



Chapter 7

The human side of mobile technology

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There is no doubt that mobile technologies offer significant economic and social benefits that in many ways contribute to the sustainable development of nations. Perhaps the most important contribution has to do with the improvement of economic development, quality of life and social capital.

Of particular relevance is the economic and social impact of wireless services in emerging countries, where the largest number of mobile handsets will be marketed in the coming years. They will not only be the first mobile phones for many of these countries' inhabitants, but also their first connection to the Internet and other basic offerings, such as financial services. This reinforces the idea that mobile technologies will help reduce the "digital divide," an idea backed by research, which reaffirms the important role of wireless services in the development of lower socioeconomic levels. In this regard, "**mobilarity**," or solidarity through the mobile phone, is helping NGOs manage and coordinate some of their projects aimed at assisting disadvantaged communities.

At the same time, we must not underestimate the social impact that mobile technology can have by improving the service offered by governments to their citizens (**m-government**) or the role it plays in the social and labor integration, participation and development of people with certain types of **disabilities**.

7.1. Mobile phone use in emerging countries

Despite the fact that in developed countries the mobile penetration rate exceeds 100%, in emerging countries it sits below 20%. With these figures, it is not surprising that manufacturers and operators have their eyes set on the latter. The spread of this technology will clearly and even quantifiably contribute to the development level of these countries. Economist Leonard Waverman of London Business School has estimated that every 10% increase in mobile handset numbers leads to a 0.5% growth in GDP.

According to Pyramid Research²⁷², the global mobile market will add the next billion subscriptions in 2009. Of these, roughly 85% will live in emerging countries and 71% will come from parts of the world with urbanization levels below 50%.

Mobile phones offer important advantages to these new users compared to other devices such as computers: they are cheaper, require a lower skill level and may be shared with other people in the community.

²⁷² *The Next Billion: How Emerging Markets Are Shaping the Mobile Industry*. Pyramid Research. October 2007.

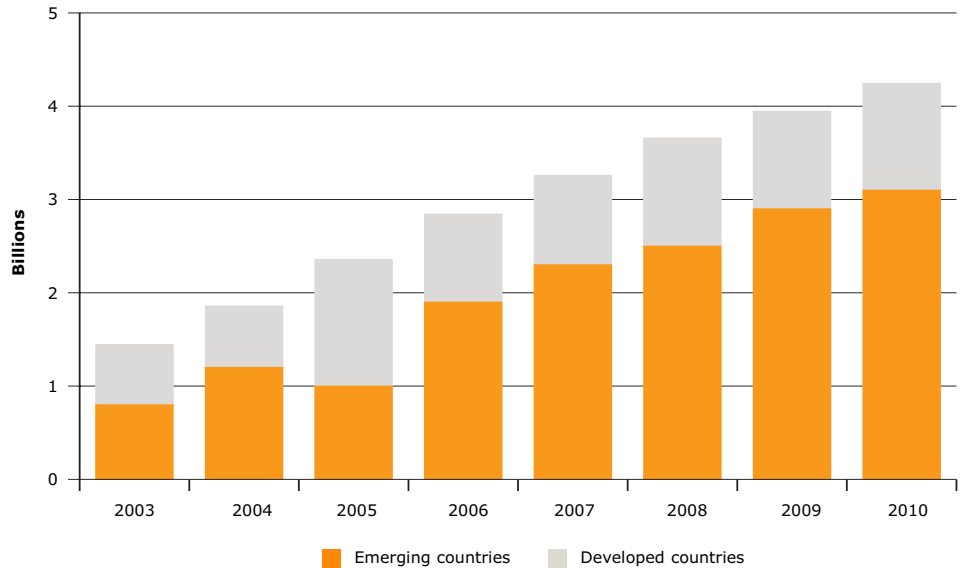


Figure 51. Global mobile subscriptions (2003-2010).
Source: Pyramid Research.

The use of mobile phones by these new subscribers will differ greatly from that in developed countries. At least initially, they will use their phones to support activities that generate income rather than as a tool for communication (see Figure 52). Personal use will grow as income levels rise.

