Suruhanjaya Komunikasi dan Multimedia Malaysia

INDUSTRY REPORT 2007

Volume 2

A Comparative of Telecommunications Trends

About the Cover

The Kuda Kepang is a highly-spirited traditional dance performance from Malaysia's southern state of Johor. Usually performed by nine dancers sitting astride two-dimensional horses, the dance forges the image of great determination with stories of historical and victorious battles told in various vigorous yet graceful movements. The Kuda Kepang image is set against the background of the Istana Budaya, the icon of Malaysian traditional performances and regarded as among the 10 most sophisticated theatres in the world. Much like the dance, the SKMM identifies and weaves the spirit, synergy and story depicted by the Kuda Kepang and the grandiose of the Istana Budaya with our own commitment in bringing about the progressive development of the communications and multimedia industry.

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FOREWORD

Suruhanjaya Komunikasi dan Multimedia Malaysia (SKMM) publishes on a number of topical reports planned for the year of 2007 and it is my great pleasure to present to you the Report on **A Comparative of Telecommunications Trends**.

The report covers a discussion on the catalysts to telecommunications industry growth, investments, telecommunications, and related sector developments, with a focus on competition as one of the drivers. An analysis of mobile service overtaking fixed line service across the world, regions and selected countries, including Malaysia and its implications on trend in communications market share.

There is also an analysis of the recent trends in telecommunications services, including regional or country comparatives such as the establishment of data services; broadband services in fixed and wireless modes; mobile virtual network operators (MVNOs); highlights in power line communications and other forms of communications service and delivery; introduction of mobility; and the need to manage growth amidst new services development.

A discussion on the blurring of traditional service boundaries brings in the importance of open access; standardisation; efforts in handset and devices development; and the impact on advertisements as a source of revenue. The discussion also includes consumer expectations on content; and user experience in converging media.

A soft copy of this report can be obtained from the SKMM website at:

http://mcmc.gov.my/what_we_do/Research/industry_studies.asp

I trust this document will provide useful information to our readers. To improve the industry report, we welcome any feedback to assist us in the future. Please send your comments to
webmaster@cmc.gov.my

Thank you.

Yang Berbahagia Datuk Dr. Halim Shafie
Chairman
Suruhanjaya Komunikasi dan Multimedia Malaysia

EXECUTIVE SUMMARY

The telecoms industry is rapidly changing. Communications was voice telephone-focused since the first invention of telephone by Alexander Graham Bell in 1875, to application-focused through data and web applications today. The much referred to convergence where voice, online and video is available on any device, anywhere and anytime, is happening in various stages though deemed only emergent currently. Growth in the telecoms industry was spurred by liberalisation and the introduction of competition; the advancement of technology, and the facilitative policy and regulatory efforts of the government to initiate change and encourage telecoms investments for greater country competitiveness and economic advancement. Also, renewed interest in the Internet, and mobile Internet as well, is stimulating previously distinct industry sectors to change their business models in order to align with the developing Internet economy.

The impact of liberalisation worldwide increased competition, thus creating new opportunities for the industry to improve the market by new investments and acquiring new skills, forging alliances with counterparts and restructuring of telecoms companies to create better synergy. As of 2005, Europe leads as having the highest degree of competition and likewise in the Internet market. Developed Asia countries such as South Korea liberalised earlier. Malaysia witnessed competition from the mobile operators, with the fixed voice incumbent, the then Telekom Malaysia (now TM) faced liberalisation changes in the 1990s. As Information and Communication Technology (ICT) investment is seen as an important factor for GDP growth, telcos are strategising to be a combined telecom and IT company. BT for example, generated total revenue of USD18 billion in 1996 compared to 2006 of USD27 billion, with revenue sources involving work from IT services and consultancy in 2006. Introduction of competition and changes to the structure of the incumbent operator from government-owned to a public-listed entity enabled private funding sources from the local stock exchange to be tapped to further telecoms infrastructure investments. Malaysia for example, posted capital expenditure (capex) of RM30 billion for fixed line in post-liberalisation compared to public expenditure of RM5 billion in total capex during pre-competition times.

Mobile subscribers surpassing fixed line subscribers in 2002 at the global level has far reaching implications to the communication services industry as a whole. This is from various aspects such as that of expanded markets, cross sector developments and international businesses. Malaysia then backed by the second-generation (2G) digital systems launched in the 1990s saw mobile overtaking fixed in 2000. For China, the crossover was in 2003. China Mobile was the largest mobile operator in Asia Pacific in 2006, claiming market share of 44%. As telecoms industry takes new entrants from other sectors compelling innovative new services, traditional service players are defending their market shares by collaborating with companies or ramping up their existing services.

In developed countries, non-voice services contribute an average 20% of total revenue while Japan commands 30%. In addition to the rollout of 3G technology which platforms web-based applications, an estimated revenue of USD45 billion is expected from data services. Broadband has opened avenues for new or incremental revenues for the telecoms market. Broadband through Digital Subscriber Line (DSL) is most widely available in the world so far. The expansion of DSL and fiber initiatives are underway in most countries, albeit at slow pace, as deployments involve high levels of financial collateral. Denmark and Netherlands both have more than 30 subscribers per 100 inhabitants in broadband services, the highest among Organisation for Economic Co-Operation and Development (OECD) countries. A large number of trials on Broadband over Powerline (BPL) are underway in many countries. Issues on the lack of a single standard for the technology will continue to hinder a wider adoption of BPL in this market. Offerings of attractive packages in fixed line and broadband services by telcos have particularly made consumers happy especially when telcos introduced low rate charges for having both services. WiFi and WiMAX are both potential revenue churners for the wireless market particularly for portable services, allowing telco companies to offer triple and quad play services. An example of a leading telecommunication company is BT. With the introduction of its new wave products under the platform of broadband and Internet Protocol Virtual Private Networks (IP VPN), BT still has managed to defend its traditional services in addition to introduction of new packages. BT has strategised to be an telecoms IT company going forward.

