced to procure supplies (seed, fertilizers, etc.) in smaller quantities, and therefore at higher prices. Selling their products is also a problem, since it is individual (transport and human labour significantly affect profit), or through middlemen (a price is dictated by big companies, and the potential quality of goods is hard to value). Although in the year 2011 there were around 1,500 agricultural cooperatives in Serbia which could

help in solving the mentioned problems, they weren't functional. For these reasons, small firms profit is still low and unsustainable. Introduction of ICT innovation in agriculture could solve many problems, for example, by creating virtual cooperatives is possible to improve small and medium farmers business. Introducing virtual markets for B2B and B2C trade would increase the speed of information flow, facilitate communication, increase transparency, there would be easier to approach buyers and sellers, and all of these would raise the overall level of agricultural sector competitiveness. Furthermore, by applying modern technical solutions for obtaining the accurate and precise information, which will be available to all participants in an agricultural value chain via internet, as well as a series of other innovation, would enable making decisions according to precise information, and not according to intuition and tradition.

Possibilities for the improvement of agricultural production are numerous, however, the question is if farmers in Serbia are generally information literate, in which extent they use internet, whether they are informed about the leading social media and whether they use them for the improvement of their own agri-business. The purpose of this paper is exactly in coming to know if farmers in Serbia have taken a first step in accepting new ICT technologies for their own business improvement. Or better to say, whether they use the internet and social media, because without their application, it is not possible to talk about taking advantage which ICT can contribute to agricultural business.

### **Internet and its application in the agriculture sector**

The U.S. Department of Agriculture studies revealing an increase in adoption of internet access by the U.S. farms and ranches since 2013. It mentions the importance of farmers finding that internet access in conducting their day-to-day business operations (Buckley, S. 2015).

As well as studies show that only 0-24% of farmers in Europe use ICTs in their work routine, while the respective percentage in US reaches 80%. The root for this disproportion is not the lack of technological solutions, but the European market approach. Namely, the current approach used by ICT companies is technology push, rather than user driven, so launched solutions mismatch the real farmers' needs. That is the reason why the agricultural results are below the true potential and why there is great potential for ICTs to improve many aspects of agriculture and ensure

safe and adequate food for European citizens, with minimization of environmental impact of farming activities (Institute Biosense, 34).

According to carried out researches (Novalić, F., Selimović, F. and Biševac, F., 2011) on a sample of agricultural manufacturers in Serbia, Montenegro and Bosnia and Herzegovina were concluded that the internet was an opulent source of matters of information and educational character; e-trade has been present in agriculture; in certain moment some activities, such as the stock trades and informing can be done only via internet. However, there are a small number of farmers who use internet; Associations of farmers neither stimulate farmers to use internet, nor help them. The authors of this research had drawn recommendations that farmers should be facilitated the use of internet, intensify the utilization of resources, even enable them to indirectly receive information from the internet.

The agricultural sector is changing due to the advancing information technologies and the internet. Information is required by agricultural producers which cover all aspects of agricultural production including the processing of agricultural products on-farm or in rural areas. The abundance of agricultural information however does not necessarily imply better informed producers, especially if their information behavioural patterns are not studied. Therefore the appropriate information services should be developed in order to meet specific information needs and information behaviours in the agricultural sector (Kostagiolas, P., Souliotis, A., Boskou, G., 2014).

Agricultural development also faces multiple challenges including 1) climate change, 2) sustainable natural resource management, 3) food security, 4) shortages of fresh water, 5) limited availability of agricultural land, and 6) changing consumer expectations. In this context, ICT can play an important role in improving efficiency and leading to smart farming in the future of agriculture (Guerrini, 2015). Today's modern farms are adopting new technologies and generating unprecedented amounts of data, including field-specific information, yield mapping, soil moisture and nutrition, weather, leaf-area index, insects, and farm management data. Data collected from farms are a fundamental block for data-driven farming decision, and it is critical to turn the data into value to support better farming decision making. ICT now plays increasingly important role in future farming (Xin, J. Zazueta, F., 2016, p. 276).

