

## MOBILE INTERNET APPLICATIONS, INFRASTRUCTURE AND SERVICES

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### **Abstract**

Mobile communication and the mobile Internet can provide important opportunities, economic advantages for enterprises and organisations and support their more efficient operating as they can be used anytime and anywhere. We can make their wide spread use, innovative effects and advantages economical if we consider the effect system of technologies and services. The technological, social and economical complex effect system puts a pressure on the spreading of business applications. The types of applicable equipment are increasing. The Internet technology and the Internet network have become essential communication tools in business processes recently. Using the Internet by means of mobile appliances increases the possibilities. By studying the business process the expenses, advantages, disadvantages can well be seen. Nowadays these applications are more and more successful in areas such as agriculture, different parts of the food industry, extension services, precision agriculture and logistics. It can be stated that the international and the Hungarian development tendencies of the mobile Internet, the RTD Programmes of EU help the wide-spread use of mobile services. The rapid development of the Hungarian domestic mobile market over the last years is the basis for the wide spread use of new broadband mobile services and applications. This system can contribute to the development of agriculture, enterprises and rural areas and can support production, commerce, services and product tracing. But for successful applications we have to consider the impact factors.

**Keywords:** Mobile Internet, application, infrastructure

### **5. Introduction**

The comprehension of the mobile Internet is not totally unequivocal and may give rise to misunderstandings, despite the fact that it can be considered a well-defined area. The improvement of mobile systems can well be demonstrated both as regards the speed of data transfer and services. 3G (third generation mobile telephone system) and wireless networks (Wi-Fi) have several similarities and differences too.

The access to wireless Internet services can be realised by using a number of technical solutions. The assessment of the mobile Internet from the point of view of business, however, must not be conducted outside their own particular contexts as this area is rather complex. After studying the applicable devices and the services built on them it became evident both the characteristics of the devices applied and the economic factors of their operation showed a heterogeneous picture. As a result of technological development devices with more and more novel functions and degrees of integration as well as services to accompany them will emerge.

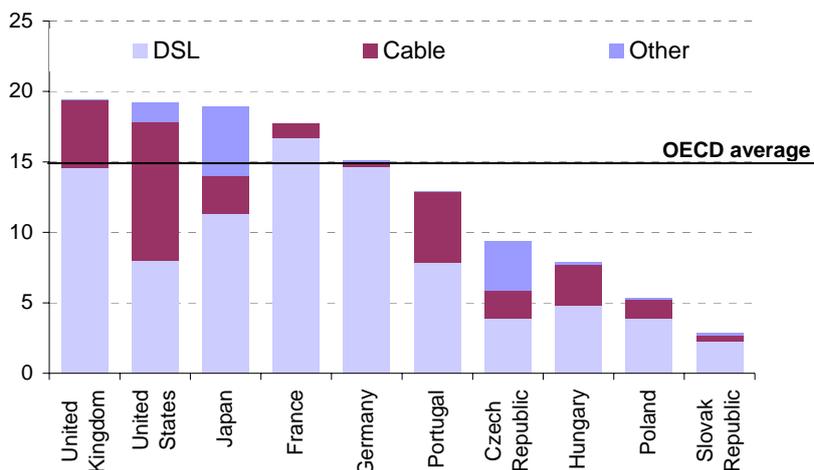
### *Broadband Internet access*

Over 2006 the number of broadband subscribers in the OECD increased 33% from 136 million in June 2005 to 181 million in June 2006 (OECD, 2007). This growth increased broadband penetration rates in the OECD from 11,7 in June 2005 to 15,5 subscriptions per 100 inhabitants one year later. The main highlights for the first half of 2006 are:

The breakdown of broadband technologies in June 2006 is as follows:

- DSL: 63%
- Cable modem: 29%
- Other technologies (e.g. satellite, fibre and fixed wireless) : 8%

Figure 1 shows the OECD Broadband subscribers per 100 inhabitants. In Hungary the leading broadband technology is the DSL, Hungary is below the OECD average.