With more than 200 Mobile Virtual Network Operator (MVNOs) worldwide, the success of this market is proven with more MVNOs marketing brands of their own to their targeted groups of customers. The IP platform opens avenue for many new products and services for telco companies, particularly under the VoIP and IPTV banners. Asia Pacific region is expected to lead VoIP with more than 90 million subscribers expected by year 2012. For IPTV, the leading markets are in Europe with operators such as BT, Deutsche Telekom and Telefonica paving the way. Asia Pacific is cited as a key subscriber growth market, with technology development as its strongest edge.

As traditional services players face pressure in the market, sources for new services and initiatives to create new business models are expanding among the industry players as migration towards NGN networks and converged intelligent networks goes under way from each telcos strategy plans. Standardisation for communications services is an important avenue, particularly as today convergence of services involves many overlapping areas such as content, hardware, software, services or network and copyright issues. Motorola and Nokia lead as the top handset vendors in US, Asia Pacific and Western Europe claiming a market share of more than 30% each. Mobile TV and Internet related services pose many opportunities for advertisers. Avenues to work with mobile operators dealing in ads plus free minutes awards to consumers may be the preferred sort of package that reaps ad revenues.

Content and consumer demands are inseparable. Specific targetted markets or personalisation or consumer oriented services would provide incremental or new revenue sources. With portable devices, services convergence is fast becoming a possibility to allow viewing of content on the go. Telcos are racing to strengthen branding, provide high speed applications, increase efficiency and create personalised services for customers. The trends towards convergence are shaping consumer behaviour as well, facilitating the tech savvy and educating the technology dinasours. Yet, amidst all this variety and choice, simplicity and reasonable price is uppermost in the minds of the masses.

GLOSSARY

A/BPON	ATM/Broadband Passive Optical Network
ADSL	Asymmetric Digital Subscriber Line
ARPU	Average Revenue Per User
ASP	Application Service Provider
BCE	Bell Canada Enterprise
BSkyB	British Sky Broadcasting
BSNL	Bharat Sanchar Nigam Ltd
CAPEX	Capital Expenditure
CDMA	Code Division Multiple Access
CMA	Communications and Multimedia Act
DSL	Digital Subscriber Line
DVB-H	Digital Video Broadcasting – Handheld
E/GPON	Ethernet/Gigabit Passive Optical Network
EDGE	Enhanced Data rates for GSM Evolution
FTTB	Fibre-To-The-Building
FTTH	Fibre-To-The-Home
FTTP	Fiber-To The Premises
GDP	Growth Domestic Product
GPRS	General Packet Radio Service
GPS	Global Positioning System
GSM	Global System for Mobile Communications
HDTV	High Definition Television
HFC	Hybrid Fibre-Coaxial
HSDPA	High-Speed Downlink Packet Access
IMS	IP Multimedia Subsystem
IMT-2000	International Mobile Telecommunications-2000
IP	Internet Protocol
IPO	Initial Public Offering
IPTV	Internet Protocol Television
ITU	International Telecommunication Union
Kbps	Kilobit per second
LAN	Local Area Network
Mbps	Megabits per second
MMDS	Multichannel Multipoint Distribution Service
NGN	Next Generation Networking
RBOC	Regional Bell Operating Companies
SIP	Session Initiation Protocol
UMA	Unlicensed Mobile Access
VDSL	Very High Speed DSL
VoATM	Voice Over ATM
VoD	Video on Demand
VoIP	Voice over Internet Protocol
W-CDMA	Wideband-Code Division Multiple Access
WiMAX	Worldwide Interoperability for Microwave Access

THE TELEPHONE AS IT WAS BEFORE

Fixed Line

1875
Bell Telephone

1930s
Candle Stick

1948
Calls via operator so no dialing function

1950s–1960s
Switch board Operated Phone

1970s
Electronic exchanges
– Push button telephone
– faster, accurate

2000s
Hands-free speakerphone
– more features

Source: Telekom Malaysia, grandstream.com

Mobile

1970s
Mobile via car phone

1984
Heavy battery

1988
Smaller battery size but still chuncky

1988
Slim and more stylish

2003
Voice & application (games system)

2007
Phone and TV system

Source: Nokia.com, LG, TM Bhd

COMPETITION AS A CATALYST TO TELECOMMUNICATIONS INDUSTRY GROWTH

The introduction of competition as markets liberalised, or opening of markets to new entrants, to previously incumbent-based or monopolistic market has seen the past 20 years of the telecommunications industry transform from one of predominantly sedate, domestic oriented, government-run agencies to increasingly competitive, innovative and market-led international companies. This together with the advancement of technology and regulatory transformation from legacy frameworks to one facilitating growth and open markets have driven these evolutionary; fueled increased investments, new and innovative services, and upgrading of the old. There is much anticipation and thought towards achieving new or integrated combinations of business models in convergence era in ways not thought possible before.

Impact of Liberalisation[1]

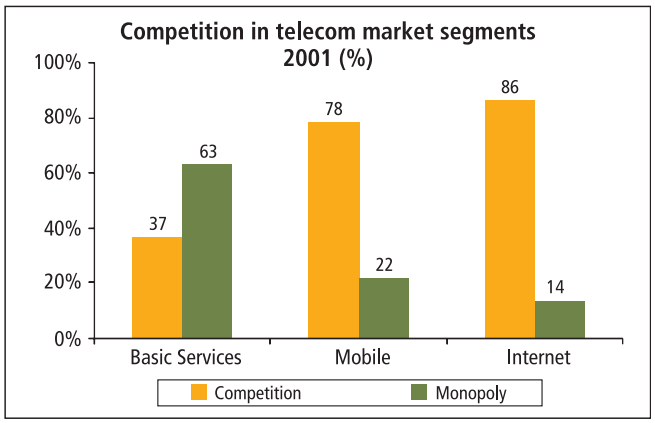
- New players come onto the market.
- Quality of services improvements taking a leap forward.
- Prices of many services fall in real terms.
- Mobile and on-line services post strong growth as telephone companies compete to offer new, combined, fixed/mobile packages, cheaper second phone lines and new pricing formula and ways of paying for services.
- Foreign direct investment (FDI) brings new skills, technology transfer and spillover effects to the wider economy.
- Domestic firms adopt the new techniques; Labour force adopt new skills.
- Firms in other sectors that use services-sector inputs such as telecoms and finance benefit as well.