Successful integration of IoT, mobile, farm management and knowledge-based software solutions, and real-time analytics in a cloud environment

will create new solutions for smart farming. Given that many decision tools developed in the public and private sectors are already available, an integration of these tools into a cloud environment could serve farmers better, especially smallholder farmers. By making farm specific data and analysis tools available, farmers can assess different scenarios resulting from different farming decisions. Although such work remains to be done, it is clear that future of agriculture will be data-driven, knowledge-based, and farmer-centred smart farming solutions in a cloud or mobile cloud application models (Xin, J. Zazueta, F., 2016, p. 279).

### **Importance of social media for farmers**

Social media has an amazing growth within few decades. It has become part of everyday life for most people in the developed and developing countries. At present social media is the world's largest communication network. It is the simplest and fastest way for sharing information such as file, photos, videos etc. Social media is not only a tool for reaching large audiences; it is also an opportunity to develop relationships (Jijina C.K, Raju G., 2016, p. 22). Social media cannot be defined as a type of web pages by which was enabled linking the modern internet technology (Web 2.0) with users' interaction (17). The biggest advantages of the social media and the reason for the great popularity of some services of this type are: Simplicity of use – Everyone can use the social media, Authentic two-way communication (conversation) – Generally observed, very few people have a real culture of conversation (in addition to providing information, it is necessary to receive them as well), because they simply “listen, but not hear” what was being said/talked/written to them. Exactly for that reason, the use of social media for realizing different goals represents a big challenge in Serbia and in the world. The most popular social media currently in Serbia, among different groups of users, are: Facebook, Twitter, Instagram, LinkedIn, Youtube (Ljubojević, Č. Ćirić, M., 2017).

Development and introduction of smartphones, broadband, and 3G mobile networks have provided opportunities for farmers to connect with their peers in spite of the distance separating them. Farmers can use internet tools such as web forums for discussion and debate, internet searches, digital versions of farmer magazines (Farmers Weekly, 2016) to learn new knowledge, query problems, and access information on their phones, even in the middle of a field. Moreover, social media, such as Twitter, Facebook or a Google group, enables them to instantly communicate, over an electronic hedge, with online peers who may never meet face-to-face, but can advise, sympathise and relate. Finally, several studies suggest that farmers tend to prefer kinaesthetic

(“learn by doing”) or audio/visual learning to other learning styles. As a result, IT now can allow farmers to view or record videos, listen to recordings and watch live web-streaming of conferences, with the subsequent benefit of enabling them to develop their knowledge and learning without having to leave their farms (Burbi, S. Hartless Rose, K. 2016, p. 2).

The use of social media sites help to enable collaboration, information sharing and partnerships for innovation among literate farmers, stakeholders, extensionists and other actors. Enabling farmers and others to “gain a voice”, offering localized and customized information, helping to share and manage the information are the main advantage in using social media in agricultural extension services. Also social media creates meaningful relationships with customers and improves market intelligence and get ahead with competitors (Jijina C.K1, Raju G., 2016, p. 23). Major agricultural companies are currently using various forms of social media such as YouTube, Twitter, and Facebook. Social media and agricultural companies have the potential to build strong connections between consumers, workers, and the general public with technical, relevant, and interesting information (Carter, J, 2013).

Technical and educational illiteracy, unavailability of high speed internet connection and recording equipment, unauthentic information, data charges and accessing device are the main limitations in using social media (Jijina C.K, Raju G., 2016, p. 24).

## **Research method**

The purpose of this paper is to get to know whether farmers in Serbia have taken a first step in accepting the new ICT technologies for the improvement of their own agro-business, i.e. whether they use the internet and social media, because without their use it isn't possible to speak about using advantages which ICT can bring to agricultural business.

The goal of this research is to determine the current state in Serbia regarding the correlation between agricultural sector and ICT and in which extent are farmers in Serbia ready for innovation and changes that the internet and technological innovation make.

In researching consumer behaviour we applied the quantitative research method, in order to carry out statistical analysis and generalize the obtained results onto broader population. We applied the survey method, and the instrument used for conducting the survey was a questionnaire which was

not standardized but created for the purpose of this research. We opted for data collection through phone calls and via direct interview.