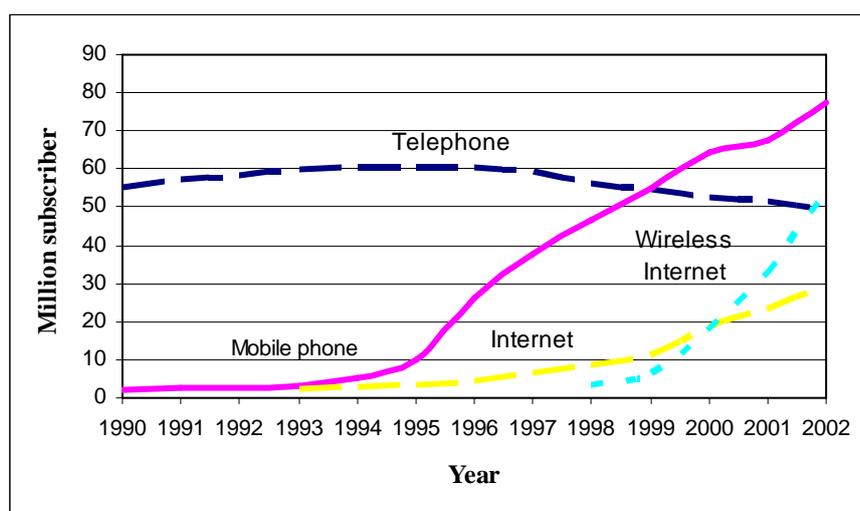


**Figure 1.: OECD Broadband subscribers per 100 inhabitants, by technology, June 2006**

The improvement of services will largely be influenced by the fact that with the long-term increases in transportation costs communication is to gain more and more importance (GEIER, 2005). Figure 2 illustrates the evolution of the telephone, the GSM (Global System for Mobile Communication) and the wireless Internet in Japan. The table clearly demonstrates that the number of subscribers to the wireless Internet rose sharply after the technology appeared in the country (TAKAHASHI, 2002). Due to the characteristics that are inherent in Japan a breakthrough of this magnitude is not expected in Hungary but the spread of the wireless technology is worth paying attention to anyway.

Distance employment made possible by the Internet and mobile employment opportunities open up totally new dimensions in taking up jobs. Managing personal information has a positive effect on the successfulness of businesses. In compliance with

the international trends above there are similar changes, although with a certain phase of delay going on in Hungary as well. By the third quarter of 2001 the number of mobile subscriptions exceeded the number of live main lines (NHH, 2006). The dynamics of the increase is well illustrated by the fact that while the number of wired main lines remains nearly constant the number of mobile subscriptions increases continuously.



**Figure 2: The development of the telephone, the GSM, Internet and wireless Internet in Japan (Takahashi, 2002)**

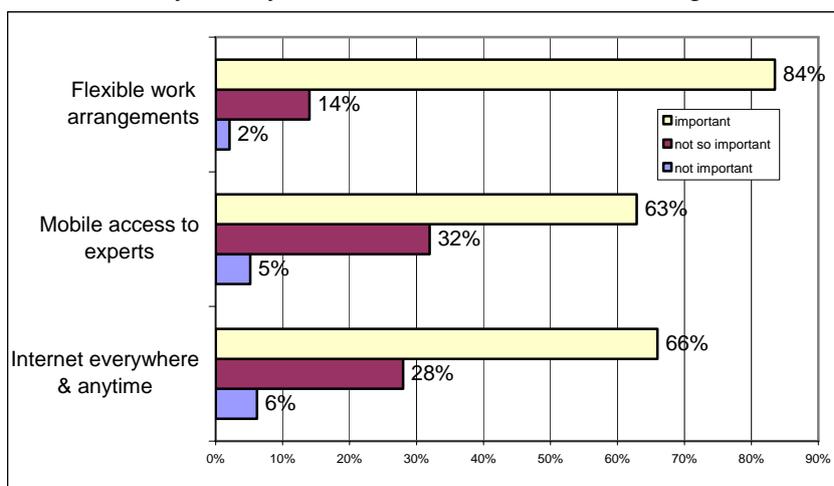
*Mobile Internet in Hungary*

For the purpose of analyzing mobile Internet user expectations we have gone through a series of structured interviews (SZILAGYI, HERDON, 2006). There are two parts of this analysis: we have talked with experts and farmers. In this paper we present the results of the survey conducted in July and August 2006, based on interviews with the experts. We have tried to contact 400 experts based on the e-mail address list in National Rural Development Plan (Nemzeti Vidékfejlesztési Terv). 87 of them replied to my query. We have interviewed 16 rural agronomist in Hajdú-Bihar county in person. Breakdown of the 87 experts by location: Northern Hungary 12%, Middle Hungary 5%, Western Transdanubia 11%, Southern Transdanubia 4%, Southern part of the Great Plain 16%, Northern part of the Great Plain 45%, Middle Transdanubia 7%.

Our statements are mainly based on the questionnaires of experts. Regarding the ownership of telephones, mobile phones or computers the respondents are pretty well supplied. On the other hand only a few of them has PDAs (Personal Digital Assistant). Looking at technologies and services these experts use we can see that e-mail, WWW and SMS are widespread (77%); other services such as weather forecast data, e-bank or professional guidance are not so common (25-45%). 22% uses WAP, this proportion corresponds to the current Hungarian average. The cause of low WAP usage probably

can be found in the scarce content of WAP services. 47% of them are using these mobile phone services (WAP, M-bank, SMS) during work.

