

Development of communication infrastructure in rural areas of the Czech Republic

Rozvoj komunikační infrastruktury ve venkovských oblastech ČR

J. VANĚK, J. JAROLÍMEK, P. ŠIMEK

Czech University of Life Sciences, Prague, Czech Republic

Abstract: The paper deals with the current trends in development of communication infrastructure which is, above all, represented by high-speed Internet connection (broadband). It is focused on conditions of the Czech Republic; or more precisely, on its rural areas, including possibilities of further development in the following period in context of trends in the world, in the OECD and the EU countries.

Key words: ICT, information society, broadband, communication infrastructure, internet, ADSL, FTTx, Multifunctional Agri-food System

Abstrakt: Příspěvek je zaměřen na aktuální trendy rozvoje komunikační infrastruktury, která představuje především vysokorychlostní konektivitu k internetu (broadband). Pozornost je věnována podmínkám České republiky, resp. jejím venkovským oblastem, včetně možností dalšího vývoje v následujícím období v kontextu trendů ve světě, zemích OECD a zemích Evropské unie.

Klíčová slova: ICT, informační společnost, broadband, komunikační infrastruktura, internet, ADSL, FTTx, multifunkční zemědělskopotravinářský systém

The contemporary information society is characterized by a dramatic reduction of space and time limitation, as well as by the constant rising of the 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 very fast development of information and communication technologies (ICT) brings these changes to all spheres of human activities (production, commerce, services, household and free time). This trend is evident also in a classic and in many ways relatively conservative branch, such as agriculture. In contrast to many further branches, agriculture has a strongly dual character. It provides production of primary commodities used for foodstuff and foodstuff itself, but at the same time has a significant impact on land and living environment, namely in the area of rural regions – today we speak about the Multifunctional Agri-food System.

The main criterion in evaluation of information society development is the level of technical infrastructure

– considered as a basic layer of complex of internet services – which consists of access facilities and communication infrastructure. Its building and subsequent usage gives space for further development, especially in the field of communication, company presentation, usage of new e-services and its provision indeed. For final user the communication infrastructure represents possibilities of internet access with the emphases on high-speed connection – broadband (rural areas at general, subsequently business sphere).

OBJECTIVES AND METHODS

High-speed Internet access represents one of the strategic objectives in building of information and knowledge society, which has a significant importance not only in the cities but today mainly in the country (the so called digital divide). This problem affects inhabitants of the country, as well as business and other subjects acting in this area.

Supported by the Ministry of Education, Youth and Sports of the Czech Republic (Grant No. MSM 6046070906).

High-speed Internet access (broadband) is defined by the minimal transfer speed. Its rate is in the particular countries set differently and ranges from 64 Kbps (France), over the rate of 128 Kbps (Germany), up to 144 Kbps (Austria, Ireland); eventually 256 Kbps (Czech Republic). All of these broadband rates (limits) may seem relatively low with regard to the currently offered connectivity. From the view of broadband penetration (most often considered as a number of high-speed connection line per 100 inhabitants), is rate of 256 Kbps the probably still sufficient – if we take into account the attained rates of penetration which are ranging, for example within the OECD countries, to the limit of 33%, whereas the OECD here represents roughly a threefold average rate in contrary to the worldwide average (OECD Broadband Portal).

The aim of the paper is to record and present the current trends in development of high-speed Internet in conditions of the Czech Republic, as well as to note possibilities of its further development in the following period, in context of the trends in the world, the OECD and the EU countries.

RESULTS AND DISCUSSION

The development of high-speed Internet infrastructure can be denoted as a current worldwide trend. In general, there is a relatively great attention paid to the mentioned problems (see e.g. The First Annual Report on the European Information Society i2010); and many other documents. The European Commission states here the necessity to support the development of information and communication technologies and to target the area of high-speed Internet.

The availability of high-speed Internet (high-speed connection) has a key impact mainly on the usage of Internet and the development of on-line services; furthermore, it stimulates the development of new and advanced services, for example the VoIP or video conferences; and it is also a key factor for the development of e-commerce. Broadband has a different starting position in the particular countries and regions of the world; it has a different state support, thus the pace of development. The penetration of broadband and today used technologies has become one of the important parameters of the technical level in the particular countries and regions.