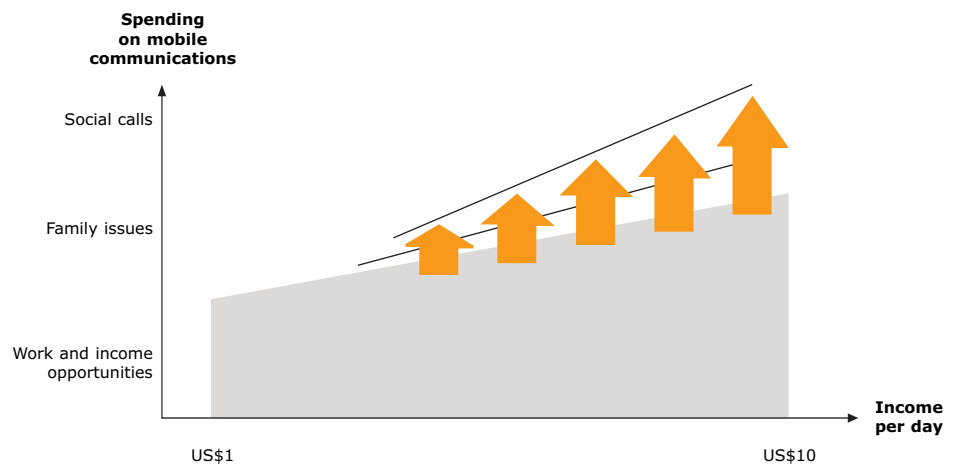


Figure 52. Spending on mobile communications in the emerging countries.
Source: Ericsson.

However, the use of mobile devices in emerging countries presents a major obstacle: **the cost of handsets and services**, which poses a formidable challenge for mobile manufacturers and operators, forcing them to rethink management costs.

The top manufacturers (**Nokia, Motorola and Samsung**) are in fact working on low-cost models to meet the basic needs of users in emerging countries. But these handsets must also enable access to more sophisticated services, such as Internet connection. If emerging countries are to participate in the advances driven by the growth of the mobile market, handsets must be made available at affordable prices and offer access to these services.

Operators are developing low-cost networks with the goal of reducing access prices. They have also introduced prepaid services to provide an entry for users who would otherwise be unable to pay a monthly bill. In Africa, they account for almost 90% of the total mobile services market.

Another stumbling block appears when it comes to **charging mobile phones** in places where power supplies can be unreliable, far away or simply nonexistent. In this context, governments should promote the use of alternative energy generators and manufacturers can develop solar chargers for their models. For instance, in early 2007 **Sony Ericsson** and **Ericsson** developed a solar charger that can be used anywhere in the world. To calculate the size of the device, which is capable of charging at least thirty batteries a day, all year round, they factored in the solar conditions in Africa and India.

If the aforementioned obstacles are overcome, mobile phones may become the gateway for these users to access the Internet and other services, thus improving their living standards and promoting development. The possibility of accessing and purchasing goods and services or conducting bank transactions will undoubtedly have a very positive impact on their lives.

7.1.1. Creating opportunities

Mobile technology opens the door to starting up new businesses that help boost per capita income in these countries. The first idea that comes to mind is that people with a low income in emerging countries are not willing to devote part of their money to mobile services and technologies to the detriment of their budget for food, education and other basic services. However, experience shows that they do not see the mobile phone as a mere means of contact, but rather as a more efficient way of working, staying in touch with family members who are often far away, accessing health services, and so on.

This situation represents an opportunity for companies that are able to innovate and offer services through mobile handsets tailored to these people's needs. Meanwhile, traditional businesses can transform their usual activities into more productive ones, while small companies can access global markets, thus con-

tributing to the establishment of fair prices for consumers. Therefore, access to new products, wider selection and increased purchasing power will improve quality of life, encourage development and exert a positive impact on society as a whole.

The most successful mobile services in emerging countries will be linked to traffic information, job postings, health services, weather forecasts, entertainment and email services²⁷³.

7.1.2. Access to goods and services

In emerging countries, mobile technologies are playing an important role as promoters of economic activity, allowing access to information on the price of goods (raw materials, finished products and tools). Moreover, since these countries have very poor land transport infrastructures, the use of mobile devices for communication replaces travel and allows trade agreements to be negotiated faster and more easily. All this, coupled with the ease of payment offered by mobile handsets, promotes development and makes a positive impact on the level of economic activity in these countries.

A clear illustration of this can be found in Kenya, where the **Vodafone** Safaricom service reports crop prices by SMS, thus ensuring a fair price for consumers. Similarly, Indian fishermen use mobile handsets to negotiate prices, resulting in an 8% increase in their incomes and a 4% drop in prices due to the decline of abusive behavior.