Examining the reasons mentioned by those who do not use mobile Internet we can see that the most important factor is money. At the same time about 2/3 of them said that they would use this new technology in the near future. It can be stated that according to the results of my examination mobile technologies are very important in keeping contact, organizing work and other social activities (Figure 3.). Looking at mobile applications work anytime anywhere and flexible access has a leading role.



**Figure 3: Human aspects of mobile work (own source, n=103)**

Assessing applications getting information and e-government is important in the eyes of the experts as the result show (both at 53%). We think it is welcome news that precision farming (33%) and food safety (35%) are getting more significant (and so do environment monitoring and e-learning – 37% and 33% respectively). 26% of experts is understanding the importance of mobile data input, and 24% sees the advantages of a mobile information system.

## 6. Materials and Methods

In the course of investigating domestic and international mobile communication it was our aim to assess and process the sources found in the technical literature. In analysing the practical applications we made use of my own already published results in addition to the ones found in the technical literature. The applications were evaluated on the basis of user assessments and through consultations at conferences.

The international situation regarding the mobile Internet and mobile communication was studied on the basis of the statistical data published in OECD Communication Outlook 2005. To get an overview of the data for Hungary we used the statistics of the Nemzeti Hírközlési Hatóság (National Information Authority) and the publications of Információs Társadalom és Trendkutató Központ (Information Society

and Trend Research Centre). In our data collection we were restricted by the fact that my attempts at obtaining Hungarian and foreign data relevant to our research area (utilisation of mobile Internet in agricultural management) failed since they were not available either from the Nemzeti Hírközlési Hivatal or other sources. At the same time in order to justify our research we thought it worthwhile conducting a (although not representative) survey which may lead to a more thorough study later on.

## 7. Results

**Application:** Wireless data transfer technologies can very well be utilised in precision management (PARKER, 2005). Such a form of management cannot even be thought of without the use of wireless technologies. Handling map data required by precision management cannot be solved without wide broadband applications. As regards the wireless technologies it is the satellite transmission and WLAN that offer good alternatives. The advantage of satellite data transfer is the coverage of large areas and its disadvantage is that its price is still high (REDING, 2005).

Mobile devices in crop production, horticulture are primarily used for data surveying. The more efficient and instant data recording is considered to be the biggest utilisation advantage of PDAs with GPS connection. The most important criterion in agricultural data surveying is simple handling and that the device should be resistant to wear and tear. There have been applications prepared already for the distant management of irrigation and production. Their greatest advantage is the opportunity to intervene regardless of time and location (SHENG, 2005).

Food safety cannot be imagined without tracing. The already available RF-ID (Radio Frequency Identification) technology coupled with mobile devices offers an excellent solution for tracing purposes. Pest control can efficiently be supported by using handheld computers. The application makes it possible to register data in the field and then download them on a central PC to run models necessary for decision-making. The registration and veterinary control of utility animals are tasks extending across countries. The E-blana (E-BLANA, 2003) project, which is supported by the EU, has prepared services that are available through mobile devices. The protection of the supply chain and the efficient and timely service can be highlighted from among the several advantages it has. Electronic trading, transportation and logistics also have applications the spread of which has every opportunity. Complex business applications, which primarily serve the flexible access to internal data, must not be overlooked either (THYSEN, 2000).

The Agricultural and Rural Development Agency (Mezőgazdasági és Vidékfejlesztési Hivatal) is bringing the Integrated Management and Control System (Integrált Igazgatási és Ellenőrzési Rendszer) in motion. This system controls the management of direct and market-based agricultural support of the Community. From spring 2006, all tasks related to controlling field-based support and pieces of land taking part in the Agricultural Environmental Management (Agrár-környezetgazdálkodás) project, as well as anything related to measuring territory PDA-based GPS systems are used. In every case the basis of the system is an extra sensitive THALES MobileMapper CE GPS-receiver. With the help of this receiver exact land measuring can be carried out right on the spot to help management.

## 8. Discussion

In surveying the databases and studies prepared by the EUROSTAT, the OECD and Nemzeti Hírközlési Hatóság (National Telecommunications Authority) it was concluded the technological trends clearly indicated the ever widening spread of the technology. Studies of the situation with mobile communication and the mobile Internet in Hungary revealed a trend that was similar to the international one. Hungary's lag as regards wired mobile Internet penetration is clearly seen but the population's state of supply with mobile telephones indicates that both the interest and the potential volume of users are given and every chance is there to exploit the opportunity.

As regards the devices they can be said to have more and more functions, which is ensured by the high level of integration. The wider than earlier application and innovative spread of the wired and the Mobile Internet are primarily limited by economic and social factors, and the lag of the country is basically brought about by these two factors.

The study of the technical and economic interpretation of the mobile Internet points towards area that may become the bases for future research. In order to exploit the opportunities inherent in the technology even services working on a market basis may be developed through the involvement of developers from the outside world.

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