Over the years, the global telecoms market saw liberalisation, and increased competition. During 2001-2005, full or partial competition in basic services was introduced in more than 40 countries. Others made commitments for introduction of competition as part of their schedule of commitments under World Trade Organization (WTO) Agreement on Basic Telecommunications Services. Also, opening up of markets worldwide spurred mergers and acquisitions wherein the global telecommunications market witnessed this amongst the world's largest telecommunications operators, both within and between countries.

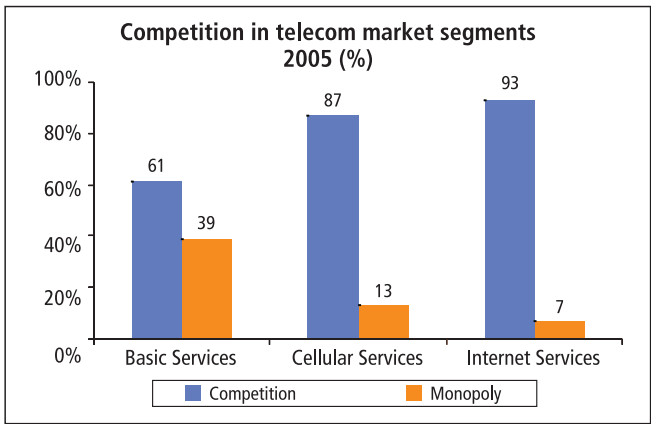
[1]Department of Trade and Industry, United Kingdom.

Privatisation Spurring Competition

Two critical factors contributing to growth in the industry was privatisation and competition. By the end of 2005, competition was evident in 87% of the global cellular markets and 93% of the world Internet markets. For basic services, about 61% of the global markets were open to competition. Globally, Europe leads as the region with the highest degree of competition and also the only region with 100% competition in its Internet market.

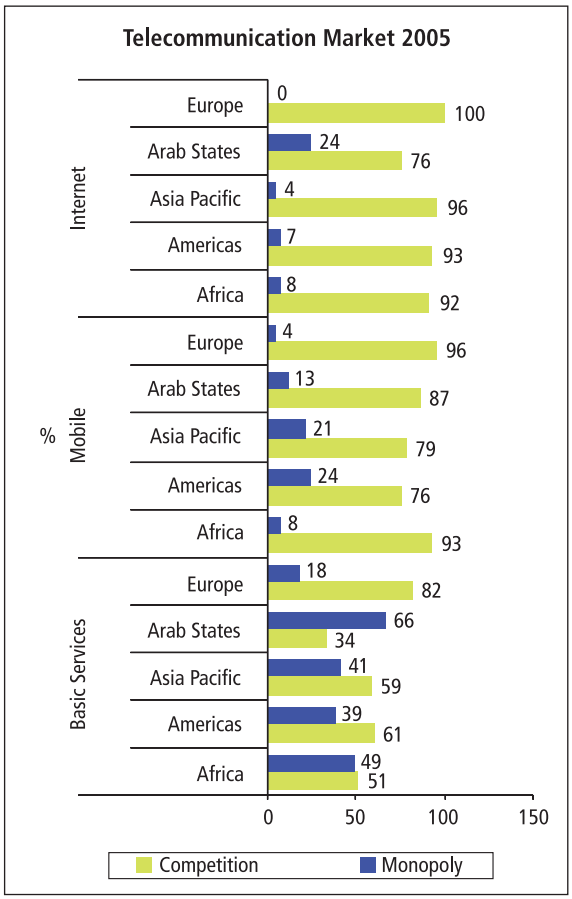


Source: ITU World Telecommunication Regulatory Database



Source: ITU World Telecommunication Regulatory Database

**Comparison based on telecoms revenue*



Source: ITU World Telecommunication Regulatory Database

European Telecom Sector[2]

It took almost a decade since the early 1990s for the dramatic liberalisation of the telecom sector in Europe and other OECD countries to take full effect, i.e., by January 1998. The shift away from a monopolistic market structure to open competition settled at 96% of the OECD market as measured by total telecommunications revenues by end of the decade. In the UK[3], British Telecommunications Plc (BT) was privatised in 1984. The UK market was the first European telecommunications market to be open to competition in 1991. For the first seven years BT's only competitor was Mercury (owned by Cable & Wireless and BCE of Canada). Objectives of the duopoly structure was to protect BT's profits in the post-privatisation period; provision of incentives for Mercury to invest; and the introduction of competition on long distance and international calls.

Mercury operated a separate network for long distance and international calls but was linked to customers using the national BT network as it was expensive for Mercury to establish a local network to rival BT. Mercury paid BT for the interconnection facility. This situation generally exists across the

[2]The European Commission.
[3]Organisation for Economic Co-operation and Development, Paris 1996.

world where a new entrant faces an existing incumbent. Another phenomenon across the nations that opened up the monopoly fixed line market was the subsequently introduced mobile services and the fast uptake of mobile service. In the case of UK, two cellular companies, Cellnet and Vodaphone, which started operations in 1985 and 1983 respectively, saw substantial subscriber growth at 9-year CAGR 1995-2004 of 39%.

Privatisation in Asian Countries

Developed Asian countries liberalised first. For example, South Korea witnessed tremendous developments in the telecommunications sector since privatisation in 1996 of KT's mobile subsidiary KMT, to become SK Telecom; introduction of a duopoly market structure in the same year; and the subsequent initiatives in the late 1990s to strengthen its telecoms policymaking and reform drive to coordinate high-tech policy. In 1998, regulatory liberalisation in the domestic wired and wireless telecommunications service markets saw auction of 20 new licenses in fixed and wireless sectors between 1997 and 1998. South Korea market today is sighted as having the world's most progressive broadband services, with broadband penetration of 89% by household (29% by population).

Hong Kong is another Asian country deemed as having a progressive telecoms market. Until 1980s and early 1990s the Hong Kong telecoms markets saw entry of competition, starting with customer premises equipment and paging markets. Competition started in the mid-1980s for the cellular mobile phone market and in early 1990s, in the broadcast uplink and downlink of satellite communications. The Hong Kong regulator, Office of the Telecommunications Authority (OFTA) was established 1 July 1993. The main duties of OFTA are economic and technical regulation of telecoms services, enforcement of fair competition, and management of radio frequency spectrum. Hong Kong today is a fully liberalised market, with telecommunications sector revenue of USD6.54 billion in year 2005/2006 compared to USD4.371 billion in 1994/1995.