Naturally, within each country, there are relatively considerable differences in the access to high-speed Internet – the differences between cities and rural regions. It concerns the so-called digital divide, which involves the majority of people in rural area

and which has not been sufficiently solved yet in the conditions of the Czech Republic. The inhabitants of cities nowadays already have commonly available fast internet; often in a number of variants and from more providers. On the contrary, the rural areas have this connection strongly limited, or eventually even not available at all. On the other hand, the Internet connectivity is relatively expensive in our conditions for all users (citizens, organizations, companies).

MAIN TELECOMMUNICATION TRENDS

The main telecommunication trend is within the broadband internet connection represented in the long term by the DSL technology, followed by the connection via distribution of cable television (cable modem) and eventually optical connection lines (FTTx). This trend continued also in the year 2006 and at the beginning of the year 2007, when new ways of high-speed infrastructure development gradually occurred. These are evident in some areas (especially Asia). In the worldwide measure, this trend has not taken the effect for the present yet; nevertheless, this can be expected during 2008 and in the next period.

At the beginning of 2006 (31. 12. 2005), 212.8 millions of high-speed Internet connection lines were recorded worldwide. One year later, at the beginning of 2007 (31. 12. 2006), it was already 281.5 millions of these connection lines (OECD Broadband Portal, Broadband Analysis) (basically, there is an inclusion of the already discussed connections with minimum speed of 256 Kbps). These numbers represent the year-on-year growth in number of connection lines by almost one third (in specific for 32.3%). From the stated number of connection lines, about 66% fall on ADSL, 22% on cable connection and 11% on optical connection lines. Other types of connection do not play practically any significant role in the worldwide measure. Towards the end of the year 2007 (currently Q3), 328.8 millions of connection lines were recorded, whereas their structure was not worldwide changed (see Figure 1). Nevertheless, in comparison with 2006, in 2007 a lower total year-on-year increase of high-speed connection lines can be expected (by estimation up to 25%).

The DSL technology dominates in the absolute majority of countries, the exceptions are just the USA, Canada and Korea, where in contrast the cable connection is most widely spread (cable modem). Fast introduction of fiber is characteristic mainly for Asian countries (Japan, South Korea, China), but recently also for the USA. For instance, Japan has reached,

according to the latest data, the share of fiber of more than 36%. The maintenance of the total position of DSL along its decline in Asia is given especially by its development in Europe, where by contrast fiber does not have any deep significant position. This primarily stands for the “old” countries of the European Union (in particular, the exceptions are Sweden and Denmark). Whereas the number of optical connection lines in the eastern part of Europe is practically twice as big as in the rest of Europe.

In this context, a new term has occurred – “next generation digital divide”, which also indicates a real and potential backwardness of Europe. Here comes to further development of the DSL connectivity though – the introduction of a relatively very fast technology ADSL 2+ (speed more than tens of Mbps), but obviously, the trend of the development of fiber – with a much higher potential – will not be overall noted. It is, with regard to its small extension, in the range of cases still included in the category “other”. On the contrary, in Asian countries, the ADSL 2+ technology was already fully applied and they began to use the new (yet not standardized) ADSL technologies with 50 Mbps downlink. For all that, these technologies are in a considerable rate compensated by fiber with a higher transfer potential.

Data provided in behalf of the OECD (OECD Broadband Portal) countries have a resembling character in their overall structure; nevertheless, there is a smaller rate of the DSL for the benefit of cable and fiber – see Figure 2. The DSL technology is indeed the chief platform in the majority of the OECD countries and generally represents over 62% of the connection lines, cable connection then takes up a higher general proportion with almost 29% (given

by the already mentioned participation of the USA, Canada and Korea).

Within the European Union, it is significant that the growth of broadband connection remains further considerable in the countries, which in the world take up the front position in the extension of the broadband (Denmark, the Netherlands, Norway, Finland, Sweden). Generally, there is an increase of difference between the EU countries with the highest and lowest rate of broadband expansion. As the growth impediments of the broadband connection, the European Commission identified especially the insufficient economic competition and divide in ordinances.

