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INTEGRATION OF CROATIAN FARMERS IN THE EU INFORMATION SOCIETY – ISSUES AND IMPLICATIONS

Abstract

Further development of family farms in Croatia largely depends on their adaptation to the contemporary demands of the open market, in particular by keeping up with new technologies and acquiring new knowledge. Through such adaptation, farmers would gain better access to information and new markets and a better position in negotiations. Overall, they would become better managers of their businesses. The Internet, coupled with other information and communication technologies (ICT), represents a tool for linking up different interest groups within the vertical agricultural chain. The role and significance of ICT and information literacy within agricultural activities is presented through a review of European development initiatives and theoretical insights regarding this topic. To reveal obstacles (objective and subjective), the current level of skills and the readiness to adopt new knowledge and technologies, a survey was conducted on a representative sample of inhabitants from rural areas, i.e. farmers, since they are a determining factor of such changes. The present paper is part of the research exploring a wider context of ICT implementation aimed at enhancing farmers' competencies, and consequently, enhancing overall agricultural performance. The analysis seeks to confirm the basic hypothesis that there are objective and subjective obstacles, but also the interest and willingness to increase the level of knowledge in the observed social unit.

Keywords: Information society, ICT, Croatian farmers, social marketing

1. Introduction

Initiatives of the European Union are necessary to offer its members and candidate countries certain guidelines and action plans aimed at increasing the digital and information literacy, primarily in underprivileged social groups. The ultimate goal is to remove barriers such as age, isolation of people living in remote or marginal areas of the EU, or in poorer regions, etc. Regardless of the reasons, the intention is to facilitate the empowerment of all individuals and to reduce the digital gap, thus enabling equal-footing participation and contribution within digital economy and the information society.

Already, the majority of all economic sectors are involved in data exploitation, which provides them with the competitiveness required for participation in the modern market system. Such exploitation implies understanding the technology, i.e. being familiar with new tools and skills that could have a strong impact on everyday business operations even in traditional sectors like farming. For example, the data collected during different stages of production, such as soil composition, sensor readings by agricultural machinery, weather forecasts and crop features can be combined with data on food markets, agricultural raw materials buying off, or forthcoming possibilities for capital investments, all with the aim of making complex decisions (European Commission, 2013). The main goal of this paper was to determine how ready farmers are for the challenges arising from Croatia's full accession to the EU, so the following hypothesis was tested: although there are objective and subjective obstacles to raising the level of knowledge among farmers in Croatia through optimized use of information and communication technologies, there is an interest, as well as a desire to enhance knowledge. To determine those challenges, the primary research analysis was divided into three sections. The **first** deals with obstacles to the adoption of new knowledge and technologies; the **second** with interest, and the **third** with desire, as the final phase before taking concrete actions.

2. Terminology issues within the literacy system

The notion of literacy is difficult to define, mostly due to national and socio-cultural implications within which it is contemplated, as concluded at the UNESCO Expert Meeting held in 2003 in Paris. In today's environment of information overflow, the traditional conception of literacy as a capacity to read, write and understand numbers needs to be revised and expanded. This is why the contemporary notion of literacy is rather stretchy and susceptible to change, but still serving both society and the individual (UNESCO, 2005). For the purposes of this paper, we will mention a set of literacies, which are a prerequisite for equitable and competitive participation in today's European agricultural system, consisting of: basic literacy acquired through elementary education, agricultural literacy as a body of specific knowledge, digital literacy and information literacy. This, of course, does not exclude the existence of other kinds of literacy; it only emphasizes their modality depending on the case in question. To gain a better understanding of the significance and impact of the above mentioned set of literacies, in the following text there follows a brief explanation of concepts, together with a review of some major authors who have studied these issues.