Malaysia saw its regulator, Suruhanjaya Komunikasi & Multimedia (SKMM) setup in 1999; one year after the introduction of converged telecoms legislation, the Communications and Multimedia Act 1998. In 1994, as new entrants both from the fixed and mobile voice sectors entered the market upon issue of new licences, Telekom Malaysia as the traditional incumbent fixed voice operator faced growing competition. With voice as core, along came mobile services, the Internet explosion, and the advent of mobile data services we are opportune to experience today. To date, the Malaysian telecommunications spot healthy competition amongst three major mobile players – Maxis, Digi, and Celcom (TM's mobile arm), with TM[4] incumbent in the fixed line market.

Time	Events	Developments
1984	Telecoms operator, Jabatan Telekom Malaysia (JTM) separated from the jurisdiction of the regulator to the then Ministry of Energy, Telecommunications & Posts.	Malaysian government's privatisation plans in the 1980s. CMA introduced in 1998 and regulator SKMM came into being 1999.
12 Oct-84	Network operating responsibilities of JTM were transferred to a new organisation, Syarikat Telekom Malaysia Berhad (STM).	On 27 May 1991, STM changed its name to Telekom Malaysia Berhad.
27 May-91	STM officially changed its name to Telekom Malaysia Berhad (TMB).	Listed on the local stock exchange in Nov-90. IPO proceeds RM470.5 million (USD173.61 million).
31 Mar-07	Malaysian government, through various companies, directly and indirectly holds a 42.99% stake in Telekom Malaysia.	Foreign ownership is 12.97%. The Malaysian telecoms market is worth RM27 billion in 2006 (USD7.8 billion) with 70:30 mobile-fixed mix.

Source: International Telecoms Intelligence

[4]Changed its global brand from Telekom Malaysia to TM in April 2005

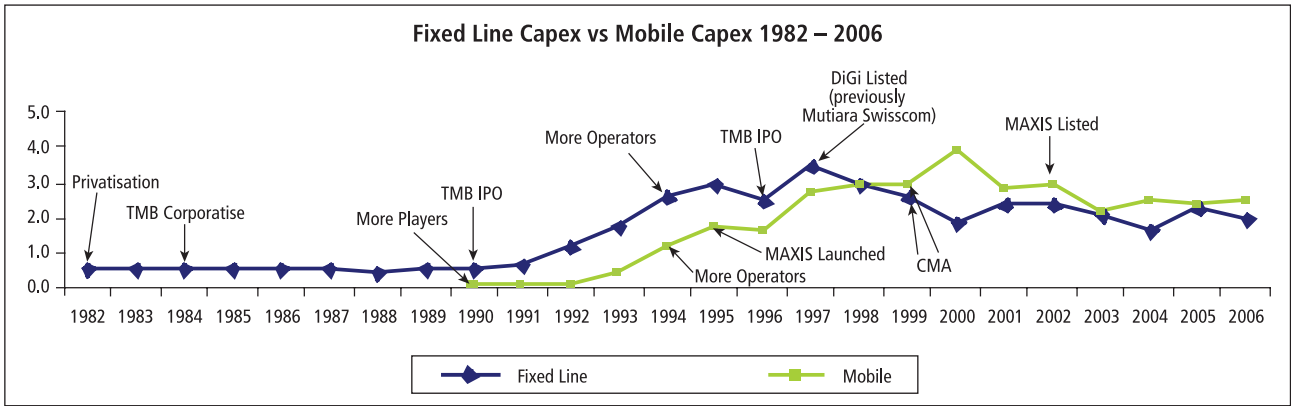
IMPACT ON TELECOMS INVESTMENTS AND FINANCIAL PERFORMANCE TRENDS

Liberalisation

Over the last two decades, the impact of liberalisation spurred the opening up of markets and introduction of competition. Along with such developments was the acceleration of telecoms investments, including the proliferation of new value added services and the shift or beginning of the confluence of ICT with telecommunications.

For example in Malaysia, the 1990s saw opening up of the telecommunications industry accelerating telecommunications investment in infrastructure not only via the new investments upon the entry of new players into the industry, but also the opportunity for the incumbent operator to change from a government "utility" body to a modern integrated telecoms company as TM Berhad is today, with operations locally and regionally. Public listing of its shares in the local stock exchange brought funds for infrastructure investments, previously not available before.

New entrants followed with their own public listing, e.g., Maxis with IPO proceeds of RM652.34 million (USD171.67 million) in 2001. A total of RM30 billion in capital expenditure was spent on fixed line services in the post liberalisation era of 1990 – 2003. In contrast, the mid-1980s to 1989 witnessed total fixed line capex of less than RM5 billion. A similar case in mobile capex exist; capex totaled RM26 billion between 1990 and 2003.



Source: SKMM, Industry

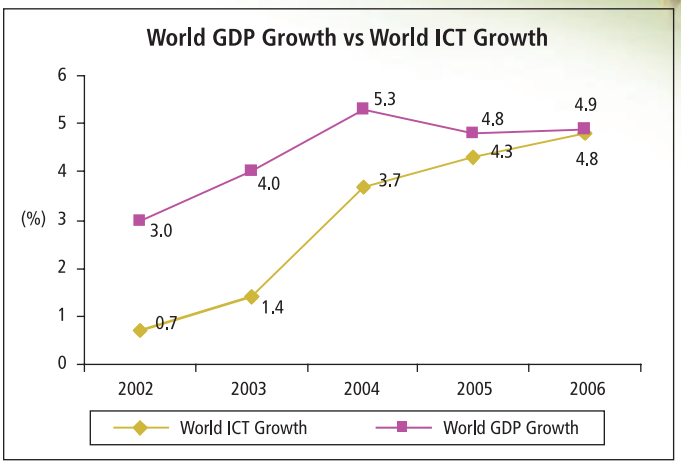
ICT and Competition

General consensus is on the importance of ICT for economic growth, and its contribution to productivity growth. Industry studies of the European economy show that the growth of ICT production lines and the increased use of ICT as a productive factor has a positive effect on GDP growth. ICT investment is deemed necessary to gear the economy towards accelerated levels of growth and increased competitive edge. Nevertheless, investments in technology need to be carried out in collaboration with both the public and private sector. Today, the telecommunications service delivery sights a situation of more influence from ICT as hardware is increasingly software complemented and as networks become intelligent in a digital and IP era. Such confluence of telecoms and ICT has far reaching implications.