The research sample consisted of 167 randomly selected respondents. We used the method of random selection for selecting a representative sample. The data were analysed using SPSS for Windows 20. The following methods were used: descriptive statistics – frequencies and percentages.

### Research results and discussion

In this research we selected gender, age structure, education, household type as the most important demographic characteristics of consumers. Based on these characteristics were analysed tested sample of agricultural manufacturers in order to get to know in which extent the demographic characteristics of tested sample are in favour of using the internet and social media.

**Table 1 – Demographic characteristics of consumers’ test sample in Serbia**

Ordinal number	Question	Answer	Count	Percent
1.	<b>Gender</b>	Male	109	65.26%
		Female	58	34.73%
2.	<b>Years</b>	Up to 20	1	0.60%
		20-30	37	22.29%
		30-40	41	24.70%
		40-50	29	17.47%
		50-60	34	20.48%
		Over 60	24	14.46%
3.	<b>Professional qualifications level</b>	PS	26	15.57%
		SS	109	65.26%
		College	17	10.18%
		University degree (bachelor)	13	7.78%
		Others (master of sciences/arts, M.A./ M.S., PhD)	2	1.20%
4.	<b>Members of your household</b>	I live alone in the household	15	9.03%
		I live with my wife in the household	36	21.69%
		I live with my wife and child in the household	19	11.44%
		I live with my wife and children in the household	47	28.31%
		I live with my wife, children and parents in the household	9	5.42%
		I live with my parents in the household	41	24.69%

**Source:** Made by authors according to the survey

According to data shown in *Table 1* can be noticed that, in a tested sample of agricultural manufacturers, prevail men with 65.26% compared to women (34.73%). This data was expected since men in Serbia are dominantly engaged in agriculture.

Speaking on age, there can be noticed in a sample the smallest share of examinees up to 20 years of age, with only 0.60%, then people over 60 years of age, with 14.46%, while other categories of examinees (20-30, 30-40, 40-50 and 50-60) are pretty evenly distributed, provided that examinees between 30 and 40 years of age prevail with 24.70%. This age structure of sample enables a good insight in the use of internet and social media of all generations which are engaged in agricultural production, except those younger than 20 years of age, who were insignificant in this sample. Reason for their small share in a tested sample can be described by a fact that people younger than 20 years of age in agricultural holdings mostly live with their parents, who furthermore are the main decision-makers in the process of agricultural production, so consequently in this survey parents had answered the questions, and not children younger than 20 years of age. If we analyse age as a demographic factor and their significance for accepting innovation, it is important to say that, according to research they have conducted (Lu, Y.-T., Chang, Y.-H., 2016) on the degree of acceptance of internet by Taiwan's senior farmers, there have come to a conclusion that the senior farmer enjoyed and increased their knowledge using internet with great enthusiasm. Senior farmers can benefit from internet by using it for information, learning, training, and trading. As well, senior farmers are increasingly using applications of internet not only to acquire knowledge, but also to enrich lifestyle. Hence, age didn't mean a limiting factor in accepting internet by farmers in Taiwan. However, according to (Kaggere, N., 2015) youth in India is increasingly uses social media on the internet, while older people and women still make a smaller percentages of those who use internet and social media. Since the demographic factors are related to socio-cultural and geographic factors, it is expected that their impact is different in various cultures and geographical regions.

If we analyse an educational structure of a tested sample of agricultural manufacturers, we can see that people with SS prevail with 65.26%, then people with PS (15.57%), while people with college and university degree education together have 17.96%, and with higher educational level (master and PhD) have only 1.2%. This data shows a rather low educational level of agricultural manufacturers, which can be, to a certain extent, a limiting factor in their readiness to accept innovation. Therefore one of the