2.1. Agricultural literacy

In view of the circumstances in which agricultural activity in Croatia is taking place, agricultural literacy can be described as a set of skills acquired through farming work and knowledge passed on mostly orally, and accordingly lacks any kind of formal mode of learning. This observation is confirmed by Croatian legislation (Act on Agriculture, 2009), which classifies a farmer as a physical person on a farm, working in agriculture, who has knowledge and skills related to agriculture. First attempts at defining agricultural literacy were roughly in this scope; however, it soon became obvious that the range of knowledge required to be a farmer today is much wider.

Meischen and Trexler propose a comprehensive definition of agricultural literacy, stating that it is "knowledge and understanding of agriculturally related scientific and technologically based concepts and processes required for personal decision making, participation in civic and cultural affairs, and economic productivity" (Meischen, Trexler, 2003).

The authors add that agricultural literacy exceeds the mere acquaintance with concepts and processes in agriculture, as well as the generalization of issues connected to its realization. They emphasize the crucial capability of making prudent decisions and implementing them in private and public activities, since to be an active participant in agriculture requires the individual to understand economic, environmental, social and business circumstances, and how they affect all the stakeholders (Powell et al., 2008).

2.2. Digital literacy

Digital literacy is viewed today as a dominant competency and the basis for acquiring and upgrading other forms of literacy. This is why digital literacy encompasses, or is even identified with, the notions such as Internet literacy, computer literacy, and information and communication literacy (Osterman, 2013). The combination of skills necessary to become digitally literate is well presented in the three-part definition by the University Library at the University of Illinois at Urbana-Champaign, which states that it is "the ability to use digital technology, communication tools or networks to locate, evaluate, use and create information; the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers; and a person's ability to perform tasks effectively in a digital environment. Literacy includes the ability to read and interpret media, to reproduce data and images through digital manipulation, and to evaluate and apply new knowledge gained from digital environments" (University of Illinois, 2011). In contrast to basic literacy, young generations of today do not gain those digital competencies so much through formal education, but more through constant exposure to the technologies, the usage of which shapes their way of thinking, as well as the rationale of seeking, moulding and consuming information.

2.3. Information literacy

Numerous authors are studying information literacy as a prerequisite for non-discriminatory participation in modern society, which is marked by technology-aided human interaction. As this notion is broader than the notion of the computer, i.e. digital literacy, knowing about technology is not enough for a person to be designated as information literate (Horton, 2007). Some important skills are the ability to find, browse and use information, as well as the ability to manage it, thus directly influencing the decision making process (Mitchell, 2009). Paul Zurkowski is a major author, and the person credited with coining the term or the concept of information literacy. He has emphasized the need for people to be information literate so that they can be equal participants in the information society. According to Zurkowski, "people trained in the application of information resources to their work can be called information literates. They have learned techniques and skills for utilizing a wide range of information tools as well as primary sources in moulding information solutions to their problems" (Zurkowski, 1974).

Information literacy is the foundation for life-long learning and a competence applicable across all disciplines and throughout the education system. Given the complex environment that we live in, and constant exposure to information, which is accessible not only on demand, but also forced upon us, the need has arisen to check its validity, reliability and authenticity. Furthermore, information available in the digital age can appear in a range of formats, thus requiring from users the capacity to interpret different types of media. In conclusion, the abundance of information in itself does not make any society or community more informed; it requires us to master certain skills that will help us to use information more effectively (ACRL, 2000).

3. Information society and legal framework

The information society is part of the *acquis* of the European Union, now used by the Republic of Croatia as well. As pointed out on the EnterEurope website (http://www.entereurope.hr/), the concept of information society designates the response of the European Union to the revolution in society spurned by the rapid development of communication technologies, based on "information" as an expression of human knowledge (Gulija, 2010).