BROADBAND – SITUATION AND TRENDS IN THE CZECH REPUBLIC

As for the development of high-speed connection, the Czech Republic occurs under the average of the OECD and on the last places within the European Union. The positions of the Czech Republic illustrate the Figures 3–5.

In the Czech Republic, the definition of broadband is already ambiguous. The National Policy for High-Speed Access of the Czech Republic (Broadband strategy of the Czech Republic) (Národní politika pro vysokorychlostní přístup) from the year 2005, today already no longer supported set this limit at 256 Kbps (with the assumption that the effective speed will not drop under 80% of nominal speed in the long-term average). Alongside this, there are other two limits of broadband – seen in the fact that the Czech Telecommunication Office uses the rate of

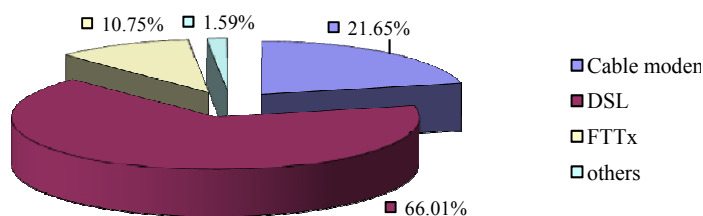


Figure 1 Broadband in the world – technology

Source: Point Topic

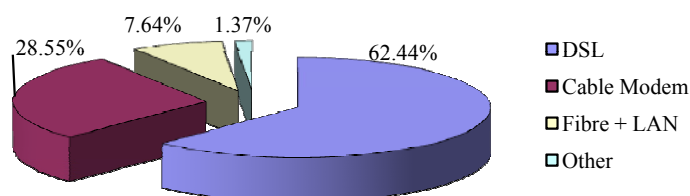


Figure 2. Broadband in OECD countries – technologies

Source: OECD

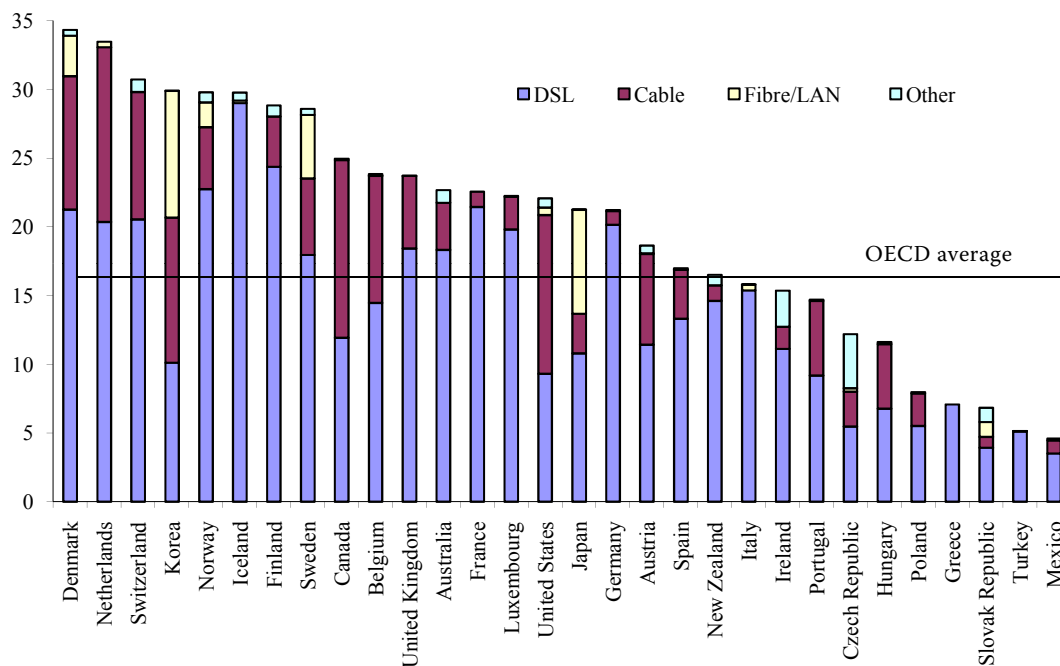


Figure 3. Broadband – penetration in the OECD countries, according to technology

Source: OECD

128 Kbps and the Czech Statistical Office the limit of 144 Kbps.

As it was already mentioned, the official statistics (OECD, Point Topic, EC – European Commission) nowadays use as a broadband limit just the rate of 256 Kbps. This rate coincided in our conditions in the year 2006 with the offered, most widely spread version of the ADSL. Practically, it would be possible to denote this rate as low in our conditions – the lower limit of ADSL speed was set at 2 Mbps by the O2 company from May 2007. This was also fast adapted by the other ADSL providers and tech-

nologies (cable operators and Wi-Fi providers of connection). Regarding the state of penetration in the Czech Republic the limits used in important statistics and other countries, the limit of 256 Kbps can be considered as still sufficient.