Areas	Influence
Production and productivity	ICT investments promote productivity and innovation.
Technology	Facilitates cost reduction and improved quality of ICT goods and services, which in turn increases investment in new technologies.
Organisation	Improvements in organisations using ICT have a positive effect on total productivity factors.

Source: Telefónica, S.A. | Corporate Responsibility Report 2005, IMF (April 06)

The UK[5] telecoms sector ranks among the world's most advanced and Europe's largest, employing over 250,000 people in 7,800 companies; attracting 23% of Europe's telecoms inward investment in 2003. Since its telecoms liberalisation in 1984, UK has developed into one of the world's most dynamic marketplaces, with strong appetite for new technology UK has 56 million mobile home subscribers (88% penetration) and 16 million Internet connections including over even million broadband subscribers.



Source: Telefónica, S.A. | Corporate Responsibility Report 2005, IMF (April 06)

The UK is also currently benefiting from infrastructure investment – both mobile and fixed line – which is unmatched in Europe. BT is transforming its national core network into a flexible, IP based network. The programme, which will cost USD8 billion, is a world-first and operators with national fixed networks. Other countries are watching BT's progress with interest.

MOBILE OVERTOOK FIXED LINE

In 2005, the telecoms industry posting rapid growth, saw rapid progress as well in policy and technology development, resulting in an increasingly competitive and networked world. By 2005, there were 1.25 billion fixed telephone lines in operation worldwide versus 520 million in 1990 and close to one billion by 2000. Access to fixed telephone networks almost doubled from 10 subscribers per 100 inhabitants in 1990 to 19 subscribers in 2005, but fixed line growth has been slowing down. The number of fixed lines grew by some 5% only over the five-year period between 2000 and 2005.

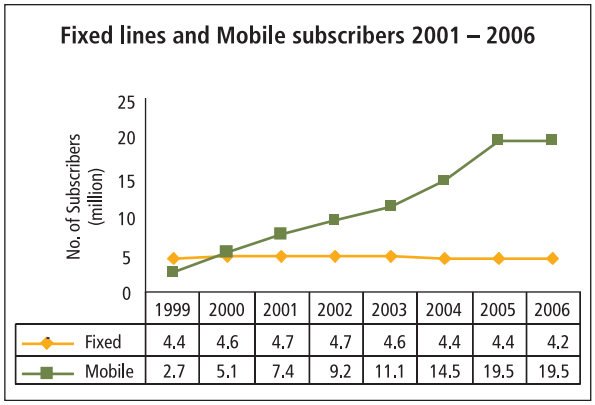
Growth is strong in the mobile sector due in part to the introduction of second-generation (2G) digital systems, launched in the early-1990s and competition forces. On global basis, mobile subscribers overtook fixed line in 2002 and by 2005, more than one out of three persons around the world has a mobile phone, up from one every 339 in 1991. In 2005 alone, the world's mobile subscriber base increased by 22%, with a global penetration rate of 34%. Amidst the success of 2G, operators have launched IMT-2000 (3G) mobile services promising enhanced services and opportunities, including mobile Internet access.

Mobile overtaking fixed line communications can be considered a milestone in telecommunications development as the mobility factor together with added applications combined in a handset points to the potential for new business models and new ways for consumer enjoyment apart from mainly voice communications as focused by fixed line service.

China in 2005 had 350 million fixed-line telephone connections in service, primarily operated by the duopoly of China Telecom and China Netcom. Fixed-line penetration rose from 11 per 100 population in 2001 to 27 per hundred in 2005. China's mobile subscriber overtook the fixed-line subscriber in 2003 (244 million mobile and 245 million fixed-line subscribers). Industry observations forecast mobile subscribers to total 498 million on annual growth rate of about 12%; reaching penetration rate of 37.6% by 2008. Commercial 3G deployments began in 2005, and 3G subscribers are forecast to grow to 118 million by 2008.

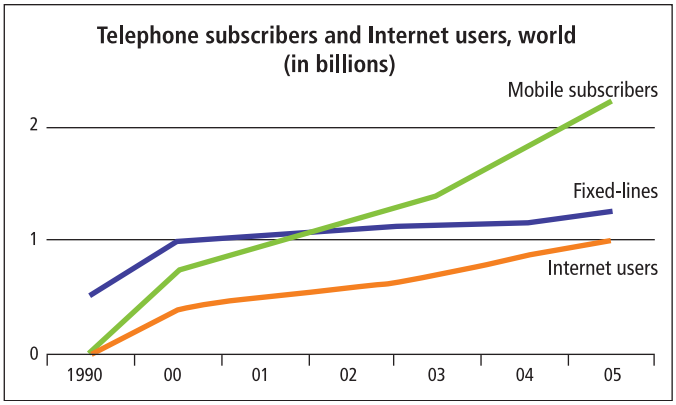
[5]UK Trade and Investment, Investment Services

Malaysia: Mobile Overtook Fixed in 2000



	1999	2000	2001	2002	2003	2004	2005	2006
Fixed	4.4	4.6	4.7	4.7	4.6	4.4	4.4	4.2
Mobile	2.7	5.1	7.4	9.2	11.1	14.5	19.5	19.5