conclusions which impose its self, according to educational structure, is a need for additional education and trainings through informal education, in order to raise awareness of agricultural manufacturers on the need of continuous learning and accepting innovation, which also include ICT technologies. It is necessary to work on their gradual training through argumentation and reasoning of benefits which ICT can bring to farmers. There can be seen in a tested sample, by analysing the household structure, that prevail households in which live husband and wife with children (28.31%), households in which live husband, wife and one child (11.44%), households in which live husband and wife, with children and parents (5.42%). Thus, there are 45.17% households in which children live, which is less than total number of households in which children don't live. If we analyse those who live alone with their parents in a household (24.69%) and we compare this number with data that there is only 0.60% of people of age under 20, we got pretty disconcerting that people of age between 20 and 30 still live with their parents without a wife and children, which in long-term doesn't represent a favourable demographic trend for rural development. Also, the fact that even 9.03% people in a tested sample live alone, as well as that even 21.69% of examinees has a spouse but doesn't have children who live with them in a household, it is one more indicator of bad demographic trend when it comes to the household structure, which are engaged in agricultural production.

**Table 2** –Resources for using internet

Ordinal number	Question	Answer	Count	Percent
1	<b>Do you use computer, lap top or tablet at home?</b>	Yes	139	83.23%
		No	28	16.77%
2	<b>Do you use a mobile phone with the possibility to use internet?</b>	Yes	127	76.05%
		No	40	23.95%

*Source: Made by the authors according to the survey*

In order to come to know how objective are the obstacles in using the internet, and not related to the agricultural manufacturers characteristics, we have asked questions related to adequate resources, computers and mobile phones with the possibility to use internet. In accordance to presented results, we notice that 83.23% of examinees have a computer, lap top or tablet, while there is smaller percentage of people with mobile phones with the possibility of using internet and it amounts 76.05%. Thus, we can conclude that 16.77% of examinees don't have technical possibilities

to use internet on a computer, and 23.95% on a mobile phone. These indicators are pretty good, taking into consideration percentages of the internet use in Europe. Hence, if only technical factors would be a limiting factor, the current situation wouldn't be so bad, since it is obvious that there is a plenty room for improvement. However, as demographic factors also affect the level of internet use, of which some were already analysed, but also socio-cultural, economic, geographical and psychological factors of agricultural manufacturers, it is necessary to determine whether all of them have a computer or an appropriate mobile phone to use the internet, in which extent and for what purposes.

**Table 3** –*The level of internet use and the purpose of its use*

Ordinal number	Question	Answer	Count	Percent
1	<b>Do you use internet and, if yes, how often?</b>	Few hours per day	84	50.30%
		One hour per day	27	16.17%
		Few times a week	18	10.78%
		Once a week	6	3.59%
		Once a month	4	2.39%
		I don't use internet	28	16.77%
2	<b>What purposes do you use internet for, i.e. what information you look for on the internet?</b> *28 examinees, who responded to the previous question that they didn't use internet, were not included in this part, so a sample was reduced to 139 examinees	Information related to a job and agriculture	54	38.85%
		News	21	15.11%
		Entertainment venues (sport, fashion, travel, recipes)	14	10.07%
		Communication on social networks	36	25.90%
		No answer	17	12.23%

**Source:** *Made by the authors according to the survey*

Of total number of examinees 16.77% of them don't use internet at all, and this exactly is the percentage of examinees, which don't have a computer, lap top or tablet. All other examinees use the internet more or less. Namely, 2.39% uses the internet once a month, 3.59% once a week, and 10.78% several times a week. On daily basis, 16.17% of examinees use the internet one hour per day, while 50.30% of examinees use the internet several times per day. Therefore, 66.47% of examinees use the internet on daily basis.

If we compare these percentages with the percentages of using internet in Europe and USA, as well as with the research conducted in Serbia, Montenegro and Bosnia and Herzegovina in the year 2011, which was already mentioned in the literature, we could notice that situation related to the internet use among agricultural manufacturers in Serbia has rapidly and significantly changed in regard to 2011, as well as that although the percentage of internet use is not at the level of the one in USA, we can consider it satisfying because it is within those characteristic for Europe.

