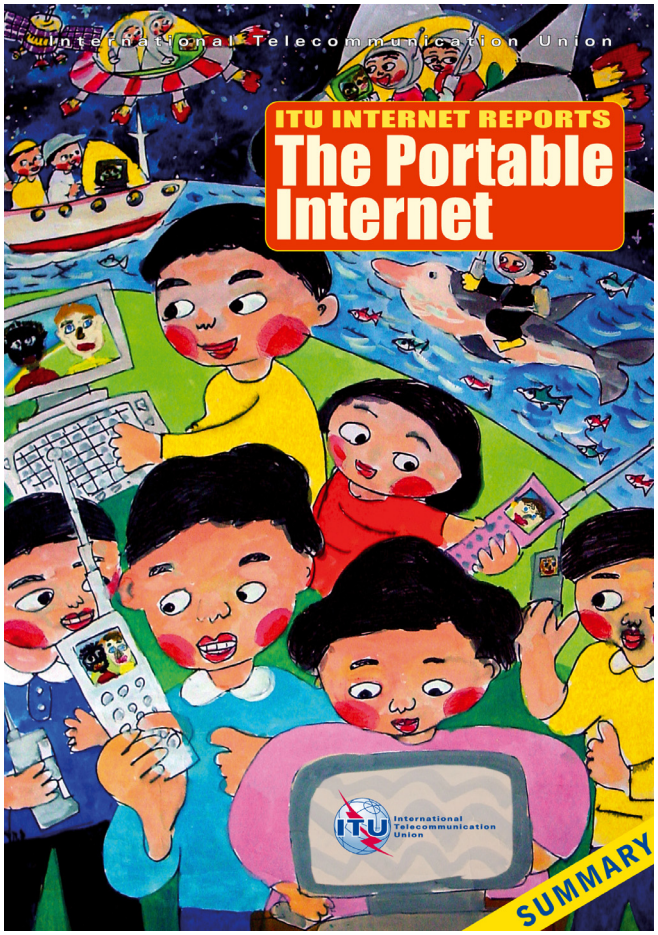
ITU Internet Reports 2004:
The Portable Internet



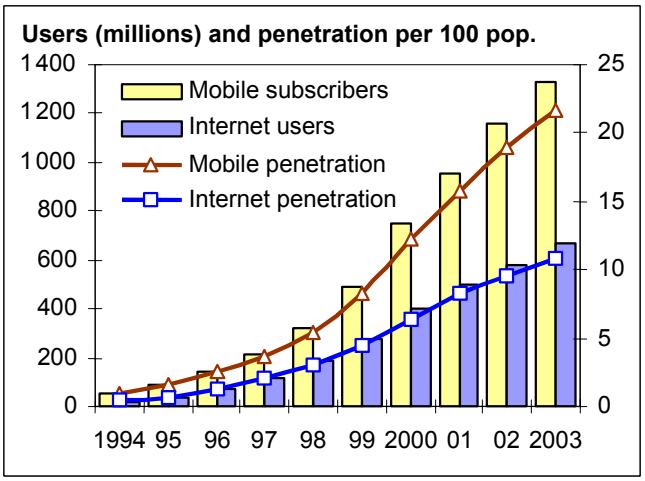
The Portable Internet: A disruptive technology?

Telecommunication networks have traditionally been characterized by long network planning cycles and high fixed investment costs. That makes the industry particularly vulnerable to disruptive or "subversive" technologies. Unlike the slow process of improving a product or service through incremental change, disruptive technologies threaten to tear up the page and start again. The "portable Internet" potentially offers us such technologies.

The term "portable Internet" – the title of the latest ITU Internet Report published specially for ITU TELECOM ASIA 2004, held in Busan, Republic of Korea, from 7 to 11 September – is used here to describe a platform for high-speed data access using Internet Protocol (IP), which covers:

- advanced wireless technologies like Wi-Fi, WiMax, IMT-2000, ultra wideband and radio frequency identification (RFID) tags. These operate at long, medium and short ranges;
- new techniques that make more efficient use of the available spectrum, including spread spectrum, smart antennae, agile radios and mesh networks.

Since 2000, however, Internet penetration has grown at a slower rate than mobile as the effects of the dot.com crash have been felt (see figure below). If Internet growth is to recover, then it is important to reach out to the growing number of users who have a mobile phone but no fixed-line telephone. Handheld devices that are Internet enabled could open up the information gateway in a new and exciting market – one that could help further the goals of universal access while challenging manufacturers and service providers to meet different users' needs across the globe.