7.1.3. m-Banking in emerging countries

For consumers in developed countries, the use of mobile handsets to conduct financial operations provides another banking channel that complements the network of branches and Internet banking. For millions, perhaps billions, of people worldwide with low incomes, mobile phones can become more than a means of communication. Those without bank accounts will be able to access financial services and benefit from them, as will their families, community and, ultimately, the entire country.

Emerging countries are leading innovation in the field of mobile banking. A key aspect of the increasing success of this phenomenon is the growing level of mobile penetration in all socioeconomic groups and geographical areas in these countries, where financial services have proved to be too expensive, inaccessible and poorly adapted, leading m-banking to quickly gain ground. In these countries, mobile handsets will play a critical role in attracting consumers to basic banking services such as holding an account, with the hope that they will subsequently request other, more sophisticated services.

The number of mobile transactions is expected to rise from 2.7 billion in 2007 to 37 billion by 2011, and most of the growth will occur in emerging countries, ac-

²⁷³ *Business Models Enhancing the Diffusion of Mobile Internet in Emerging Markets*. Lappeenranta University of Technology. School of Business Professor Veli-Matti Virolainen. February 2008.

According to data from Juniper Research²⁷⁴, China and the Far East will be the regions with the largest number of users, reaching 250 million by 2011.

Access to financial services

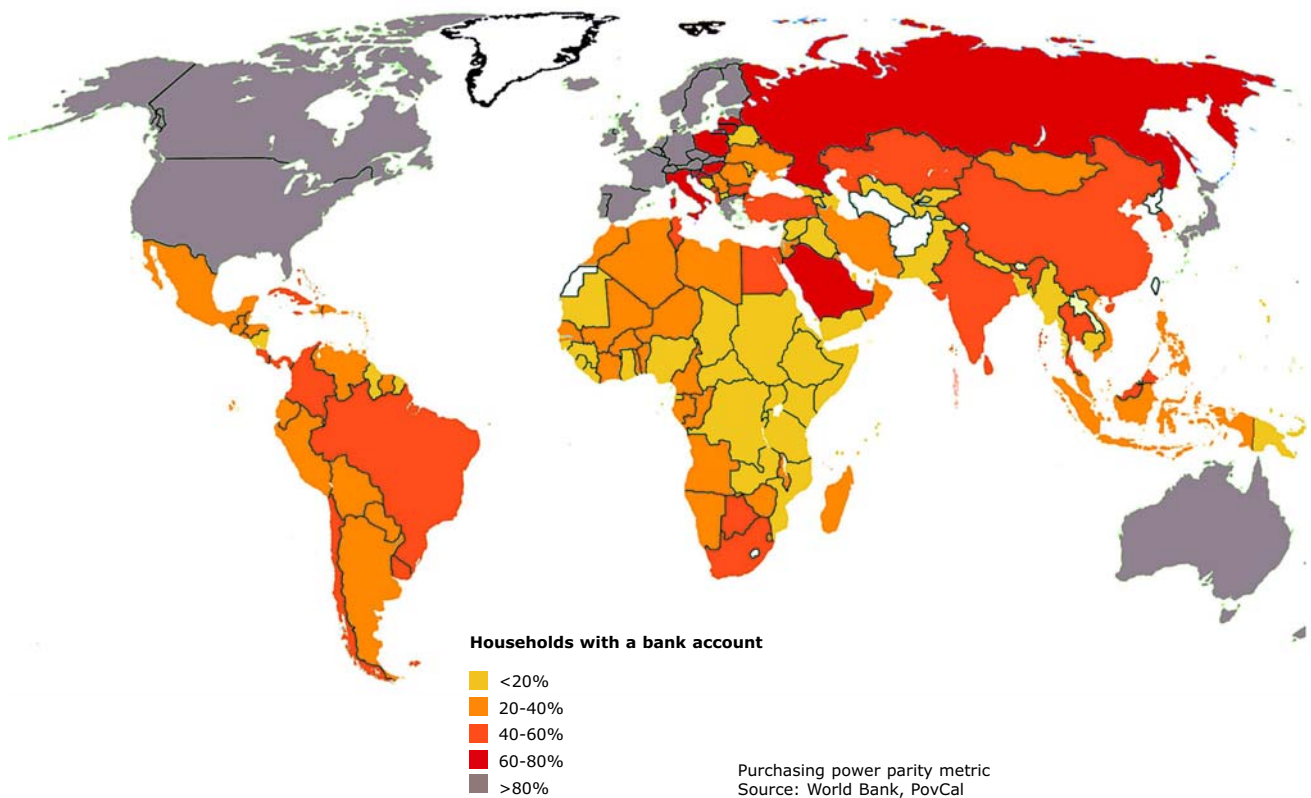


Figure 53. World map of the population's access to financial services.
Source: Nokia/Siemens.