Initiatives of the European Union are necessary to offer its members and candidate countries certain guidelines and action plans aimed at increasing the digital and information literacy, primarily in underprivileged social groups. The ultimate goal is to remove barriers such as age, isolation of people living

in remote or marginal areas of the EU, or in poorer regions, etc. Regardless of the reasons, the intention is to facilitate the empowerment of all individuals and to reduce the digital gap, thus enabling equal-footing participation and contribution within digital economy and the information society. The latest issue of the Common Agricultural Policy (CAP) was redesigned in late 2013 to include more efficient measures for sustainable agriculture and vibrant rural areas. Some of the guiding principles for the reform are geared towards overcoming economic, environmental and territorial challenges. The answer to economic and environmental challenges comes in the form of sustainable food production and management of natural resources, whereas territorial challenges such as revitalizing rural areas will be solved by reallocation of funds for priority areas.

Table 1 Chronology of the European Commission initiatives towards information society

Milestones	Period	Major goals and guidelines
eEurope	2000 – 2005	• Information society for all (socially inclusive) • Access to cheaper and faster Internet • Online public services • Promotion of e-markets
i2010	2005 – 2010	• Creating a single information space • Strengthening innovation and investment in ICT
Digital agenda for Europe (DEA)	2010 – 2020	• One of the key initiatives of the Europe 2020 strategy • Improving interoperability of information and communication products and services • Promoting trust and security on the Internet • Enhancing digital literacy, knowledge and e-inclusion

Source: authors, According to: http://epp.eurostat.ec.europa.eu/portal/page/portal/employment_social_policy_equality/information_society

One of the key issues the reform is confronted with is rural development. The member states are required to devise a plan covering at least four out of six possible priorities, including: a) supporting the transfer of knowledge and innovation in agriculture, forest management and rural areas, and b) improving the viability of farms and competitiveness of all types of agriculture, as well as supporting the use of innovative technologies on farms (CAP, 2013).
All the above poses new challenges for farmers and some might not be ready to tackle them. The changes are now in full swing thanks to the European Commission initiatives, which member states have to act upon by developing their operational strategies and providing legal frameworks within their system. **Table 1** gives an overview of the initiatives by the European Commission since the year 2000.
Taking into account all the above, the intention was to determine how ready farmers are for the challenges arising from Croatia's full accession to the EU. The current situation and the readiness of farmers to tackle the challenges are presented below in the analysis of primary research.

4. Methodology of primary research

The primary research is a part of more extensive research into the broader context of the implementation of information and communication technologies with the aim of enhancing farmers' knowledge and consequently overall agricultural sector performance. This section of the research aims at testing the main hypothesis that although there are objective and subjective obstacles to raising the level of knowledge among farmers in Croatia through optimized use of information and communication technologies, there is an interest, as well as a desire to enhance knowledge. Therefore, it is necessary to analyse the current level of knowledge and readiness to adopt new knowledge and technologies, in order to discover areas of interest. A well-managed interest may lead to higher information literacy, which is one of the prerequisites for the successful integration of Croatian farmers into the modern agricultural market system. The analysis of obstacles will help develop a strategy for overcoming these obstacles, bearing in mind that the focus on interest and desire is central to the AIDA (acronym for "attention, interest, desire, action") concept, which, according to Derrick White, in his book "Close More Sales" is probably "...the oldest acronym in marketing. It