However, if analysing data which points out to the purpose of internet use, then the results are not so optimistic from the possibility of agricultural production improvement point of view. Namely, only 38.85% of examinees use internet in order to find information necessary for a job improvement, and generally for the improvement of their agricultural production. 15.11% of them use the internet in order to find out the news, 10.07% of examinees use the internet in order to find the entertainment venues, 12.23% of them didn't respond at all, while 25.90% pointed out that use internet due to the use of social networks. Hence, their insufficient use of internet for business purposes is something we can notice as the insufficient readiness of farmers for changes that ICT technologies bring. It is positive that one fourth of examinees points out the social networks as something they are interested in the most, and therefore the social networks could be one of the ways for informing and gradual adjustment and referring farmers to the oncoming ICT changes, which will reflect on the entire value chain in agriculture.

According to the research in China (Heang, J. F., Khan, H. U., 2015), it is noticed that agricultural producers in China encounter many issues in marketing their products to end customers. As a result, many have ended up selling their produce to middlemen, but many middlemen manipulate the situation and squeeze producers so that it has become difficult to realize profits. With the proliferation of Internet access and increasing computer literacy rates, that research showed that Internet marketing could play an important role in helping these agricultural producers. Since the middlemen situation is very similar in Serbia as well, exactly the internet marketing, the use of social networks and the creation of virtual markets could help in perspective also the agricultural manufacturers in Serbia to overcome the perceived problem. Possibilities for improvement are numerous, it is only inevitable to change the purpose of using internet by agricultural manufacturers and move it from entertainment to the exploitation of business opportunities.

It is interesting to point out to the authors' study (Taragola, N., Van Lierde, D., 2010), by which was determined that horticultural growers in Flanders make low use of the Internet. The Internet applications used most frequently are online banking, information on market prices and yields of outputs, and weather forecasts. However, a large variation of the Internet behaviour is observed among the growers, depending on personal characteristics (biographical and social characteristics, communication behaviour) and business size. According to the quotations of examinees in this study, there can be noticed a certain similarity with the mentioned research in Belgium. The examinees, who stated that they use internet only for business purposes, were stated that they use internet to find out weather forecast, prices on stock exchanges and markets, and they were also significantly interested in information related to plant protection and repair of machinery. Unlike the research in Belgium, in our study none of the examinees didn't state online banking as an option for which they use the internet.

According to data shown in Table 4, we can notice a surprising data that even 40.71% of examinees have never used e-mail for sending/receiving mail, while 22.16% of them use e-mail once a month. Contrary to this, a percentage of those who use e-mail on daily basis is 13.77%, 11.38% uses internet several times a week, and a percentage of those who use it once a week is approximate (11.98%). Since e-mail uses for sending/receiving mail, mostly for business purposes, these data although at first sight surprising are actually in accordance with the results obtained in the previous table, and point out that the internet is poorly used for the business purposes.

When examinees were asked if they were using some agricultural forum, even 49.70% of them were responded that they have never used an agricultural forum in order to get informed. Only 5.99% of them said that they do it every day, 12.57% several times a week, 8.98% once a week, and 22.75% once a month. The stated indicators speak in favour of a previous thesis that the internet doesn't use for business purposes, and that farmers don't use or use poorly agricultural forums for finding necessary information.

When it comes to the social network Facebook, we can notice that even 44.91% of examinees use it on daily basis, 14.97% several times a week, and there are small percentages of those who use Facebook once a week or once a month, and those who never had used this social network are

34.73% of a tested sample. If we compare this data with data that 16.77% of examinees don't use internet, it leads to those examinees which use the internet only 17.96% have never used Facebook. The obtained data are in accordance with the recent study, according to which 42% of farmers who use Facebook are using it every day. Farmers are making their presence on social media for sharing personal stories or using the sites as news sources online (Jijina C.K1, Raju G., 2016). This finding is significant for several reasons. Firstly, an extremely high percentage of Facebook use is in accordance with the previously set thesis that the internet has been mainly used for entertainment purposes, and obviously the Facebook network is a mean to get entertainment. Secondly, a habit in using Facebook on daily basis can be useful if Facebook would be used for informing, correlating and joining in order to improve agricultural production and overall business. Therefore, this social network should in particular take into consideration when designing strategies for the improvement of agricultural production in Serbia, with the help of social networks.

