

THE PROGRESS OF MOBILE BROADBAND TECHNOLOGIES AND THE DIGITAL DIVIDE

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Introduction

The growing use of internet is coming faced with a change process by the new mobile broadband applications. Anywhere, anytime and on any device , the internet access will be supplied by the efficient mobile broadband access technologies. Mobile Broadband access is becoming highly important for the most recent applications and services that are available through a high speed internet connection. The fourth generation (4G) of mobile technologies will bring high speed connectivity, high user capacity, reduced latency ve IPv6 supported all-IP arhitecture. Those technologies will serve for the storing and changing of increased amount of data. The inovation in mobile broadband technologies causes deep impacts in many other fields. This study will point out the potential of mobile broadband applications and services, the importance of their change in our lives and the potential Digital Divide subject that will come up with the progress.

Mobility and broadband applications

Fixed internet access rates are increasing day by day as we observed in subscription numbers. But broadband access is becoming essential as high speed internet connection need appears for the new

technological applications and services. DSL (Digital Subscriber Line), FTTx (fibre-to-the-premises/home), Cable modem can be named as fixed broadband technologies. HSPA, LTE, Mobile WiMAX,UMB are the basic mobile broadband technologies. Mobile broadband combines the new necessity of high-speed data services with mobility. People with broadband access use the Internet more often and more intensively for online shopping, education, use of government services, playing or downloading digital content and video telephony (OECD,2008). Some applications are related to telemedicine, e-commerce, e-banking and e-government. Broadband-based applications have a far greater impact on people, society and businesses.The rapidly growing demand for affordable bandwidth in fixed and mobile services is driving the industry to deliver high performing cost effective wireless broadband platforms that can be deployed in the varied spectral allocations worldwide (Motorola Inc.,2007).

Internet is growing in the core of lives including wired and wireless applications.But the increasing rate of users are looking for space and time free internet access anymore. This tendency is called as mobile internet. As Ovum RHK &Ericsson published an analysis ,the broadband subscribers will be over 1.8 billion by 2012. Mobile broadband subscribes will reach to a number over 1.2 billion by the same year (See Figure 1) (Fridberg, J., 2008).

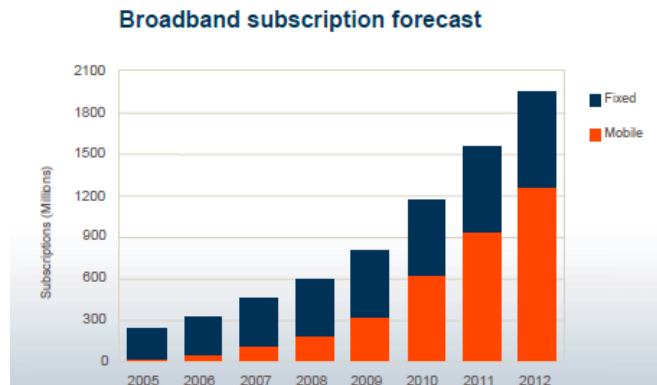


Figure 1. Ovum RHK, Strategy Analytics & Internal Ericsson mobile-fixed broadband subscription forecast

In the developed world, users' desire to be connected anytime, anywhere will be a primary source of demand. Consumer demand for social and search services such as Facebook, MySpace, YouTube, Yahoo, and Google increases the demand for mobile broadband capabilities. Better connectivity means more efficient business. Wireless technology is playing a profound role in networking and communications, because it provides two fundamental capabilities: mobility and access. Mobility is communication with geographic freedom and while in motion. Access is communication services, whether telephony or Internet, easily provided across geographic areas and often more easily accomplished than with wireline approaches, especially in greenfield situations where there is little existing communications infrastructure (Rysavy Research, 2007). Productivity increases associated with the accelerated mobile-broadband growth throughout the world. Competition of companies brings innovation and investment in the market, and it will bring activity in employment.

People are clearly drawn to broadband for the instant access to information, entertainment, web applications, and rich communications such as social

networking. Cisco reports that the average broadband connection, on a global basis, already generates 11.4 Gbytes of Internet traffic per month, which is equivalent to 375 Mbytes per day. Mobile broadband growth is even faster than wireline, because not only are individual users consuming ever more data, but the percentage of users using mobile broadband is increasing. The result is a huge projected increase in data consumption as shown in Figure 2, Cisco projection of global mobile broadband traffic measured in petabytes (million gigabytes) per month. This growth is at a 108% compound annual rate over five years (Rysavy Research, 2010).