Boosting the circulation of money is vital to ensure economic development in emerging countries, where many people who live in rural areas rely on money sent to them by their families in the city or abroad. The problem arises when this money is sent from hundreds or even thousands of miles away. In this context, mobile phones allow money to be sent and received quickly, thus avoiding long lines at post offices.

However, this dream will only be possible if financial regulators collaborate with telecommunications companies, financial institutions, operators and manufacturers. A good example is the **central bank of the Philippines**, which is actively participating in the adoption of technology platforms to foster m-banking in the country

²⁷⁴ Tendencias de las telecomunicaciones. 3/10/2008. Article: "Los jóvenes son los que más usan la banca móvil." http://www.tendencias21.net/Los-jovenes-son-los-que-mas-usan-la-banca-movil_a2224.html.

and works closely with operators and financial institutions. Meanwhile, **Vodafone** has established a service in Kenya that allows users to transfer money to their relatives, employees and suppliers, thereby avoiding transport costs and time.

7.2. Mobile technology at the service of citizens (m-government)

Ibrahim Kushchu (director of the UK Mobile Government Consortium) defines m-government as the strategy, implementation and use of all types of technologies, services and applications for mobile devices with a view to achieving benefits for citizens, businesses and government agencies. This circumstance has not gone unnoticed in the public administration sphere, which is promoting initiatives that encourage the use of mobile phones to improve public service and reduce costs. Among other uses, they aim to make it easier for citizens to carry out administrative procedures, access various types of information and set up a direct communication channel with the government.

Countries like Singapore, which holds the top spot in the ranking prepared by Accenture²⁷⁵ of countries with the best service and proactive communication with citizens, are committed to offering a multichannel service, giving both the public and businesses access to around 150 Government services using their mobile devices, which are becoming an increasingly important channel for disseminating information. The Government also aims to ensure that 300 services will be available via mobile phone by the end of 2008. The main services are currently based on SMS; for instance, the Supreme Court uses this system to remind the public of the date and time they are to appear in court.

In Italy, the **Centro Nazionale per l'Informatica nella Pubblica Amministrazione (CNIPA)** has rolled out a mobile service project whereby citizens can contact the Administration via SMS, MMS, voice, Wi-Fi and Bluetooth connections. Research is still underway for the project to include new technologies such as biometric data, voice over IP, and digital television services.

Despite its enormous potential, the future of m-government depends largely on parallel technological developments, such as **mobile electronic signatures**. This will allow users to give legal validity to documents accessed from their mobile phones without having to travel. In Spain, this service is only offered by **Vodafone** and, according to Law 59/2003 of December 19 on electronic signatures, "it enables the signer to be identified and detects any subsequent change in the signed data, which is uniquely linked to the signatory."

7.2.1. What services can the State offer to its citizens via mobile phones?

m-Government is based on advanced e-government services offering mobility, clarity and contact between citizens and the government agencies. The most important services developed along these lines are: m-communication, m-services, m-democracy and m-administration.

²⁷⁵ *Government Executive Series. Leadership in Customer Service: Delivering on the Promise.* Accenture. 2007.

The mobile phone as a communication channel between government and citizens (m-communication)

The use of the mobile phone as a channel of communication between governments and citizens considerably improves information flows in both directions. There are many initiatives in the field of communication **from government to citizens (G2C)**:

- **Information on urban mobility:** Some city councils send traffic information to citizens' mobile phones to reduce congestion. For example, the Catalan Traffic Service (**Servei Català de Trànsit**) offers real-time traffic information for expressways and selected roads via SMS. Other examples in the field of urban mobility include a service offered by the **City of Madrid** that provides a method of locating towed vehicles via SMS.
- **Public information service:** Governments send automatic alerts and news to citizens' mobile handsets with information on tax payments and renewal notices for driver's licenses, passports and ID cards, among others. For example, thanks to the Municipal SMS Information Service of the **City of Las Palmas de Gran Canaria**, people can receive updated information on taxes, culture, sports, youth or news on their mobile phone. New Zealand's state electricity company also uses SMS to report power cuts and their causes. Lastly, Singapore residents can choose which alerts they wish to receive, ranging from parliament news to driver's license renewals.
- **Information on tourism, culture and leisure:** The public administration institutions can offer information via mobile phone of tourist sites in the area, as well as future cultural and sporting events. For example, the **City of Salamanca** for the past few years has been offering an SMS messaging service that regularly informs its registered users about the city's cultural activities. The **City of Barcelona** also has a mobile Internet connection service featuring the city's cultural calendar and a directory of cultural institutions.
- **Health information:** Governments can use mobile devices to report health emergencies to the public. For example, in the summer of 2008 the Spanish **Ministry of Health and Consumer Affairs** launched a heat protection campaign²⁷⁶ in which people received information on their mobile phones that included weather forecasts and risk levels for their province. Also worthy of note is the program run by the **City of Avilés** that sends an SMS to registered citizens when ever there is an urgent need for blood donations. Across the globe, in Hong Kong the government started a program to send information via SMS on SARS (Severe Acute Respiratory Syndrome) in order to dispel rumors.