Unlike Facebook, Twitter is a network which is almost never used among agricultural manufacturers. Of total number of examinees, 93.41% of them were responded that they never used twitter, while only 0.5% was responded that they use twitter every day. Thus, twitter is definitively a social network that is not of importance and has no effect on agricultural manufacturers.

When analysing the level of YouTube use, we can see that 37.72% of examinees have never used YouTube, or approximately to the level of those who have never used Facebook, but significantly less than the ones who have never used an agricultural forum, and much less in regard to those who have never used Twitter. A number of examinees which use YouTube every day are only 5.39%, or only 0.6% less than the agricultural forum use, but a cumulative percentage of those who use YouTube several times a week, once a week and once a month, is higher than the agricultural forum use. Therefore, we can conclude that after Facebook, YouTube is the most common in use of farmers in Serbia. This is followed by the agricultural forum, and then Twitter, which is negligible.

**Table 4** – *Level of using e-mail and the social media*

<b>Ordinal number</b>	<b>Question</b>	<b>Answer</b>	<b>Count</b>	<b>Percent</b>
1.	<b>Do you use e-mail for sending/receiving e-mails and, if yes, how often?</b>	Every day	23	13.77%
		Few times a week	19	11.38%
		Once a week	20	11.98%
		Once a month	37	22.16%
		Never	68	40.71%
2.	<b>Do you use some agricultural forum and, if yes, how often?</b>	Every day	10	5.99%
		Few times a week	21	12.57%
		Once a week	15	8.98%
		Once a month	38	22.75%
		Never	83	49.70%
3.	<b>Do you use Facebook and, if yes, how often?</b>	Every day	75	44.91%
		Few times a week	25	14.97%
		Once a week	6	3.59%
		Once a month	3	1.80%
		Never	58	34.73%
4.	<b>Do you use twitter and, if yes, how often?</b>	Every day	1	0.59%
		Few times a week	2	1.20%
		Once a week	5	2.99%
		Once a month	3	1.80%
		Never	156	93.41%
5.	<b>Do you watch youtube and, if yes, how often?</b>	Every day	9	5.39%
		Few times a week	33	19.76%
		Once a week	36	21.56%
		Once a month	26	15.57%
		Never	63	37.72%

*Source: Made by the authors according to the survey*

## **Conclusion**

According to researches we have conducted on consumers sample, which although relatively modest in numbers, but can consider representative for Serbia by its demographic characteristics, we have received encouraging information that 83.20% of examines own computers. All of them who have computer also use internet and 66.47% of examinees use internet on daily basis. This parameter is in accordance with the level of the internet use by farmers in Europe. However, when analysing data which point out to the

purpose of internet use, then the results aren't so optimistic. Namely, only 38.85% of examinees use the internet in order to find information necessary for the improvement of a job and generally for the improvement of their agricultural production. Thus, what is noticed as insufficient preparedness of farmers for changes which ICT technologies bring is their insufficient use of internet for business purposes. Data that even 40.71% of examinees have never used e-mail for sending/receiving mails, as well as that 49.70% of examinees have never used the agricultural forum too, speaks in favour of the fact that, although agricultural manufacturers have been using the internet significantly, it hadn't been used enough for the business purposes. When it comes to the social network Facebook, we can notice that even 44.91% of examinees use it on daily basis, and 14.97% several times a week. Extremely high percentage of the Facebook use is in compliance with an established thesis that the internet is mostly used for the entertainment purposes. Unlike Facebook, Twitter is the network which is almost not used among farmers. Of total number of examinees, 93.41% of them were responded that they have never used Twitter. Hence, the most significant of all social media for farmers convincingly is Facebook, although YouTube and agricultural forums mustn't be neglected, although small groups of farmers use them, while Twitter isn't definitively the network of great significance for farmers in Serbia.