Source: SKMM, Industry



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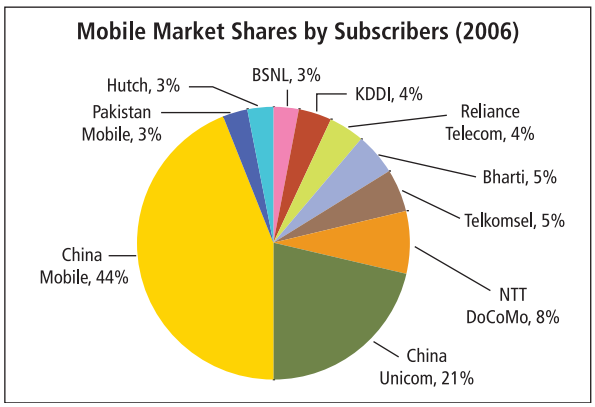
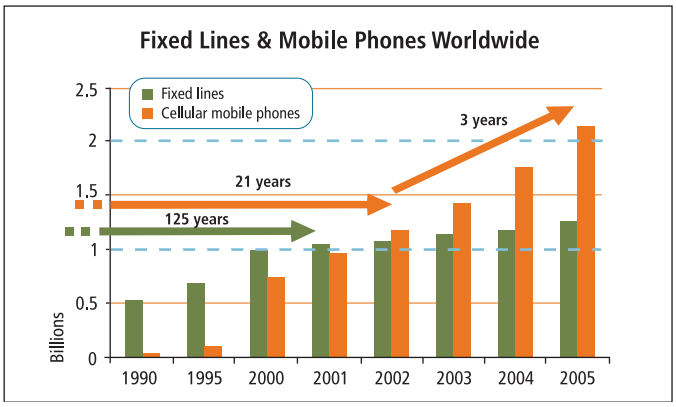
Asia-Pacific's 10 Largest Mobile Operators



Source: Business Monitor International



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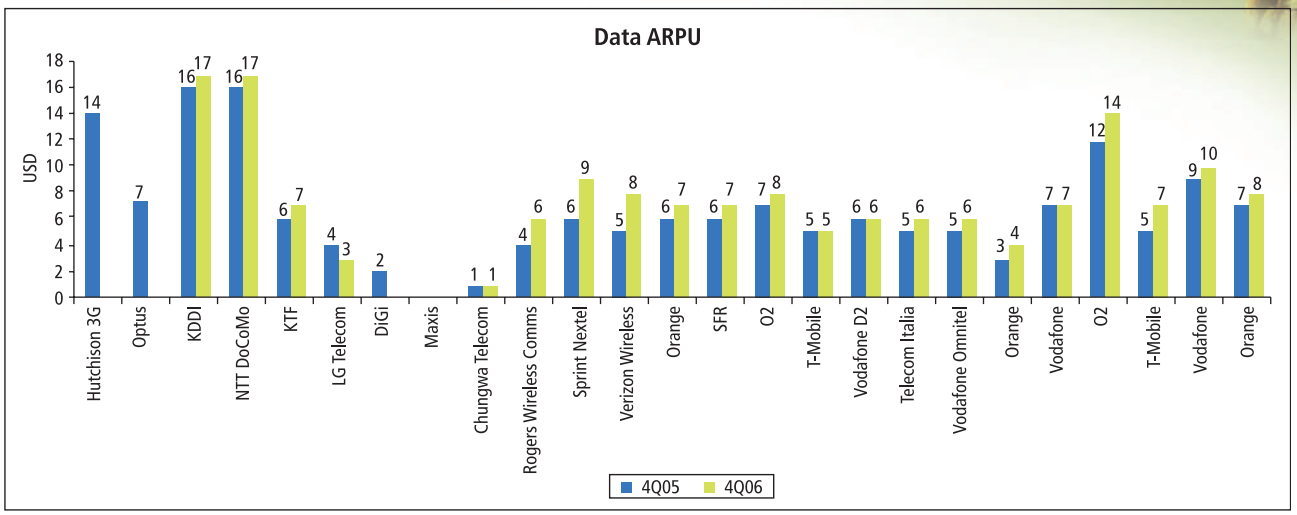
RECENT TRENDS IN TELECOMMUNICATIONS SERVICES

Establishment of Data Services

Data or non-voice services on mobile phones is still dominated by SMS (Short Message Service), the text messaging service first developed in the GSM (Global System for Mobile communications) world in Europe and launched commercially in most markets in the early 1990s. To date, mobile messaging has newer mobile formats – MMS (Multimedia Message Service), Instant Messaging (IM) and in addition web-based applications on the handset, such as mobile e-mail, community portals, fixed and mobile broadband Internet access, mobile payment, mobile TV streaming, broadcasting and music.

Industry experts forecast that by year 2009, MMS users would be 177 million in Europe and 201 million in Asia Pacific versus 44 million and 85 million users in 2005 respectively. While the core business of mobile operators remains the provision of a high quality two-minute phone call, as voice ARPUs steadily decline, mobile data is key to growth aspirations of many mobile operators. Messaging is the only significant revenue generator in the mobile data space with revenue of USD30.1 billion in 2004 to an estimated USD44.7 billion in 2007.

New messaging format is to generate significant revenues. Industry experts estimate such formats will represent 36% of peer-to-peer messaging revenues by 2010. However, data services evolve differently in different regions. For example, for Europeans and Asians frequency of use has made it part of their culture. Europeans were quicker to use these services as virtually all carriers use the same GSM-based network technology, while operators in the US have to mitigate the GSM and CDMA orientation. At least 20% of total revenues are made up of data services comprising SMS, MMS, IM, E-Mail, Community Portals and Internet Access.