Meanwhile, the most common **citizen-to-government (C2G)** service allows users to submit queries or complaints using SMS or MMS. This service is already available in the Philippines and China, where it is even possible to send questions to congress representatives.

²⁷⁶ "Campañas 2008 – Combatir el calor está en tus manos", <http://www.msc.es/campannas/campanas08/campanaCalor08.htm>.

Payments to the Administration made easier with mobile handsets (m-services)

This concept involves the option for citizens to make transfers or payments to the Administration (m-transactions and m-payments). For example, public transport in Rome can be paid for via SMS, which requires an electronic wallet to be linked to a credit card or prepaid phone card. Norway, meanwhile, has established an SMS-based tax refund system.

A new way of exercising the right to vote via mobile phone (m-democracy)

This system essentially refers to the possibility of voting via mobile phone. Although it appears to be a tool with great potential to increase citizen participation, it still presents significant barriers, such as the distrust of citizens regarding data protection and voting-system efficiency, or the difficulties it poses for older people, who are more reluctant and find it more difficult to use mobile phones.

In the local elections of May 2002 in Liverpool and Sheffield (UK), voters could choose to exercise their right to vote using a mobile device via SMS, thanks to a PIN code that guaranteed voting privacy and security.

Improving public administration's internal processes (m-administration)

This aspect aims to improve the system of internal public sector operations by using mobile devices for officials to contact one another, for instance. This is what the **City of Sanlúcar de Barrameda** has done by equipping its municipal police with mobile devices that allow agents to stay in touch using **Vodafone** "Push to Talk" technology²⁷⁷.

Other m-government services

Governments can also use mobile technologies to help disadvantaged groups or improve the environment:

- **Assistance to disadvantaged groups:** Government can use the mobile network to provide assistance to the elderly or disabled. Norway, for example, uses mobile services to contact workers who specialize in care for the elderly and to provide updated information on people who need home care. Another example can be found in A Coruña (Spain), where people with reduced mobility requiring a ramp to access buses can find out the arrival times of adapted vehicles by SMS.
- **Monitoring of wild animals:** Mobile technology can also be used to control the lives of wild animals. A pilot project launched by Save the Elephants in Kenya

²⁷⁷ 3GSpain. May 2006. Article: "El Ayuntamiento De Sanlúcar De Barrameda Dota de Movilidad a la Policía Municipal." <http://www.3gspain.org/foros/showthread.php?t=3481>.



uses GPS tracking to monitor the movements of elephants. Mobile communication systems identify these animals, indicating their location via text messages.

Challenges for m-government

Although m-government presents numerous benefits for both governments and citizens, a number of **obstacles** must be overcome for these benefits to materialize:

- The **cost** of new government applications.
- The **age of users**. As many older people do not have handsets or do not know how they work, governments should implement policies to encourage use among this group.
- **Data security and privacy** constitute the main obstacles hindering mass adoption of these services, and systems need to be implemented to guarantee them.
- Users will experience **information overload**. Since this could become another obstacle, it will be necessary to discern between valuable and dispensable information.

7.3. Channeling aid via mobile phones

In addition to the above, the mobile phone is a powerful tool for helping others. Mobile devices are becoming a very important element to address the needs of victims of **natural disasters and violent conflicts**. SMS is used to coordinate evacuation efforts, report the need for blood donations and warn citizens of impending storms, volcanic eruptions, and even missile attacks.

One example can be found in Malaysia, where a tsunami warning system has been designed that will be linked to screening centers in India, Indonesia and Thailand. The Malaysian government's intention is to use SMS technology to alert the public of the possible arrival of new tsunamis, which includes contacting population groups who are unlikely to hear radio warnings, such as tourists or people who are on beaches at the time.