is the best and will never change" (Moore, 2005). In order to confirm the above mentioned, in this paper we present a part of the primary research carried out using the CATI method and a closed questionnaire consisting of 18 questions, most of which were multiple-choice. Nominal and ordinal scales were used. The ordinal scale selected was a Likert scale. The sample consisted of randomly selected family farms and it was stratified in two stages (by county and size of settlement), using the list of family farms that received state aid in agriculture. The survey was conducted with a sample of 572 farmers. The majority of respondents came from Zagreb County (12.4%), followed by Osijek - Baranja County (8.7%), Koprivnica - Križevci County (7.2%), Bjelovar - Bilogora County (7.0%) and Split - Dalmatia County (7.0%). The smallest number of respondents came from Primorje - Gorski Kotar County (1.6%). More than half of the farms were established in the period between 2000 and 2005 (57.0%). One third of the farms were established after 2006 (32.0%) and only a small portion (6.8%) before 2000. 76.6% of the farms are situated in predominantly rural areas, and a smaller number in suburban (20.5%) and urban (2.8%) areas. In terms of production, 52.8% of the farms were primarily engaged in livestock breeding, 44.4% in crop production, and a small part were engaged in the processing, transport and trade of agricultural products (2.6%). Furthermore, 21.7% of respondents owned 5-10 hectares of land, 20.6% of farmers had 10-25 hectares, 18.5% had 1-5 hectares, and 15.0% had between 25 and 50 hectares. Sociodemographic characteristics of the respondents indicate that the male to female ratio was 60:40 with men accounting for 59.1% and women for 40.9% of the sample. The majority of respondents were above 40 years of age (60.1%); a slightly smaller percentage (39.2%) were 21-40 years old; and only 0.7% of respondents were under 21 years of age. According to the level of education, 58.7% of respondents reported completing secondary education; 24.3% primary education (primary school); 10.8% reported to have a two-year post-secondary or university degree; and 1% had completed a master's degree. Furthermore, 26.2% of respondents earned about HRK 5,000 per month; 21.2% earned less than HRK 5,000, and 19.2% more than HRK 5,000. 33.4% of respondents refused to answer that particular question. In terms of their status on the farm, 93.9% of respondents were the owners or co-owners of the farm, and the remaining small percentage (6.1%) were employees or associates.

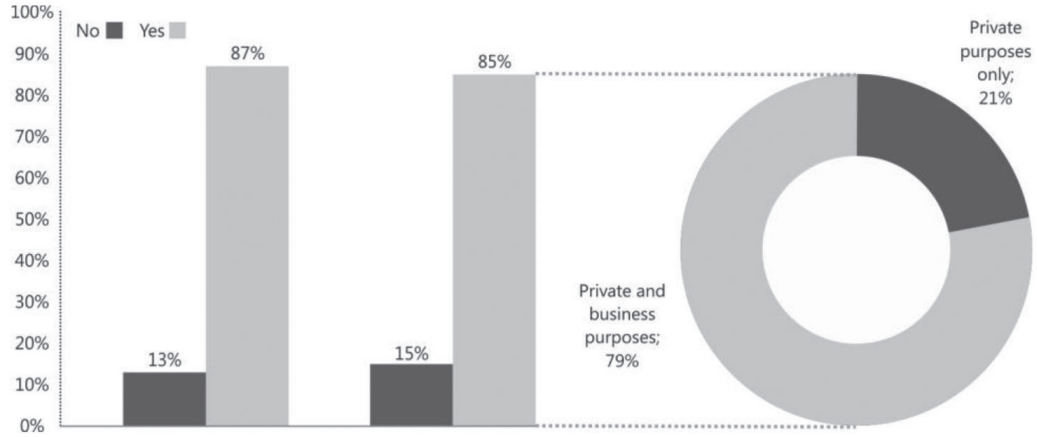
5. Results and discussion

As the Internet, along with other information and communication technologies, is a tool for bridging the gap between various experts, people from rural areas and farmers through interaction and dialogue, it can help with establishing collaboration with new partners and facilitate cross-sectoral networking between government institutions, various support agencies and farmers. Also, as mentioned earlier, without the Internet one can hardly achieve an adequate level of information literacy, which is a prerequisite for the successful integration of Croatian farmers in the modern agricultural market system. Primary research analysis was divided into three sections. The first deals with obstacles to the adoption of new knowledge and technologies; the second deals with interest, and the third with desire, as the final phase before taking concrete actions.