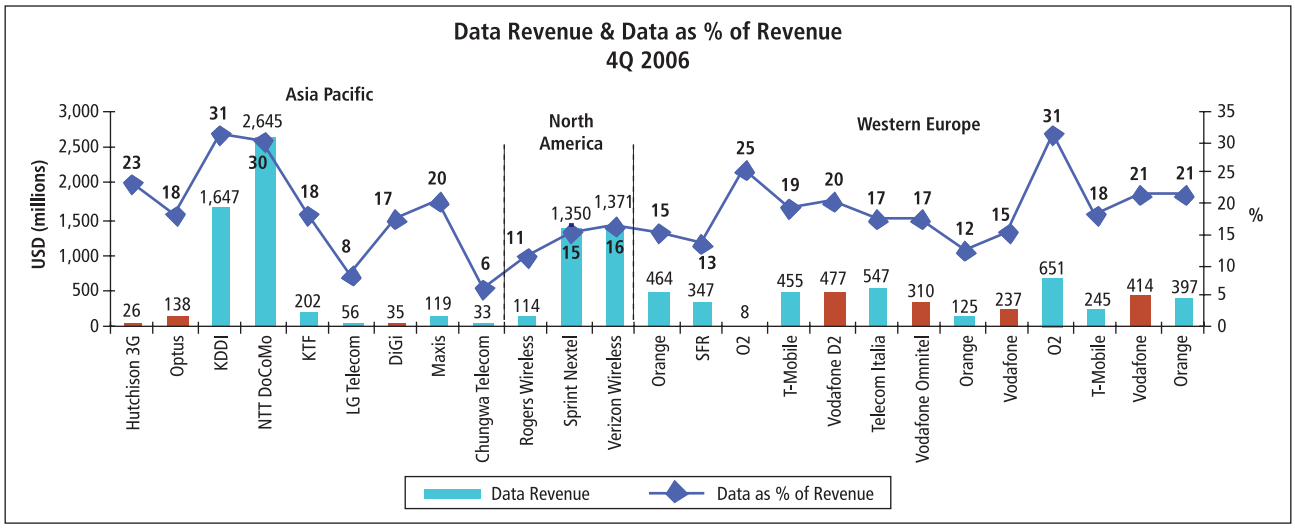


Source: Informa Telecoms & Media

NTT DoCoMo and KDDI achieved data ARPU levels of more than USD17 a month in 2006. In the European region, UK's O2 has 31% revenue from data services and data ARPU was nearly USD14. Overall ARPU levels for other countries are below USD10. Meantime, UK data revenue totaling USD651 million is only about a quarter of that for counterparts in Japan. An example of data services being an important source of revenue is Australia's 3 and Optus dramatic rise in data revenue due to the fact that Hutchison 3 is a 3G operator and Optus has been rolling out a 3G network. Rollout of 3G networks worldwide has impetus to propel data services further. Japan has the most impressive data revenue, at 30% of total revenue; with the highest data ARPU; and the biggest volumes of data revenues totaling more than the USD2 billion level.

Industry analysts reported that operators are continuing to introduce more flat-rate data offers to which customers have reacted positively. In March, Vodafone Group Plc launched a new flat-rate mobile roaming data tariff which is estimated to be similar to average hotel broadband charges (between USD10 to USD20 per day) and applicable when users are roaming on Vodafone's subsidiary networks around Europe.

Mobile Data Revenues for Selected Countries



Note: Brown bar charts indicate 4Q 2005 Source: Informa Telecoms & Media, Company reports

Mobile operators are seeking ways to increase data services revenues, mainly due to price pressure and competition from mobile virtual network operators (MVNOs). Industry experts found that with intense pressure on voice revenues, mobile operators urgently need to find ways of increasing non-voice ARPU.

Despite an abundance of non-voice service initiatives since the introduction of GPRS and more recently 3G, many operators in developed markets are trying to secure significant increase in non-voice ARPU. Faced with an increasingly diverse range of non-voice service choices, mobile operators need to identify and implement those that add most value to their businesses in their respective markets.

World's Top 10 Non-Voice Services

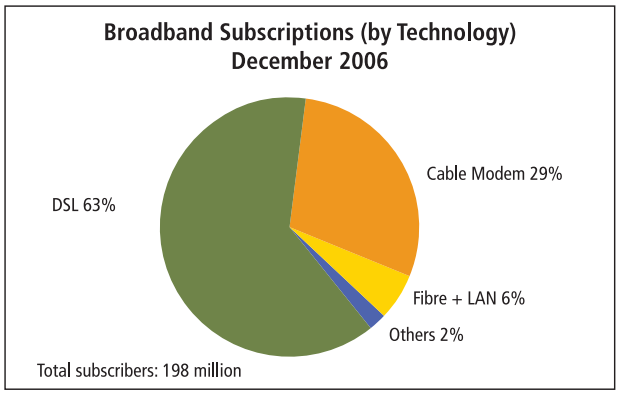
No.	Mobile Operator	Non-voice Service	Country
1.	Vodafone	Casa FASTWEB DSL service	Italy
2.	O2	SMS Service	UK
3.	3	3G mobile TV and video streaming service	UK
4.	T-Mobile	BlackBerry e-mail and IM service	US
5.	Sprint Nextel	CDMA2000 EV-DO Revision A mobile broadband	US
6.	3	DVB-H mobile TV broadcasting service	Italy
7.	KDDI au	EZ Chaku-uta Full music downloading service	Japan
8.	SK Telecom	Cyworld Mobile community portal service	South Korea
9.	NTT DoCoMo	DCMX mobile credit service	Japan
10.	Vodafone	MiniCall 'voice SMS' service	Egypt

Source: "The World's Top 10 Non-Voice Services for Mobile Operators", April 2007, Analysys Research

NARROWBAND TO BROADBAND

ITU standardisation sector defines broadband as a transmission capacity that is faster than primary rate Integrated Services Digital Network (ISDN) at 1.5 or 2.0Mbps. The OECD and international regulators specify the minimum download speed of a broadband connection ranging from 128Kbps to 2Mbps or higher. The definition varies from country to country and is generally accepted as high speed, 'always on' Internet connection. A narrowband is a low-capacity communications circuit or path and usually implies a speed of 56Kbps or less.

With the increasing penetration of established broadband technologies such as DSL service and cable modem, in addition to improvements in fixed wireless broadband and satellite broadband services, the number of broadband subscribers worldwide will double over the next 5 years. In Malaysia, as at first quarter of 2007, Internet dial-up penetration rate per 100 inhabitants is 14% versus broadband at 3.7%.



Source: OECD Note: OECD countries only

Industry analysts expect by the end of 2010, the number of worldwide broadband subscribers will reach 413 million from the 198 million in December 2006. Prospects for the overall broadband sector are developing fast and factors influencing the industry are the potential of the technologies that comprise the broadband market and the operators using them, in addition to sufficient speed, reasonable cost and availability triggering user demand.

Broadband Technologies and Trends

Broadband technologies are opening up avenues for creating new or incremental revenue source through IPTV, VoIP and FMC; improving on traditional voice revenue sources. From the fixed broadband perspective, drivers for network upgrades both at the access level (such as DSL enhancements, VDSL and direct fibre initiatives), and in the core network, including the core IMS allow services to transfer seamlessly across different networks.

