

## Information and communication technologies and multifunctional agri-food systems in the Czech Republic

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### ABSTRACT

At present, one of the main measures in the evaluation of information society development is, first of all, a stage of communication infrastructure, which is an essential base for its functioning. The paper gives information on the results of a broad survey of information and communication technologies (ICT) development in companies of agricultural production within the whole Czech Republic (CR), which was carried out in the first quarter of 2008. The aim of the survey is to analyse the stage of Internet connectivity development in rural regions, where an absolute majority of business operators acts, as well as to find out the stage and current trends in development of ICT usage.

**Keywords:** ICT; broadband; Internet; ADSL; FTTx; Wi-Fi; cable connection

The contemporary information society is characterized by a dramatic reduction of space and time limitation, as well as by constant rising of availability and speed of access to an immense amount of information. Information society gradually changes business, public administration as well as each individual's life. This trend is evident also in a classic, and in many ways relatively conservative branch, such as agriculture. In contrast to many other branches, agriculture has a strongly dual character. It provides production of primary commodities used for foodstuff and foodstuff itself, but at the same time it has a significant impact on land and living environment; today we speak about a multifunctional agri-food system. As a result, the role of ICT is becoming substantive along with the development of country regions.

### MATERIAL AND METHODS

The greatest investigation of ICT use in the agricultural resorts was repeatedly accomplished in

the period from 2000 to 2003 by the Information and Consultancy Centre (ICC) of FEM CULS in Prague in cooperation with the Department of Information Technology (DIT). The research works included almost 2700 companies (informants) that represented almost 76% coverage of arable land in the CR.

The results showed that the year 2003 meant a significant shift in the development of ICT. An increase in a number of companies connected to the Internet was very dynamic (a year-to-year increase between 2002 and 2003 was 22%) and thus the penetration reached the level of other sectors; as compared with the EU countries it was even higher. However, it is necessary to take into account the influence of enterprise structure in the CR and the EU countries. Besides the increase of penetration, the intensity of Internet use has significantly grown as well, resulting in a definite trend of regular everyday use. Still, the intensity of use of basic Internet services (e-mail, electronic banking, searching information, etc.) sharply contrasted with the use in presentation

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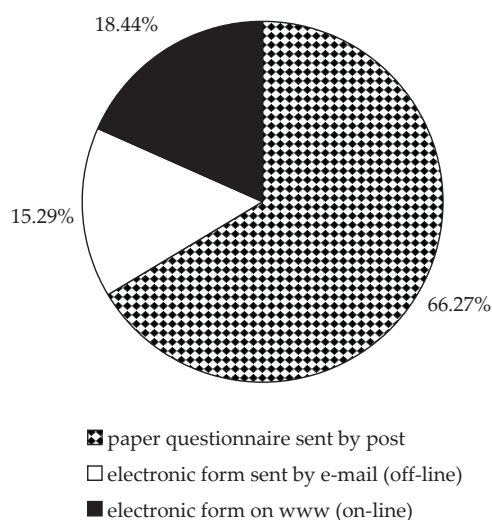


Figure 1. Questionnaire investigation – questionnaire format

and other communication; for example, only 3.1% of informants had their own web site, which signified more than a 100% increase in comparison with the year 2002.

Similarly, a technology of connection to the Internet corresponded with the level of development of CR network infrastructure in 2003 when business connectivity corresponded with generally accessible possibilities, with a slightly higher representation of ISDN; to be more specific, 46% covered ISDN connection, 38% Dial-Up, 12% wireless connection, and 4% fix line.

During the last five years (2003–2008) the whole resort passed, of course, through a fast development; besides that, information and communication technologies themselves recorded a dramatically high pace of development.

The investigation in 2008 had two main aims. The first (general) aim was the investigation itself on the use of information and communication technologies in the resort. The second aim was to verify and update the database of entrepreneurs (informants). The informants received a cover letter with instructions and a questionnaire that they could fill in and send back by post. Altogether 3100 entrepreneurial bodies in the whole Czech Republic were addressed. The questionnaire was also available to download at the Internet (with the possibility of offline filling-in and sending back by e-mail), and as online as an electronic form (in this case, it was possible to fill it in on-line, save it as unfinished and finish later – i.e. the combination of online and offline work). In both cases the agrarian portal AGRIS (<http://www.agris.cz>) was used; it is operated by ICC in cooperation with DIT.