The first part of the analysis deals with obstacles to the adoption of new knowledge and technologies (a prerequisite for developing information literacy skills) by classifying them into two groups: objective and subjective obstacles. Access to a computer and access to the Internet (Graph 1) are observed as potential objective obstacles to the adoption of new knowledge and technologies. The study has shown that objective obstacles were minimal as the vast majority of farmers in the survey had access to a computer (87%) and to the Internet (85%), which, in the majority of cases, was high speed Internet (75%). Furthermore, most of those who had access to a computer and the Internet used these also for business purposes (79%). It is necessary to improve the situation for 15% of farmers who do not have access to a computer and the Internet, and thus face an objective obstacle to integration using IT tools as a means of achieving information literacy.

However, in the majority of cases, the fact that there were no objective obstacles did not result in concrete actions that would enable farmers to integrate better into the existing agricultural market: the vast majority of respondents do not have their own website (84%) or do not use social networks to communicate and exchange information (72%). A smaller percentage of respondents (28%), who are present in social networks, mostly have only a Facebook profile (like the majority of the social network users in Croatia), while other social networks (including business networks such as LinkedIn) are not used.

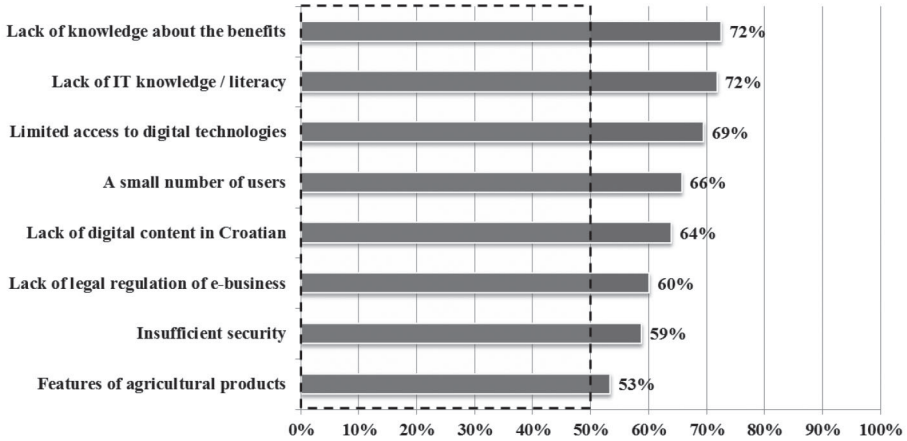
Graph 1 Access to computer and access to the Internet



Source: authors

Given that the majority of farmers have no objective obstacles and acknowledge that business purposes are an important part of using computers and the Internet, but nevertheless lack the basic communication tools, suggests the presence of subjective obstacles (caused by their opinions, attitudes, lack of awareness...). Subjective obstacles were tested using a set of statements (respondents were asked to rate statements on a scale of 1 to 5) where farmers independently rated the main obstacles to the application of information and communication technologies by family farms in Croatia. By responding on behalf of family farms in general, farmers tend to express more easily their perception about obstacles that they personally find difficult to overcome (**Graph 2**). Considering the percentage of

Graph 2 Ranking of perceptions about obstacles

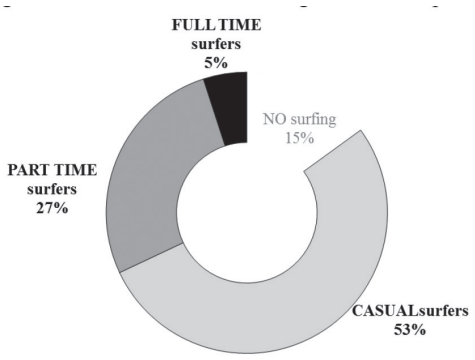


Source: authors

respondents whose ratings were mostly 4 and 5, it is clear that the majority of farmers chose all the stated reasons (all the statements exceed 50%), but most of them are not certain about the benefits they would have from information and communication technologies (72%) and think that they lack adequate competencies (72%). In addition, even though the vast majority of farmers have a high speed network connection, most of them feel that they have limited access to digital technologies and that there is a small number of Internet users that might be of interest to them.