From the half of the year 2007, the Internet connectivity in the whole Czech Republic significantly accelerated; and so the basic conditions for development of broadband were set. Thus, the Czech Republic denotes a relatively substantial pace of development of high-speed access to Internet, even if this in fact slowed down.

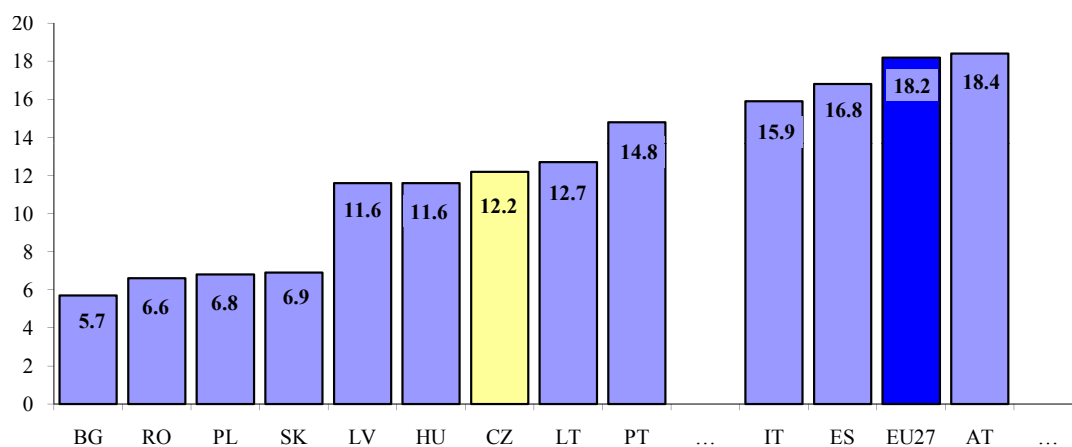


Figure 4. Broadband – penetration in the EU countries

Source: European Commission

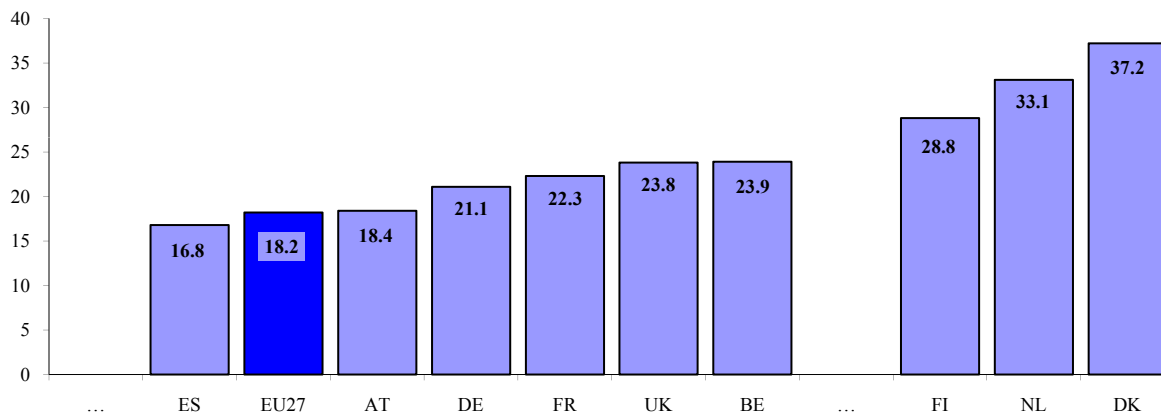


Figure 5. Broadband – penetration in the EU countries

Source: European Commission

The technical structure of the built communication infrastructure is partly different from other countries (the EU, advanced countries); above all, through the outstanding prevalence of Wi-Fi technology, which represents over half of the connection lines within the European Union (some important statistics were caused primarily because of the situation in the Czech Republic). At the same time, there is a relatively fast mobile connection, which compensates for the fixed connectivity. An outstanding development was noted also by the ADSL, which despite penetrative acceleration of transfer speed (ADSL2+), currently does not reach the same dynamic as before – obviously, there is a competition of Wi-Fi in the country (other services reacted also with acceleration of the transfer speed) and namely price (the so-called “naked” ADSL is not offered). Further reason for penetration slowdown will still be limited by the computer facilitating, which is not the essential problem of the company environment though; however, from the view of a range of subjects from agricultural-food complex, this will have a definite impact (by households in the Czech Republic this impact is today already obvious).

CONCLUSION

After a long-term backwardness in development of high-speed connection in the half of the year 2007, a significant acceleration of internet connectivity occurred in the Czech Republic – thus, the basic conditions for development of broadband were set. In comparison with other countries, there are currently only 45% of connection lines realized through the DSL technology, that means a high share of other technologies (in the conditions of the Czech Republic,

this does not mean FTTx but especially a massive implementation of Wi-Fi and cable connection).

From the perspective of the rural areas of the Czech Republic, it is possible to state that the accessibility of high-speed Internet is provided to a significant extend as the coverage practically reaches 100%. Nevertheless, the digital divide in the Czech Republic still persists. The availability of the particular service (of particular high-speed connection) is restricted even in many larger settlements and in the case of rural regions, there are great constraints, eventually the service is fully unavailable. For instance, cable television is run only in particular areas, the ADSL is not available in many small municipalities, or there is a trouble with its speed. Hence, in rural areas these technologies still remain considerably inaccessible or exploitable with difficulties.