Source: ITU World Telecommunication Indicators Database.

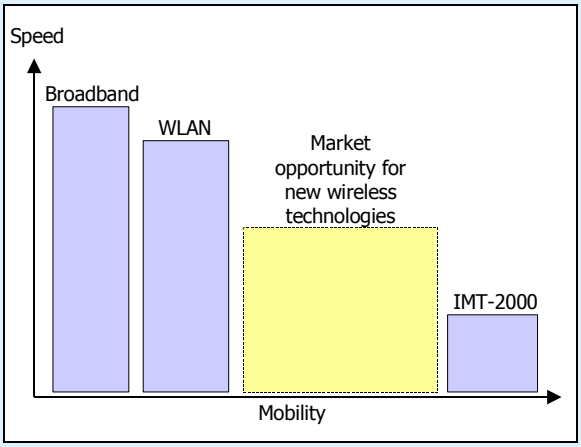
Wireless networking technologies

Users accessing the Internet often face a trade-off between higher connection speeds and mobility (see upper chart on left overleaf). Fixed-line technologies generally offer higher speeds while IMT-2000 mobile phone networks offer greater mobility. Wireless local area network (WLAN) technologies fall in between, offering users limited mobility with only a small decrease in overall speeds. However, there is a wide gap between the amount of mobility offered by 3G and that of WLAN, and many see this as the prime market segment for new portable Internet technologies, especially in developing countries.

The portable Internet, as defined here, comprises a wide range of technologies, each filling the need for a specific type of user access. These technologies can be categorized according to the geographical reach of their radio signals (see lower chart on left overleaf).

Short-range technologies, such as Bluetooth, ZigBee and RFID allow low-power connectivity within a range of 30 metres. Medium-range technologies can communicate at least 150 metres from a hotspot (e.g. Wi-Fi, or IEEE 802.11b) and up to several kilometres, depending on environmental and regulatory factors. Finally, long-range technologies such as WiMAX (IEEE 802.16) and IMT-2000 (3G) have ranges that extend up to 50 kilometres from a base station, and to near-nationwide coverage when offered as a networked service. Also in this category fit solutions based on high- or low-altitude platform stations (HAPS/LAPS) that can serve a whole town, and satellites that can serve a whole region.

The Portable Internet



Portable Internet technologies

Long range	Medium range	Short range
• IMT-2000 (3G)	• WLAN	• Bluetooth
• WiMax – IEEE 802.16	➢ Wi-Fi – IEEE 802.11b	• RFID
• IEEE 802.20	➢ IEEE 802.11a	• ZigBee
• HiperMAN	➢ IEEE 802.11g	
• Satellite	➢ IEEE 802.11i	
• HAPS/LAPS	• Free space optics	
• LMDS	• HiperLAN2	
• MMDS	• Ultra wideband	

Note: For abbreviations and acronyms, see text and Glossary in the main report.
Source: ITU.

Internet-enabled portable devices based on these technologies may hold considerable future promise – particularly in places where fixed-line infrastructures are difficult to install (see box to the right). But adequate regulatory and policy measures need to be in place to encourage operators, private sector investors and users to expand services and launch innovative new projects. Governments have a key role to play in this, for example through policies for licensing that are conducive to fostering new services, and through pro-competitive policies. Protection of the user is also important: pricing strategies that keep services affordable are in everyone's long-term interests, as the Report illustrates. Keeping a grassroots focus is important too: it is crucial to find out what users want, and to cater for local or cultural specificities – including such considerations as local language content and software, and providing training programmes to keep skills linked to projects and ensure sustainability.

A Wi-Fi lake for the developing world

A "shikara" against the sunset on Dal Lake

With the recent de-licensing of radio spectrum for spread-spectrum packet-based communications in India, wideband connectivity has been extended – using Wi-Fi technology – to sparsely populated communities.

The Dal Lake Wi-Fi project was envisioned and successfully implemented by Dax Networks and was implemented in partnership with the Indian Department of Tourism, the State of Jammu and Kashmir (J&K) and the Internet service provider, Ipeaks. Established in 2003, this Wi-Fi Lake is thought to be unique and revolutionary in the developing world.

Local boats, called *shikaras*, are used to travel on the five-kilometre-wide lake, and are connected to stationary houseboats on the lake. Houseboats are akin to living accommodation on the lake and along with the *shikaras* have provided housing for tourists and residents for centuries.