After establishing that obstacles were largely subjective and related to the lack of awareness about the possibilities of information and communication technologies, the fact that farmers themselves were aware of the problem is encouraging. In order to identify farmers' training needs in terms of developing and exploiting the potential of all dimensions of information literacy, it was necessary to determine whether there was interest among farmers in adopting new knowledge and technologies. Therefore, the second part of the analysis focused on understanding **interest**. Time spent actively on the Internet, as a quantitative variable, was selected to measure interest (Graph 3). Farmers were classified into four groups: those who are not on the Internet (NO surfing); those who actively spend less than an hour a day online (CASUAL surfers); those who actively spend up to three hours a day online (PART TIME surfers), and those who actively spend a minimum of three hours or more a day online (FULL TIME surfers).

Graph 3 Segmentation of farmers according to the time spent actively online



Source: authors

As can be seen from Graph 3, the majority of farmers are online up to an hour a day. Whether that is enough, not enough or too much, depends on how they use that time. It should be noted that the surveyed farms usually have no person in charge of office work only. It is, therefore, very important to determine the optimal time needed to maximize the opportunities of the digital age, without compromising the core activity. This is why the level of interest in specific topics in the total sample of farmers was measured (Table 2).

Table 2 Interest in particular information

Items	n	% Total sample	% Online sample	Average grade (scale 1-5)
1. Incentives and development programs	467	81.64%	92.84%	**4.5**
2. Weather Forecast / prognostic maps	456	79.70%	90.70%	**4.5**
3. Diseases and pests warning systems	451	78.80%	89.70%	**4.4**
4. Market information	447	78.10%	88.90%	**4.3**
5. Prices and availability of products	443	77.40%	88.10%	**4.3**
6. General news about agriculture	443	77.40%	88.10%	**4.3**
7. Cadastral information	429	75.00%	85.30%	**4.3**
8. Latest practices	426	74.50%	84.70%	**4.2**
9. Management and operation	403	70.50%	80.10%	**4.1**
10. Services (forums, etc.)	397	69.40%	78.90%	**4.1**
11. Technology solutions after harvest	376	65.70%	74.80%	**4.0**