In accordance to obtained results, we can conclude that considering the intensity of Facebook network use among farmers in Serbia, the recommendation is to use this network for informing, correlation and association of farmers. It is necessary via this network to carry out informing, gradual adjusting and referring of farmers in oncoming ICT changes, which will reflect on the overall value chain in agriculture. Instead of using the social networks for the entertainment purposes, it is necessary to educate farmers to use the social networks for the purpose of their agro-business development. Conducting training programs, awareness campaigns, and workshops will help them to make understand the agricultural app and use social media better. Thus, we draw a conclusion that a significant percentage of farmers in Serbia has made a first step given that they own computers, smart phones and use the internet on daily basis, however, it is necessary to take a series of steps and measures for the purpose of their further education and exploring the possibility of using the internet, aiming to improve their agri-business and adopt changes and technological innovation which bring the years ahead.

## Literature

1. Burbi, S. Hartless Rose, K. 2016., The role of Internet and social media in the diffusion of knowledge and innovation among farmers, <https://www.researchgate.net/publication/305391623>
2. Buckley, S. 2015. More farmers are adopting Internet access, says USDA study, *Fierce Telecom*. 8(25), 1-1.
3. Carter, J, 2013. Who's Trending in Agriculture? A Look at Social Media, *Natural Sciences Education*, 42(1), 33-35.
4. Farmers Weekly 2016. Farmers Weekly Magazine. <http://www.fwi.co.uk>
5. Food and Agriculture Organization of the United Nation. <http://www.fao.org/faostat/en/#country/272> 20.2.2017
6. Guerrini, F. 2015. The future of agriculture? smart farming, Forbes, <http://www.forbes.com/sites/federicoguerrini/2015/02/18/the-future-of-agriculture-smart-farming/#5708f01a337c>
7. Heang, J. F., Khan, H. U., 2015, The Role of Internet Marketing in the Development of Agricultural Industry: A Case Study of China, *Journal of Internet Commerce*. 14 (1), 65-113
8. Jijina C.K, Raju G., Social media and farmers, 2016, *International Journal of Research in Engineering and Technology*, 5(19), 20-25.
9. Kostagiolas, P., Souliotis, A., Boskou, G., 2014. Online Producers: Studying the Information Needs and Internet Seeking Behavior in the Agricultural Sector, *International Information & Library Review*. 46 (3/4), 137-148.
10. Kaggere, N. 2015. WhatsApp! Whats At? Siddu stunned by 69 year old farmer.<http://www.bangaloremirror.com/bangalore/cover-story/WhatsApp-WhatsAt-Siddu-stunned-by69-yrold-farmer/articleshow/46361423.cms>
11. Lu, Y.-T., Chang, Y.-H., 2016, Investigation of the internet adoption on senior farmers,*Engineering Computations*., 33 (6), 1853-1864.



12. Ljubojević, Č. Ćirić, M. 2017 *Marketing usluga*, Fakultet za ekonomiju i inženjerski menadžment, Novi Sad.
13. Make Sense, Institute Biosense: [http://biosens.rs/wp-content/uploads/2016/10/BioSense\\_book\\_eng\\_hi-res.pdf](http://biosens.rs/wp-content/uploads/2016/10/BioSense_book_eng_hi-res.pdf) 19.2.2017.
14. *Marketing na društvenim mrežama*, (2014). Univerzitet Mitropoliten. [digis.edu.rs/mod/resource/view.php?id=2117](http://digis.edu.rs/mod/resource/view.php?id=2117)
15. Novalić, F., Selimović, F. i Biševac, F., 2011. Uticaj Interneta na razvoj poljoprivrede, Naučna konferencija -AGROBIZNIS2011,u okviru projekta “Bolja saradnja za bolju budućnost“,Univerzitet u Novom Pazaru.
16. *Statistički godišnjak Republike Srbije 2016*, Republički zavod za statistiku, Republika Srbija, 2016.
17. Taragola, N., Van Lierde, D., 2010, Factors affecting the Internet behaviour of horticultural growers in Flanders, Belgium, *Computers & Electronics in Agriculture*. 70 (2), 369-379
18. Xin, J. N., and F. Zazueta. 2016. Technology trends in ICT - towards data-driven, farmer-centered and knowledgebased hybrid cloud architectures for smart farming. *Agricultural Engineering International: CIGR Journal*, 18(4), 275-279.