

# Impacts for m-Internet applications and perspectives in agriculture

Robert SZILAGYI<sup>1</sup>, Miklos HERDON<sup>2</sup>

*University of Debrecen Centre of Agricultural Sciences Faculty of Agricultural Economics  
and Rural Development Department of Business- and Agricultural Informatics,  
4032, Debrecen, Hungary, +3652-486-255  
Email<sup>1</sup>: [szilagyi@thor.agr.unideb.hu](mailto:szilagyi@thor.agr.unideb.hu)  
Email<sup>2</sup>: [herdon@thor.agr.unideb.hu](mailto:herdon@thor.agr.unideb.hu)*

## 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 use it anytime and anywhere.

We can make their wide spread usage, innovation effect and advantages economical way if we consider the effect system of technologies and services. The technological, social and economical complex effect system puts pressure on spreading of business applications. The types of applicable equipment are increasing.

There can be found four player groups according to social aspects: manufacturers, enterprises, customers and workers. 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.

If we study the business process the expenses, advantages, disadvantages can be seen well. Nowadays these applications are more and more successful in the following areas such as in agriculture, in different parts of food industry, in extension services, precision agriculture, logistics.

## Key words

Mobile Internet, application, mobile devices, usage factors

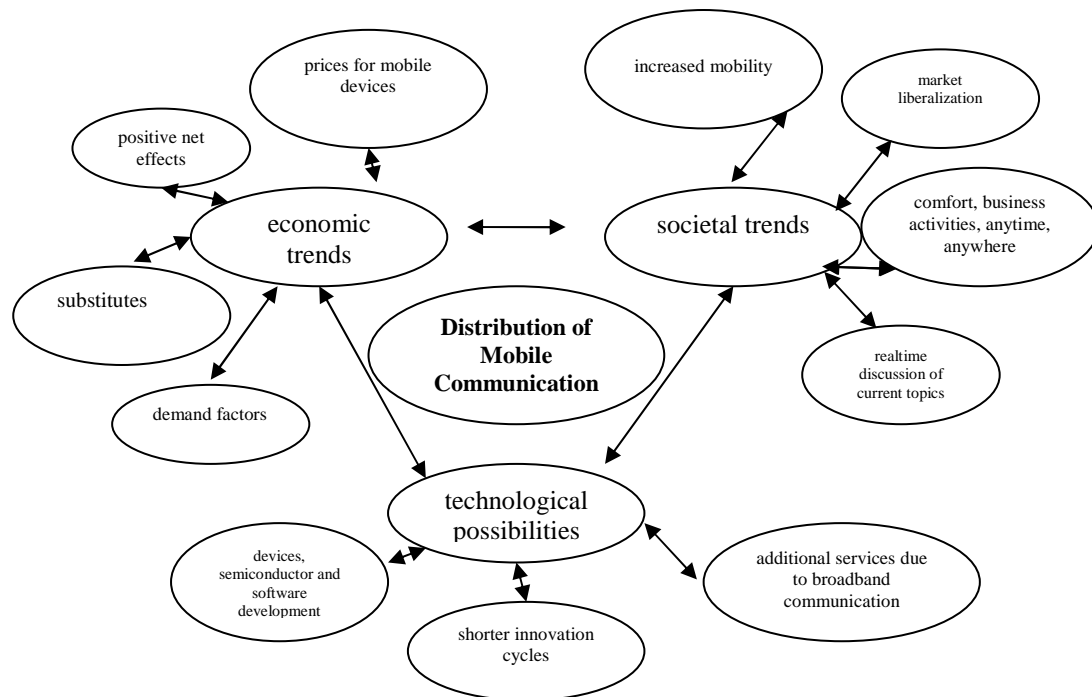
## Driving forces for m-communication

At present the mobile communication is driven by different factors [1]: Firstly, there are social development trends. M-commerce is an application of the Internet idea, the possibility to be able to communicate privately or for business anytime and anywhere. While traditional communications services address all social layers, the future will bring a growing fragmentation of the market and customer segments.