The further development of broadband in conditions of the Czech Republic is currently influenced mainly by the continuing boom of Wi-Fi (European unique); fast development of the ADSL; the development of mobile services and in future also by the expected competition of the forthcoming technologies (including the mobile ones) such as WiMAX or HSDPA. It is also necessary to count with the further development of Wi-Fi technology. With high expectation, the problem will be seen in limitation of the disposable broadband speed – mainly in the international comparison (low share of fiber and the parameter of the implemented ADSL 2+).

The overall backwardness of the Czech Republic compared with its surroundings is still a reality. Regarding the official support, which this field has (respectively does not have) – through the dissolution of the Ministry of Informatics which represented a relatively good conception; along with no continuation in the broadband strategy and no clear

competition of the forthcoming ministries, respectively their inactivity, it is not possible to expect any significant progress. Generally, it can be stated that the development of broadband is still slowed down through a range of legislative, economic, social and market factors.

The knowledge presented in the paper was obtained as a result of the Research Program titled "Economy of the Czech Agriculture Resources and their Efficient Use within the framework of the Multifunctional Agri-food Systems" of the Czech Ministry of Education.

REFERENCES

i2010 – First Annual Report on the European Information Society [online]. c2006 [cit. 2007-03-26]. Available at <http://www.micr.cz/files/>

OECD Broadband Portal [online]. OECD. c2007 [cit. 2007-12-29]. Available at http://www.oecd.org/document/54/0,3343,en_2649_33703_38690102_1_1_1_1,00.html

Broadband Analysis [online]. Point Topic, c2007 [cit. 2007-12-28]. Available at <http://point-topic.com/home/press/dslanalysis.asp>

Národní politika pro vysokorychlostní přístup (Broadband strategie ČR) [online]. MI ČR, c2007 [cit. 2007-12-29]. Available at <http://www.micr.cz/files/>

Broadband access in the EU: situation at 1 July 2007 [online]. c2007 [cit. 2007-12-29]. European Commission – Communications Committee, Available at http://ec.europa.eu/index_en.htm

Arrived on 30th January 2008

Contact address:

Jiří Vaněk, Jan Jarolímek, Pavel Šimek, Czech University of Life Sciences Prague, Department of Information Technology, Kamýcká 129, 165 21 Prague-Suchdol, Czech Republic
e-mail: {vanek, jarolimek, simek}@pef.czu.cz