However, governments are not the only ones putting such initiatives into motion; citizens use person-to-person communication to warn of dangers or risks they may be exposed to. One example was the use of mobile phones during the 9/11 terrorist attacks on the World Trade Center. According to the National Institute of Standards and Technology (NIST), 16% of the survivors of each tower had made phone calls before deciding to evacuate the building. The majority of survivors studied by NIST stated that they began evacuating after receiving outside information on their mobile phones.

It is also worth noting the vital role played by mobile communications during the Lebanon conflict in July-August 2006. The use of wireless voice services increased by almost 40% in the period immediately following the outbreak of hos-

ilities. Not only was it the primary means of communication after the bombing of roads and bridges, but it also enabled the transfer of vital information on evacuations and enabled people to escape bombings, find food and fuel, and be reunited with family members.

Likewise, mobile devices have become an easy and effective means of raising money for charity. This new movement, known as **Mobilarity** ("solidarity through the mobile phone"), uses SMS and MMS as a new means of help and mobilization, making it an innovative channel through which NGOs will offer a wide variety of aid programs in the near future. Under this system, humanitarian organizations were able to raise eight million euros for victims of the tsunami in Southeast Asia in 2004.

Leading Spanish NGOs, the wireless carrier **Vodafone Spain** and the mobile services company **mmChannel** have signed an agreement to launch a joint program for aid and mobilization services via mobile phones. Amnesty International, Action Aid, the Spanish Red Cross, Entreculturas, Greenpeace, Manos Unidas, Plan España and Save the Children are the eight NGOs supporting the program, which may be extended at any time to other organizations wishing to incorporate new mobile technologies in their struggle for solidarity.

With regard to the use of mobile technology in NGO management, a study by the Vodafone Group Foundation titled *Wireless Technology for Social Change: Trends in NGO Mobile Use* cites a number of examples of how mobile technology is being used in various fields.

- Health, such as controlling the identification and treatment of people living with HIV in South Africa.
- Humanitarian assistance, including supporting the logistics of food distribution to Iraqi refugees in Syria in 2007, where an SMS was sent to affected families indicating distribution areas.
- Environmental conservation, such as monitoring urban air quality in Ghana through the use of sensor-equipped mobile phones.

Mobile phones will be a good ally for **disabled groups** to meet their needs. According to the study *El uso del móvil entre la población con discapacidad* conducted by Telefónica and the University of Deusto, 90% of disabled people use mobile phones: 43% have them for the security they provide and 28% because they facilitate communication.

The usage rate for adapted mobile handsets varies depending on the type of disability. Thus, the blind or visually impaired use mobile phones the most (96.64%), followed by those with hearing disabilities (95.07%), the physically disabled (94%) and people with intellectual disabilities (74.44%).

People with visual or physical disabilities use mobile phones for making calls as well as writing and receiving messages, while those with hearing disabilities can

communicate easily via text messages, and those with intellectual disabilities use them primarily for making calls.

Among the improvements that can be made, the study underlines the need to have simple, intuitive handsets, increase the availability of accessories that facilitate the use of mobile handsets for specific disabilities, and provide advice and training on the possibilities that wireless services offer for improved communication. Nevertheless, technology advances for everyone and helps cut down the obstacles that disabled people come up against. Handsets are already available that allow people with hearing problems to communicate over the phone using a system that turns voice into text, as well as induction loops that prevent interference with hearing aids.

In this regard, **Telefónica Móviles España** has drawn up the first telecommunications sector catalog on *Mobile Services for Social Integration*, which features around 30 services and applications that use mobile devices to help improve the social welfare and communications of people with special needs.

7.4. Conclusions about the impact of mobile technologies in the social sphere

Mobile phones offer an important means to improve society in terms of citizen services and development aid to emerging countries. It is important to bear in mind that of the next billion subscribers, 85% will reside in developing regions, which is a considerable market for all players in the mobile market. These players should ensure accessibility to the Internet over mobile phones, as it not only represents a means to increase profits, but also enables citizens of the third world to access products and services, boosting access to financial services and bringing new business opportunities, which improves people's standard of living.

m-Government measures will serve to promote interaction between citizens and government, allowing the former to access information and immediate alerts, make tax payments, receive assistance and even exercise their right to vote. Meanwhile, the government will have a unique means of improving its service to citizens as well as its internal processes.

Lastly, mobile technology also presents itself as a useful tool in disaster management, in the implementation of NGO projects and as an integrator of people with certain types of disabilities.