The way of acquisition of results by the informants (form of the questionnaire) is given in Figure 1. The whole two thirds of informants preferred the paper (classical) form of the questionnaire to the electronic forms (offline, online) whose representation was only a third in total (33.73%).

At the end of the mentioned research, 667 responses were received which represents 21.52% of the addressed informants. Regarding the fact that many bodies included in the research do not carry on business further or have ceased (a database with last update in 2003 was used), the real resulting percentage of informants in a frame of active business is naturally higher. In the next years it will be possible to implement a research with an exactly targeted group of enterprises. The results of the whole research were processed in details and they are being continuously published. Some chosen summary results are introduced in the following text where the attention is paid, above all, to the area of Internet technologies.

## RESULTS AND DISCUSSION

According to the expectations and the results of the research themselves, an absolute majority of entrepreneurs have the Internet connectivity (precisely 86.81%); other 10.34% plan to establish it (Figure 2). During a relatively short time the connectivity could thus achieve more than 97%. As to the Internet connection technologies, ADSL represents a big share, and according to the specific conditions in the CR, Wi-Fi takes the second place. However, a relatively considerable number of companies are still connected through ISDN or even with the Dial-Up. Another alternative is currently a mobile-phone connection. Regarding

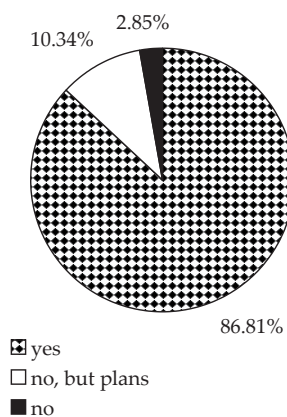


Figure 2. Internet connectivity

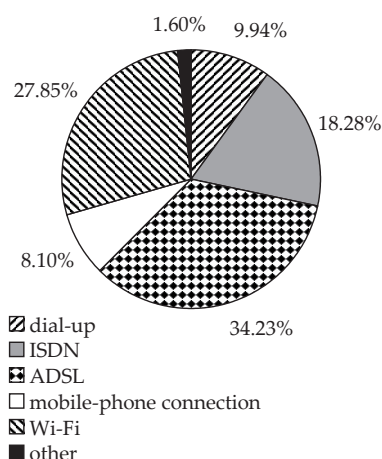


Figure 3. Technologies of Internet connection

the conditions in the CR and specifics of the range of informants, CATV and FTTx solutions are not mentioned. Representation of particular technologies is shown in Figure 3. It is necessary to remark that some enterprises use several types of connection.

Intensity of Internet use is also relatively high; more than 91% of enterprises report that they use Internet regularly, from this number the entire 85% use Internet daily (Figure 4). Fields of utilization are standard (e-mail, www browsing, e-banking); less usual is purchase in Internet shops (Figure 5).

As expected, other use of Internet technologies is rather low. The results show that only 24% of enterprises have their own www sites, only 3% have an e-shop. Of course, with respect to the nature of agricultural products and goods, the possibility to use an e-shop in this branch is questionable. Nevertheless, a considerable progress came in comparison to the last research in 2003 done in this field (Vaněk and Jarolímek 2003).

The results of the research show that the most widely used search engine is Czech Seznam (stated by almost 90% informants), followed by Google (51%) and further two Czech systems Atlas and Centrum (both 31%). Other search engines like Yahoo!, MSN Live and AOL are in the interval from 5% to 1%.

The research brought further interesting data in the field of knowledge and usage of departmental (resort) Internet information sources – the users are well acquainted with the official departmental portals – Ministry of Agriculture, State Agricultural Intervention Fund and Portal of a Farmer; followed by specialized information portals – Agroweb, AGRIS, Agronavigator and in the end the portals of the Agrarian Chamber – KIS – Regional informa-

tion centres and APIC-AK (Agrarian consultancy and information centre – The Agrarian Chamber) occur (Figure 6). The acquaintance with the first group is between 78 and 90%; the group comprising Agroweb and AGRIS portals reaches 60%; the other portals follow with certain distance. Other information sources are mentioned in a small rate (altogether 6.22%). The acquaintance with individual information portals is unequal and moves in the interval between 36.4% (APIC-AK) and 90.16% (Ministry of Agriculture).