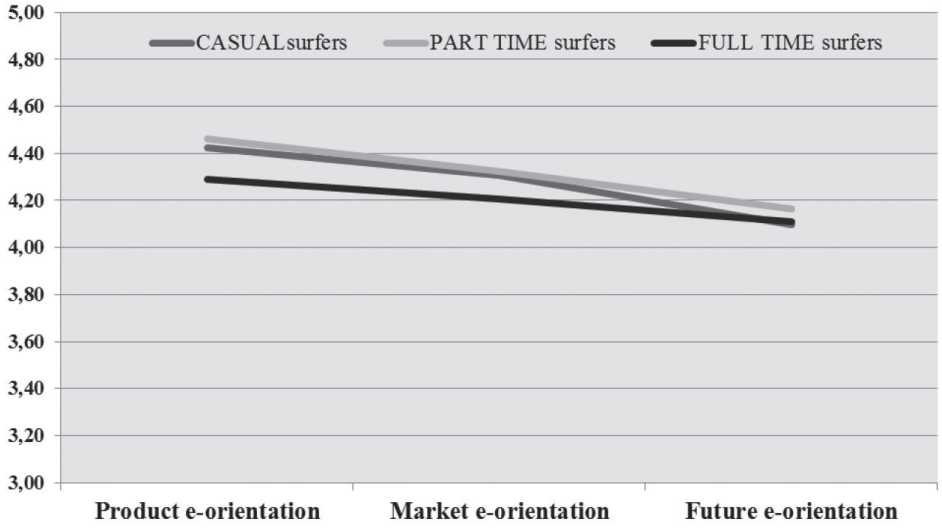
Source: authors

Table 2 shows the percentage of respondents who rated individual statements with 4 or 5 and the average scores for individual statements. All the observed statements received very high ratings, which means that farmers are open to acquiring new knowledge and that subjective obstacles were far from causing indifference. However, in relative terms, it is possible to identify statements in which farmers showed the greatest interest. In order to better observe the 11 statements, they were grouped into three dimensions: **product orientation, market orientation** and **future orientation (Graph 4)**. A question arises whether there is a difference in the ratings of interests among different groups of farmers and whether the interests of those who spend more time online are of different orientation. The average scores for each dimension show that those farmers who spend more time online gave slightly lower ratings to all interests, which means that during the three hours spent on the Internet they largely manage to satisfy their interests related to all three dimensions under consideration here.

To understand interests, as the most important factor in creating desire, and finally driving farmers to action, all dimensions were analysed in detail by segments of farmers (Table 3). In order to put these high scores into context, the affinity index was calculated. It compares the interest of all in relation to the score 4.0, as a solid, but not extreme (the highest possible) score. This supports two conclusions: 1. CASUAL and PART TIME surfers rate interests higher than FULL TIME surfers; 2. regardless of the segment, interest ranking is the same: the priority is to get answers focused on the present (product orientation followed by market orientation), whereas the lowest interest is shown in development, which focuses on the future (future orientation). This shows that even full time surfers do not use the time spent on the Internet efficiently and effectively. The last set of questions refers to the **desire** of farmers for targeted use of new technology to improve business performance in specific areas. As expected, farmers were motivated for all available segments, which is consistent with the declared interest (**Graph 5**).

Farmers have indicated a desire to use new technologies in order to enhance their competencies and ability to better respond to market demands, a desire for a lower information price, lower transactions price, increased competitiveness, expanding to new markets, but also a desire for information related to marketing research and production differentiation. This confirms they are open to new knowledge.

Graph 4 Segmentation of farmers according to their e-orientation



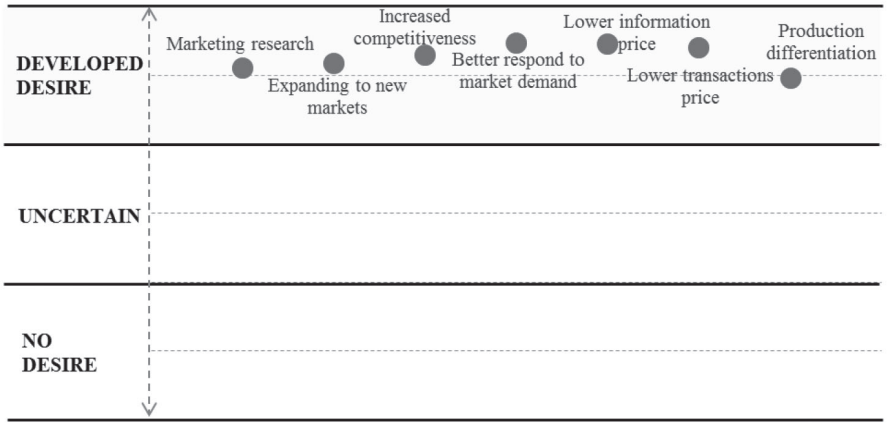
Source: authors

Table 3 Affinity indexes per segments

SEGMENTS	CASUAL surfers	PART TIME surfers	FULL TIME surfers	TOTAL	TOTAL DIMESION INTEREST RANG
DIMENSIONS	AFFINITY INDEX				
Product orientation	**110.6**	**111.5**	**107.3**	**110.7**	
Incentives and development programs	111.5	112.3	107.3	111.5	**1**
Weather Forecast / prognostic maps	111.3	112.5	109.8	111.5	
Diseases and pests warning systems	109.0	109.8	104.8	109.0	
Average: Market orientation	**107.7**	**108.1**	**105.2**	**107.7**	
Market information	108.0	107.5	113.0	108.3	
Prices and availability of products	108.0	106.5	101.5	107.0	**2**
General news about agriculture	106.8	109.5	108.0	107.8	
Cadastral information	108.3	108.8	103.3	108.3	
Average: Future orientation	**102.4**	**104.1**	**102.8**	**102.9**	
Latest practices	105.0	105.3	108.0	105.3	
Management and operation	102.8	104.0	104.0	103.3	**3**
Services (forums, etc.)	102.0	104.3	100.8	102.5	
Technology solutions after harvest	99.8	102.8	98.3	100.8	