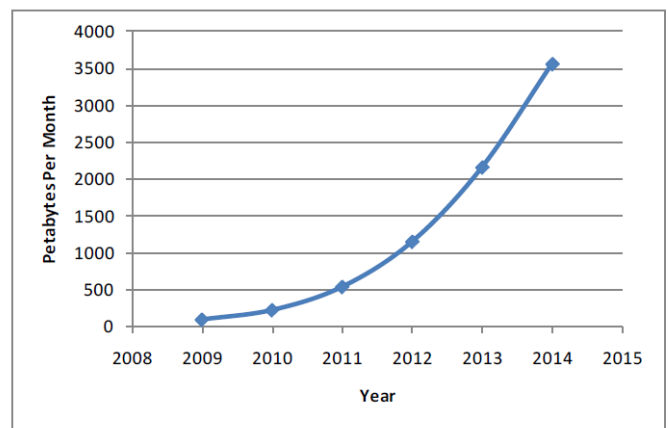


Figure 2. Global Mobile Broadband Data Projection (Source: Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, February 10, 2010.)

Mobile broadband technologies

The aim is the appropriate selection of the mobile broadband technology both for subscribers and operators. It can be simply called as the way to 4G. With 4G technologies high-speed transferring of large files, high-quality videoconferencing, secure access to corporate networks, bringing the characteristics of today's 'Web 2.0' into the mobile space (by LTE

technology), secure e-commerce, real-time peer-to-peer applications like multiplayer gaming and file sharing can be possible.

The use of mobile broadband applications with 4G technologies will allow other much efficient and widespread use of services such as;

- VoD, MoD and multimedia services
- Mobile TV, IPTV, HDTV
- HD qualified voice communication
- Realtime voice services, VoIP (Voice over IP)
- 3D TV
- Mobile Health, Mobile Learning applications
- WEB 3.0 Mobile applications
- Interactive multiple-players games
- triple/quadruple play services
- SaaS (Software As a Service), Hosting Services
- M2M (Machine to Machine) applications

Figure 3 summarizes the evolution of how the basic senses of sound and sight as well as knowledge are fulfilled by various generations of mobile wireless networks (Tellabs,2008).

HUMAN SENSE	SOUND	SIGHT	KNOWLEDGE
NETWORK GENERATION			
1G-2G	Voice	—	Low Speed Data
3G	Voice	Images	Hypertext (HT)
4G	Voice, Speech	Video	Files (Speech, HT, Video)
Typical Bandwidth	10–80 Kbps	1–20 Mbps	0.5–10 Mbps
Required Latency	<160 ms	<100 ms	<5 s
Principal Application	Communication	Entertainment	Information

Figure 3. Mobile wireless generations and applications

With 2G, 3G and 4G there is an acceleration in data speed (see Figure 4) (Tellabs,2008). Mobile data speed will reach the fixed data speed by the technological inventions as the aim of 4G.

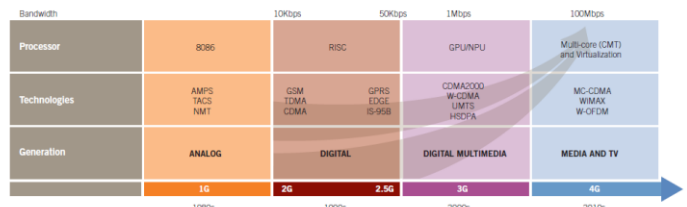


Figure 4. Evolution to 4G

Broadband and digital content

The pattern of broadband use is shaped by socio-economic characteristics including education, income, age, gender, or place of access. Digital content is a key factor behind the rapid growth of OECD broadband subscribers to 251 million in 2008, up from 68 million in 2003 (OECD,2008). The growing number of users causes the creation of new content. Mobile broadband is serving for content creation and demand.