Secondly, there are transmission technology-related driving factors. Not only will we experience voice transmission of a quality comparable to a fixed line, we will also have mobile access to Internet and to other Internet Protocol (IP)-based services and applications.

Thirdly, there are economic drivers. Positive network externalities, attractive content, low costs and reasonable prices of the mobile services, substitution possibilities and other factors are contributing substantially to the market growth. Fixed-line connections are substituted

through mobile connections to an extent indicated by the price of UMTS services, the capacities of the UMTS net and the UMTS penetration rate. It is also expected that the mobile telephone suppliers adopting “penetration pricing” will stimulate a stronger substitution effect. Based on these driving forces, we expect the mobile environment to be the next market attracting the attention of a large number of diverse and global players. (Figure 1.)



*Fig.1 Drivers for mobile communication*

## Relevant social groups

Mobile communication technologies are still at a very early stage of development. [2] Like the rest of the edifice of the New Economy, the “mobile future” is built on a foundation of promises. RSGs (Relevant Social Groups) in most cases device manufacturers, application providers, or network operators are to be seen as rhetorical tools to funnel the attention of other RSGs such as business customers, end users, and policymakers into particular interpretive channels. The key point is whether the RSGs see the problem as being solved. Until now, the formulation of the problems that new communication technologies need to address have almost entirely emanated from the powerful cultural, economic, and technological core of Western Europe and North America, resulting in a focus on individual consumption and worker/business productivity. The range of user benefits promised by the developers and marketers of new mobile technologies begins to mimic the ideal of the tech-savvy, autonomous (male) protagonist of the science fiction narrative.

At the production end and consumer groups have constructed two main themes (problems) of mobility. The themes are:

1. the omni-powerful consumer
2. the ultra-productive worker.

These interpretations of the technology are challenged by two other themes:

1. privacy,
2. worker surveillance.

Initially there is a high degree of interpretive flexibility associated with new mobile communication technologies. This perspective helps represent the “seamless web” of meaning-creating-and-constructing actors who compete to install, and instill, contesting meanings of the same artifact.

There are still too many RSGs vying with each other and throwing their voices in the mix. Interpretive stability in the sense of rhetorical closure has not yet been achieved in the case of mobile ICTs and several user and other relevant groups still have the power to alter the direction of the technological development.

To understand the new mobile technologies in a global context, we have to bear in mind that technology-aided connectivity is a privilege of the minority. While it is true that some advanced nations such as Finland have near-universal mobile connectivity, for most of the world this is not the case.

While the digital divide between rich and poor countries in terms of PCs connected to the Internet remains very wide, there is evidence to suggest that mobile technologies are finding rapid acceptance in the developing world, potentially narrowing the gap between rich and poor:

- In the late 1990s, mobile phones in the poorest nations of the world grew at a rate 2.5 times that in the richest nations, and these phones were more likely to be digital- ready than in any category of advanced nations.
- In the developing nations, access to digital communications is often through shared media rather than through individually owned media. This is not only true for PC-based access (through Internet cafes, for example) but also in the case of mobile phones.
- The business models of providing digital access are quite different from the business models of promoting ownership of digital media and individual subscription to digital services.

The challenge of transforming mobile technologies in fundamental ways sounds appealing, but is it realistic? After all, the ultimate goal of technology developers and marketers is the “bottom line”. It is no accident that organizations most involved in bringing the Internet and mobile communication capabilities to developing countries are not commercial firms but two nonprofit organizations: World Bank and the United Nations. For the commercial ICT firms, visionary transformation and re-interpretation of the problems and solutions of mobile technologies make sense only if they are costneutral and preferably profitable.

## **Future Mobile Workplaces**

MOSAIC project [3] (<http://www.mosaic-network.org/>) proposes four mobile workplace scenarios. These are structured along two driving forces, each having two extremes, 1. ‘human attitude’ (individualism or community oriented) and 2. ‘organisational development’ (hierarchical control or selforganisation). In the Contingent Workplace, human behaviour is individualistic in a context of self-organising. Agile Workplace captures a community-oriented human attitude while the organisation is decentralised. The Guided Workplace has human behaviour oriented towards individualism whereas the organisation is centrally

coordinated. In the Focal Workplace human attitude is pursuing community objectives and the organisation is hierarchical.