The houseboats are equipped to provide the lake's Wi-Fi network connectivity. Now that the project has been successfully implemented, Dax has plans to duplicate the model at other lakes in India – Nainital, Hussain Sagar, Kodaikanal and Kumarakom. During the pre-launch of the project, a representative of Dax Networks stated that this Wi-Fi lake is "not just a bold statement, but also a move that can have cascading effects in the state and a positive rub-off on the overall image of the country". A similar Wi-Fi marine service was also set up off the shore of Lake Michigan in the United States in 2004, covering over 32 km.

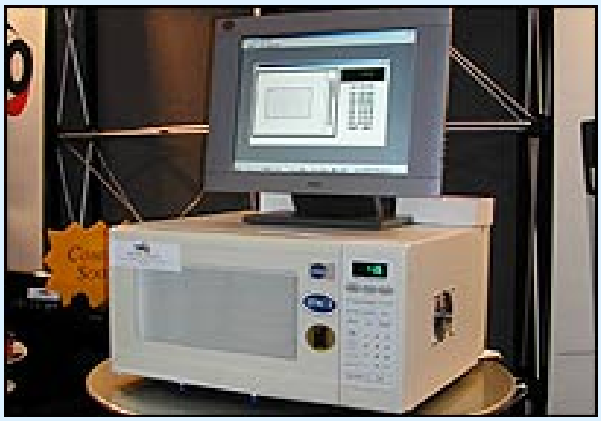
Sources: www.w2i.org/pages/in_the_news/news_internet1.html
www.ottawawireless.net/about-us/pressreleases/2004-02-11.pdf
Picture courtesy of IndiaMART.com at: www.indiamart.com

Social impact and future scenarios

Many have remarked that the overwhelming presence of mobile communications in everyday life has led to a blurring of boundaries between our public and private worlds. Public places are now commonly "colonized" by the private lives and conversations of mobile users. Similarly, there has been an extension of each user's physical space, through the creation and juxtaposition of a mobile "social" space, i.e. face-to-face interaction can be interrupted by a remote third party. Individuals are constantly exposed to the private or professional lives of strangers and mere acquaintances, whether or not they wish to be. This "permeability" between the separate contexts of social life will only be accentuated by the advent of more sophisticated and user-centric portable Internet technologies.

If the permeability of portable Internet technologies continues at the current pace, societal changes will evolve at an equally rapid pace. While ownership of portable Internet devices may still be far off for many, the portable Internet is likely to have some impact on everyone. Imagine a future scenario where one can pre-programme domestic devices while away from the home (see box to the right); where health information can be transmitted automatically to a doctor for prescriptions to be reliably and rapidly administered; where trade for small businesses can take place without the need for costly office space and computer equipment; and where the whereabouts of people and objects can be detected instantaneously from a handheld portable device. Imagine a device that could store all personal information, such as ID information – replacing the need for a separate driver's licence or ID card, and entertainment, including favourite music, photos and films. Health information for diabetics or those with heart conditions might also be stored, a person's health status monitored and even treatments administered. If these portable Internet scenarios become reality, day-to-day living could be transformed in the future. Such developments hold great promise for development in all societies, but the social impact must always be assessed and appropriate measures taken to ensure that the future information society is as inclusive and healthy as possible.

Connected oven keeps food cool



Imagine being able to leave a meal in the fridge for the day but then send a command over the Internet to cook it so that it is ready when you get home. A US company called Tonight's Menu Intelligent Ovens has come up with a refrigerated microwave that can be controlled over the Web or by mobile phone.

The product is part of a trend towards the smart kitchen hooked up to the Internet, so that you can browse the contents of the fridge or tell the oven to immediately refrigerate your chicken once it is cooked. It also means the oven can be controlled over the Internet or by mobile phone, allowing one to delay the cooking time, change the cooking temperature or cancel the cooking order altogether.

Source: BBC (UK).

The Portable Internet Report

Table of Contents:

Statistical tables:

The Portable Internet is the sixth in the Internet Reports series, and was prepared by a team from the ITU Strategy and Policy Unit (SPU). It can be purchased online or in printed copy from the ITU website at: www.itu.int/publications/index.html.

Printed copies are also available from the ITU Sales Service (Fax: +41 22 730 51 94, e-mail: sales@itu.int).

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