As for the evaluation of usage of the above information sources, it is evident that these portals are mostly intensively used; the percentage of usage varies from 68% (Agronavigator) to almost 96% (State Agricultural Intervention Fund) – details are shown in Figure 7.

The turning point in the usage of Internet in the rural areas was certainly the year 2003 when there was a considerable increase of connected companies; the connectivity reached the level of 78%, which was comparable to other branches; at that time, mostly accessible technologies with low speed, the so called narrowband (Dial-Up, ISDN, fix line) were used. Further, a significant phenomenon was noted, i.e. everyday use of Internet services (e-mail, www browsing) at the business level. At the same time, an important entry phase of an electronic banking (e-banking) culminated. The e-banking itself was possibly the main impetus in development of Internet technologies in the department – the companies established the connectivity, above all, for the benefits of electronic banking.

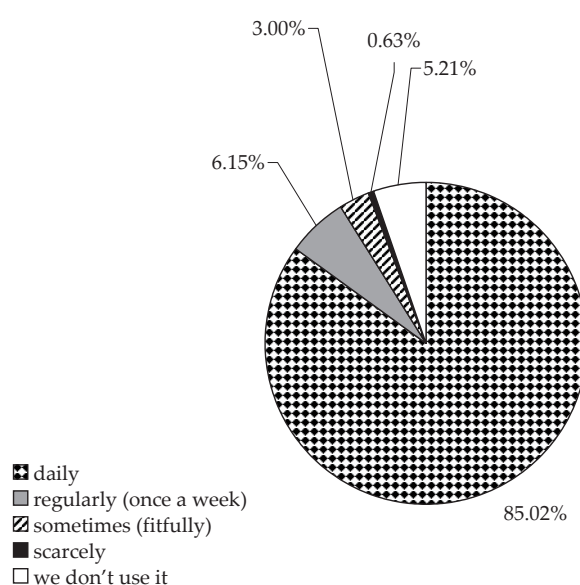


Figure 4. Intensity of Internet use

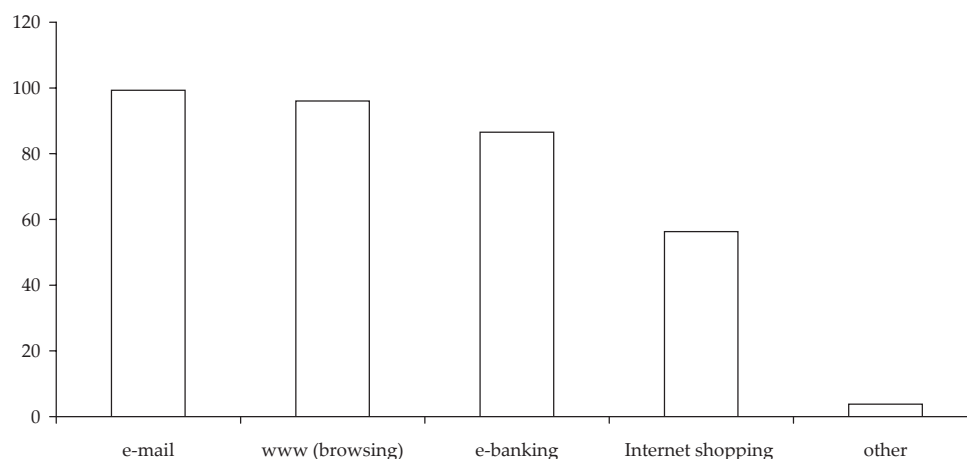


Figure 5. Internet use (%)

Despite of the technological development and European and world trends, the Internet connectivity in the Czech Republic did not develop towards transition to a high-speed connection, which hindered further development of the Internet not only in the rural areas. After a long-term stagnation, in the half of the year 2007, a significant acceleration of the Internet connectivity in the Czech Republic occurred; the basic conditions for full development of broadband were thus set. General trends in development of high-speed connection in the world and in the conditions of the Czech Republic are presented for example in Vaněk et al. (2007, 2008).

The research implemented at the beginning of 2008 has shown which changes in the sphere of ICT took place during the five years; it charted an actual stage of development and indicated further possible directions of progress. During a short period, almost full connectivity of companies will

be reached; whereas broadband, which today constitutes minimally 65% of connection, will further spread and its qualitative parameters will increase. However, in comparison to the majority of EU and OECD countries, its development is not generally at the sufficient level in the Czech Republic. The specifics of the CR that are significantly manifested in the rural area and predetermine also the business sphere acting there (important or even unique position of Wi-Fi; on the contrary, a relatively low rate of ADSL, minimal development of FTTx, massive decline in a number of fixed lines, etc.), will further persist.