Such scenarios enable us to recognise that mobile work is to be considered at different levels: *the worker, the workplace, the organisation and the organisational environment*. Mobile work is a combination of technology, workplace organisation, (inter-) organisational procedures, and facilities and support systems allowing people to work at times and locations of choice. Mobile work involves not only a traditional meaning of ‘worker mobility’ focusing primarily on multiple work locations including the office, home, hotspots, and on the move. Mobile work in a more extensive meaning would also and foremost include the mobility of the workplace and work organisation, increasingly following the needs and opportunities of the mobile worker and team irrespective time, place and other context-related constraints: the network may become the working place. The mobile workplace thus evolves towards a scenario of work organisation characterised by empowerment of workers and teams being part of ad-hoc temporary projects and organisations, and by awareness of context.

A very useful categorisation of five types of mobile work as currently found in practice is developed by Lilischkis [5] as part of the STAR project. The *on-site movers* carry out work requiring movement around a certain site. Different types of critical success factors can be active in different parts of the innovation life cycle, from R&D to commercialisation. Also, specific critical success factors might be part of factors determining a national innovation system and could be described in terms of the dominant aspects of innovation systems.

Porter [6] has developed this concept to understand why a nation becomes the home base for successful national competitors in an industry. His “diamond” model has five determinants that are enforcing and shape the environment in which local forms compete that promote the creation of competitive advantage: (1) factor conditions, (2) demand condition, (3) related and supporting industries, (4) firms strategy, structure and rivalry, and (5) government role.

In 2003 Malone [7] presented a theoretical framework based on evaluation of costs and benefits of communication and coordination. In their three-stage model, in the first stage (‘cowboys’) communication costs are high and the best way to make decisions is via independent and decentralised decision makers. In the second stage (‘commanders’), as technology causes communication costs to decrease, it becomes feasible to bring together decentralised information for coordinated, central decision making. Finally, in the third stage (‘cyber cowboys’), communication costs have decreased to such a level that connected decentralised decision makers are more effective and combine local knowledge with the best information available elsewhere.

This approach suggests that there are basically two factors determining the viability of an organisational form: (1) the decision situation, determining the situational requirements of communication and coordination, and (2) technology, determining costs of communication and coordination.

Applying the framework to mobile working it can be stated that mobile working will even more decrease the costs of communicating local information and increase the way local information can be used. Mobile ways of working will also enable new ways to gather and use local information. The third framework is focusing on the dynamics of adoption.

## **Future mobile workplaces survey**

MOSAIC [4] research activity along 2004, in term of vision, is showing new emerging collaborative or shared workspace approaches such as the “People and Network” or “peoplenetworking”- centric approach, which is also related to the so-called on-line

communities as well as social networks, and the “process-centric” approach. These new approaches are intended to bridge the gap between performance, purpose, balance and networking within an inclusive, innovative and interconnected workplace. This combination of *inclusive*, *innovative* and *interconnected* is named in short the i<sup>3</sup>Workplace.

The main results of the survey show the following:

#### **The social perspective (Human aspects in Mobility)**

It appears very clearly that most of the respondents, are already convinced about the implementation of flexible work arrangements before 2010. A majority believes that future mobile workspaces will better integrate social, learning and work activities. Collaboration among distributed competencies is also predicted.

#### **The Workspace perspective (Mobility and work settings)**

A large majority of the respondents predicted that mobile access to experts, workspaces plug&play capabilities, and workspace access anywhere at anytime, as well as collaboration in shared workspaces will happen before 2010. Workspace access wherever you are and whenever you need it, almost everyone is expecting to come through. It will become a real business driver very soon when people will be used enough to stay permanently connected within city areas (wireless Internet connection, i.e. WIMAX).