Characteristics of 4G technologies

4G will introduce the IP based connectivity. Mobile IP is designed by Internet Engineering Task Force (IETF) to allow mobile subscribers to move from one network to another while maintaining a permanent IP address to maintain the usage of resources and services on the move (Ergen,2009). IP address of a mobile user needs to be same regardless of the attachment point. Mobile IP mechanism maintains the IP address of a user and facilitates directing the packets of a mobile station to appropriate attachment point during handover. With Mobile IP, a node in the network always sees the mobile user with the same IP address. The fourth generation of mobile networks will turn into end to end IP based networks with the arrival of IPv6. Every device in the world will have a unique IP address. 4G networks becoming fast and have very cost-effective solutions with IP built high-speed data capacities in the mobile world.

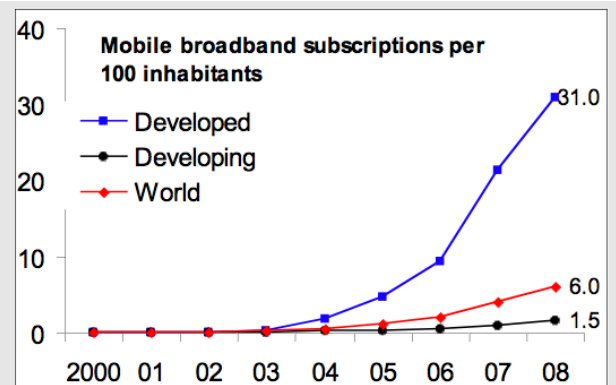
Innovative devices fundamentally change how people use broadband. Smartphones have allowed subscribers to use mobile e-mail, browse the Internet, to use hundreds of mobile applications. There is an example of innovation in mobile devices such as the introduction of the iPhone and Android with hundreds of new mobile applications. Before smartphones, personal computers with graphical user interfaces and growing processing power enabled the emergence of the Web browser, which led to the widespread adoption of the Internet. Competition, often from companies that were not market leaders, has driven innovation and investment in devices in the past and must continue to do so in the future. There are more video and broadband applications for the TV, possibly in conjunction with other devices, such as mobile phones and personal computers (PCs). There is also

an innovation in computing devices, such as the creation of graphical user interfaces with the developed software applications (Federal Communication Commission,2009).

Mobile broadband and the Digital Divide

There is a progress in access to Information and Communication Technologies (ICTs) in general. The digital divide is usually measured in terms of people's access to ICTs. Digital divides can exist between developed and developing countries (also known as global divide), or within a country (known as internal country divide). It comes up in different demographic characteristics of the population, such as age, gender, income and race, or different locations, such as urban and rural (International Communication Union, 2009).

The majority of countries worldwide had launched and commercially exploiting new mobile broadband technologies. Comparison of developed versus developing economies shows that mobile broadband uptake is clearly dominated by the developed world with penetration at 31% compared to 1,5% in the developing world (Figure 5) (International Communication Union, 2009).



Source: ITU World Telecommunication/ICT Indicators database

Figure 5. Mobile broadband subscriptions of countries

With the widespread usage of mobile broadband technologies the term Digital Divide will come into question. There has to be some cautions in order to prevent prospective gaps. It is important to reduce inequalities (such as social-economical, technological, cultural, geographical sourced) in reaching possibilities to the Information sources by forming technological, economical, social and legal circumstances. The price of devices and access can be reduced by the time. Broadband services can be provided in geographically and economically disadvantaged areas of the country by the choosing the appropriate 4G technology (such as WiMAX in rural areas).

Countries need correct generated Government Politics to improve new generation mobile communication. In order to avoid geographical and social gaps broadband politics need to be improved.

Implementing e-government politics for the productivity is essential. Besides these, innovations have to be encouraged. It is urgent to arrange competitive clauses to serve broadband services by the companies and to be ready with all kind of regulations related to the new technologies. We need to improve the talent of private persons and workers in this area.

Conclusion

The Mobile Broadband access will serve for the users in order to reach value added applications for education, health, economical, social and cultural purposes in daily life. The aim is to provide broadband access anywhere, anytime and cheaper as well. It is essential to provide high speed with low latency and high capacity data access to the users in lower costs.

In order to increase the number of conscious users, introduction and training facilities must be held. Competitive requirements of the companies have to be arranged properly as soon as possible. The employment opportunities with the progress of the mobile broadband technologies will cause economical movements as a result. Eventually, the widespread use of many mobile broadband applications will change our lives with their potential.

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