Source: authors

Graph 5 Areas for which farmers have developed a desire for better use of new technologies



Source: authors

6. Conclusion and recommendations

The literature review and the EU development initiatives emphasize the importance of investment in individuals as the main bearers in economic activities. Farmers are no exception in these processes. On the contrary, their segment is facing new circumstances, forcing them to adapt rather quickly in order to be competitive. New challenges demand versatile farmers who will be enterprising, well informed and driven. By continuous investment in new knowledge, by supporting the interest and creating possibilities for improvement they will attain the ultimate goal of establishing healthy and sustainable development of agriculture and related activities. Proficiency in basic computer skills and information literacy will contribute to empowerment and emancipation of farmers who can become active participants in further agriculture development stages within the chain of decision-making. As an important social group, farmers should be empowered through training programmes within the education system and through other initiatives aimed at upgrading the existing body of knowledge. Such empowerment will create permanent social value that can bring benefits for the whole community, such as preservation of the rural environment, keeping young people in rural areas, self-employment, and strengthening agriculture as a strategic industry. The primary research has confirmed the basic hypothesis that although there are subjective (not so many objective) obstacles to raising the level of knowledge among farmers in Croatia, a high level of interest and desire make an excellent foundation for the use of information and communication technologies in the agricultural sector. A precondition for capitalizing on the interest and desire shown is to provide training for farmers who are not sure about the concrete benefits or how to obtain them. In addition, they realize that they lack the skills in using new technologies (although available), but they are ready and willing to work on their own development, given that this will enable them to become part of the modern agricultural market system.

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Integracija hrvatskih poljoprivrednika u informacijsko društvo Europske unije – problemi i implikacije

Sažetak

Razvoj obiteljskih poljoprivrednih gospodarstava u Hrvatskoj uvelike ovisi o njihovoj prilagodbi suvremenim zahtjevima otvorenog tržišnog sustava i to praćenjem novih tehnologija i usvajanjem novih znanja. Takva bi prilagodba poljoprivrednicima osigurala bolji pristup informacijama i novim tržištima, bolji položaj u pregovaranjima te poboljšani menadžment. Internet s ostalim informacijsko-komunikacijskim tehnologijama predstavlja alat za povezivanje raznih interesnih skupina unutar vertikalnoga poljoprivrednog lanca. Uloga i značaj informacijske pismenosti, u području djelovanja nositelja poljoprivredne proizvodnje, prikazana je kroz pregled europskih razvojnih inicijativa i teorijskih saznanja koja se bave važnošću ove tematike. Kako bi se uspostavile prepreke (objektivne i subjektivne), trenutna razina vještina i spremnosti na usvajanje novih znanja i tehnologija, provedeno je istraživanje na reprezentativnom uzorku ljudi iz ruralnih područja – poljoprivrednih proizvođača, budući da su oni odlučujući čimbenik spomenutih promjena. Rad predstavlja dio istraživanja koje se bavi širim kontekstom uvođenja informacijsko-komunikacijskih tehnologija s ciljem unaprjeđenja znanja poljoprivrednika, ali i rezultata poslovanja u poljoprivrednom sektoru općenito. Analizom se nastoji potvrditi temeljna hipoteza da postoje objektivne i subjektivne prepreke, ali i interesi, kao i želja da se razina znanja poveća u promatranoj socijalnoj jedinici.

Ključne riječi: informacijska pismenost, ICT, hrvatski poljoprivrednici, društveni marketing