#### **The Service or business perspective (Mobile applications & services)**

It may look very optimistic but highly rely on whether semantic knowledge technologies and wearable computing and connection will reach a certain degree of maturity to enable all these service elements. It should be noticed that the integration of multimedia, telephony and computing in consumers’ applications has reached the incredible level of 90% which really means it is a hot topic and best wish of almost everyone.

#### **The Platform perspective (Mobile services platform & awareness)**

Most of these vision elements have got a majority of votes, except the vision element dedicated to the standardised interaction between mobile devices and their environment where only half of voters are considering it may happen before 2010. Last but not least, standardisation among mobile devices and their environment seems still uncertain as this assumption did not get the majority of votes, only half of the voters, saying it will append..

#### **The Technology perspective (Mobile access technology)**

The assumption regarding “IP connectivity wherever you are and whenever you need it” could become soon a reality but again depends on how much consumers will be willing to pay for it but we all feel nowadays a strong willingness by Internet service providers and telecom operators. “Mobile devices turn from PDA and phones into working artefacts” assumption is also showing that a majority of respondents estimated it will append before 2010.

#### **The Legal perspective (Mobile policy & regulation)**

This is the only vision perspective receiving no majority for most of its vision elements, except the one dedicated to the employment regulation changing towards more flexible work that may appear much more as an adaptation than a real dramatic change. It should be recognised that respondents were not legalist people but there is a sign showing that unification of work regulation, even for flexible work, is a very sensitive aspect of the European Union.

## **Application perspectives in agriculture**

When mobile internet devices are used for keeping files or registers, an important problem – the synchronization of the central data base - has to be solved. This is inevitable because of the storage capacity of mobile devices.

If the continuous synchronization is provided, then the central data base is available without storing huge volume of data. It can be very useful for instance during harvesting. With mobile devices crops and the harvested quantity can be immediately recorded.

Mobile devices can also help users with the plant hygiene. With a digital camera the photos of infected leaves or other plant parts could be sent to the plant hygiene center. After analyzing the photos the center can give advice and proper instructions for the users. If the list of parasites and diseases are fed into the PDA, then the list of useable chemicals for each disease is also easily accessible. Besides these the very technology is also suitable for environmental application. For instance, it is applicable for water and soil sample testing. With the help of wireless connection the samples can be analyzed.

## **Conclusion**

Changes in technology will proceed with organizational and social change. The rapid evolution of hardware and software devices will increase consumer demand for timely and accurate information. If current trends in wireless broadband technologies continue, it is likely that, in the medium term, demands, beyond data, for on- field best management practices will increase rapidly. These developments, coupled with the rapid advances that are being made in human computer interfaces, are likely to make IT ubiquitous, enabling access to dramatically increased amounts of data, tools for analysis, and decision support systems. [3]

## **Literature**

- [1] Buellingen F., Woerter M.(2004): Development perspectives, firm strategies and applications in mobile commerce, *Journal of Business Research* No.57, 1402– 1408 p.
- [2] Dholakia N., Zwick D. (2004): Cultural contradictions of the anytime, anywhere economy: reframing communication technology, *Telematics and Informatics* No.21, 123–141 p.
- [3] Schaffers H. (2005): Understanding Innovation in the Mobile Workplace, Mosaic network publication (<http://www.mosaic-network.org/>)
- [4] Pallot M., Prinz, W., Schaffers H. (2005): Future Workplaces, towards the „Collaborative” Web, Mosaic network publication <http://www.mosaic-network.org/>)
- [5] Lilischkis S. (2003): More Yo-yos, Pendulums and Nomads: Trends of Mobile and Multi-Location Work in the Information Society, STAR Project Issue Report N. 36, Draft.
- [6] Porter M. (1990): *The Competitive Advantage of Nations*, MacMillan Press
- [7] Malone T.W., Laurbacher R., Scott Morton M.S. (2003), ‘Inventing the Organizations of the 21st Century’. MIT Press.
- [8] Zazueta F.S., Vergot P.III Use Of Handheld Computers In Agricultural Extension Programs, EFITA 2003 Conference, (2003) Debrecen, Hungary