Further development of broadband in the conditions of the Czech Republic is currently influenced mainly by continuing boom of Wi-Fi; development of ADSL towards ADSL2+; development of mobile-phone services and in future also by expected competition of forthcoming technologies (including the mobile ones) such as WiMAX or

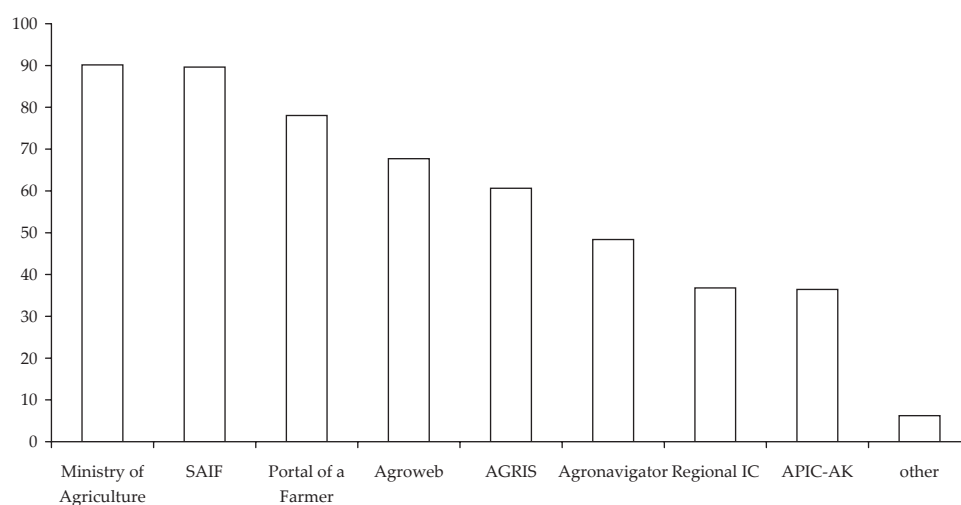


Figure 6. Knowledge of departmental www server

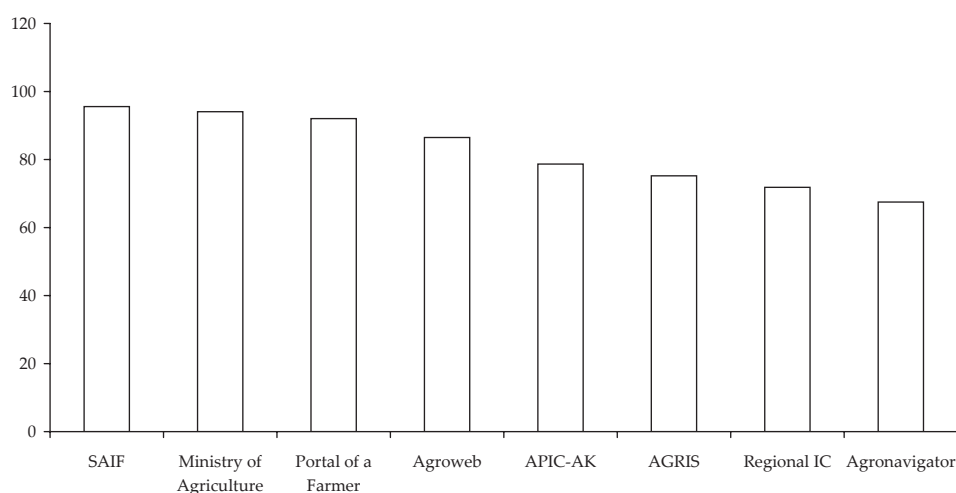


Figure 7. Knowledge and usage of departmental www servers

HSDPA. It is also necessary to count with further technological development of Wi-Fi.

The ground for dynamical development further offers, first of all, the sphere of Internet presentation (www pages) and applying of technologies web 2.0. There can be a slight improvement in intensity and quality of Internet services usage, which embodied saturation (e-mail, www browsing); the reserve can still be seen in e-banking. On the contrary, for the objective reasons there will not be a strong development of sale on the Internet (e-shops).

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