Service	Average Speed per Service	Modem	ADSL	HFC	VDSL	PON
Multiple voice lines	100Kb /100Kb	X	X	X	X	X
High Speed Data	100+ / 10Mb+				X	X
Broadcast TV	6Mb / channel			X	X	X
Broadcast Pay TV	6Mb / channel			X	X	X
Video on Demand	6Mb / channel				X	X
Video Conferencing	1.5Mb / 1.5Mb				X	X
HDTV	20Mb / channel				?	X
VPN Connections	10Mb / 10Mb				X	X
Medical imaging	10Mb+				X	X

Source: BuddeComm based in CEOS data, August 2006

Broadband over Powerline (BPL)[6]

Around the world, BPL trials started about five years ago; allowing utility companies as a viable third option to the cable and phone companies providing high-speed data access to the Internet. Nevertheless, there are technical limitations and interference issues. Another key problem in 2007 remains the high equipment costs.

Recently, BPL is gaining renewed interests on a global basis. More than 100 commercial BPL trials were conducted in 40 countries – a third of this in the US, with majority in Europe. In Asia Pacific, the technology is gaining traction with a handful of utility companies launching commercial trials in Australia, China, India, Korea, Japan and Malaysia. Interestingly, IPTV over BPL is cited amongst operators in France Telecom, Belgacom in Belgium. There is keen interest from China Telecom and China Netcom.

Utility firms & local ISPs & Trials	Devices
Aurora Energy and Country Energy & AusNet, TasTel in New South Wales, Tasmania (Australia)	High-speed Internet and telephony services over powerlines via power points in the home, with customers connecting to the service via a BPL modem (200 Mbps) developed by Mitsubishi Electric, Japan, to 1,200 customers.
Reliance Energy in Mumbai and Delhi (India)	Offering broadband Internet access, voice and data services to 5,000 customers, using low-voltage BPL (underground) together with fiber optics. Similar services offered to 200 customers in Delhi trial using mid-voltage and low-voltage (overhead) BPL.

Source: "Home apps drive powerline use", Telecom Asia, 3 May 2007

A key benefit of BPL not available in other technology economically is guaranteed data communication in every power socket in the home. However, the lack of a single standard for the technology will continue to hinder a wider adoption of BPL. Meantime, analysts predict that BPL subscribers in Asia will grow from less than half a million in 2006 to over 1.8 million by 2011.

BPL Advantages	BPL Opportunities	Issues
No new wires	In-home networking	If BPL is to gain momentum, industry players need to address the issue of coexistence and interoperability between different standards
Easy to install and use	Multi Dwelling Unit/Maximum Transmission unit networking	
Every house or business has electric cables	Last mile access (underserved areas)	

Source: "Home apps drive powerline use", Telecom Asia, 3 May 2007

Lower Pricing and Product Packages

Much has changed in the broadband market in the last year. Competition, most acutely illustrated in the UK market, has intensified resulting in lower prices. This is in part due to new-breed operators launching broadband services, e.g., UK, Orange and BSkyB. Such developments point to a trend away from offering single services to packaged products; and a surge in flat-rate charging, particularly for voice, versus "metered" charging.

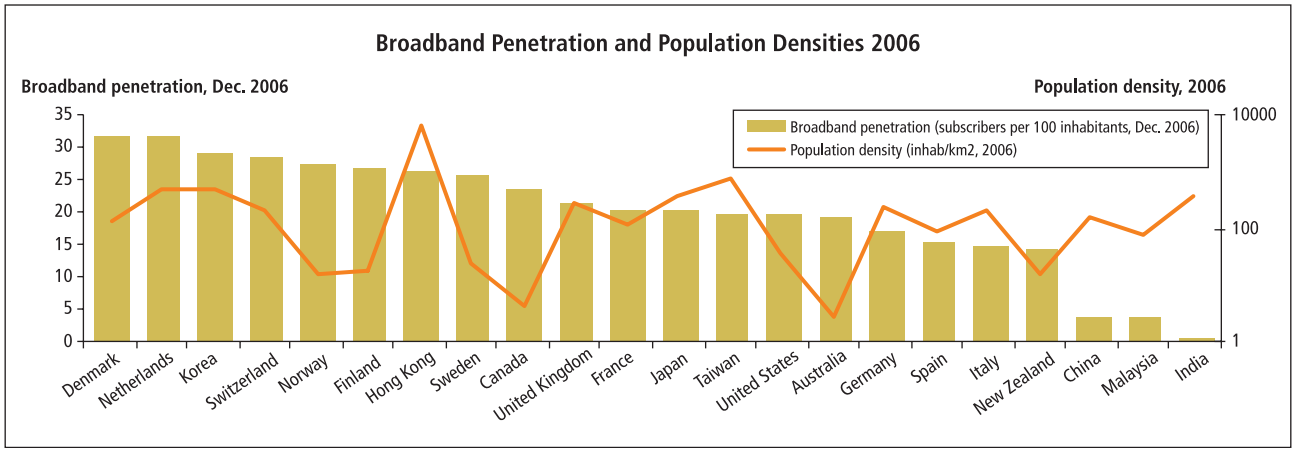
[6]2006 Global Broadband Powerlines, Moving into Home Management, July 2006, BuddeComm

In South Korea, discount rates for packaging services started in March 2007, facilitated by a Ministry of Information and Communication scheme. SK Telecom and KT Corporation announced its packaged services to debut in July 2007. The regulator is set to green light the discount rates, which may vary in the 10% range, as this has positve impact to offer benefits to consumers and spur the telecom business. Packaged services are offered by Hanaro Telecom and AT&T. Hanaro, the runner-up broadband carrier, cut 44% off the basic fee for inner-city calls and for those who order both the outfit's high-speed Internet and fixed-line telephone. Meanwhile, US landline telecom company AT&T offers a 23% discount for subscribers who select a mix of high-speed Internet and voice services.

This has influenced broadband operators to take strategic steps, which includes pricing pressure on voice revenues for both mobile and fixed players; pressure on the pricing of 'basic' broadband services and lower barriers to entry for new mobile and broadband entrants.

Funding Needs and Planning for Future Network

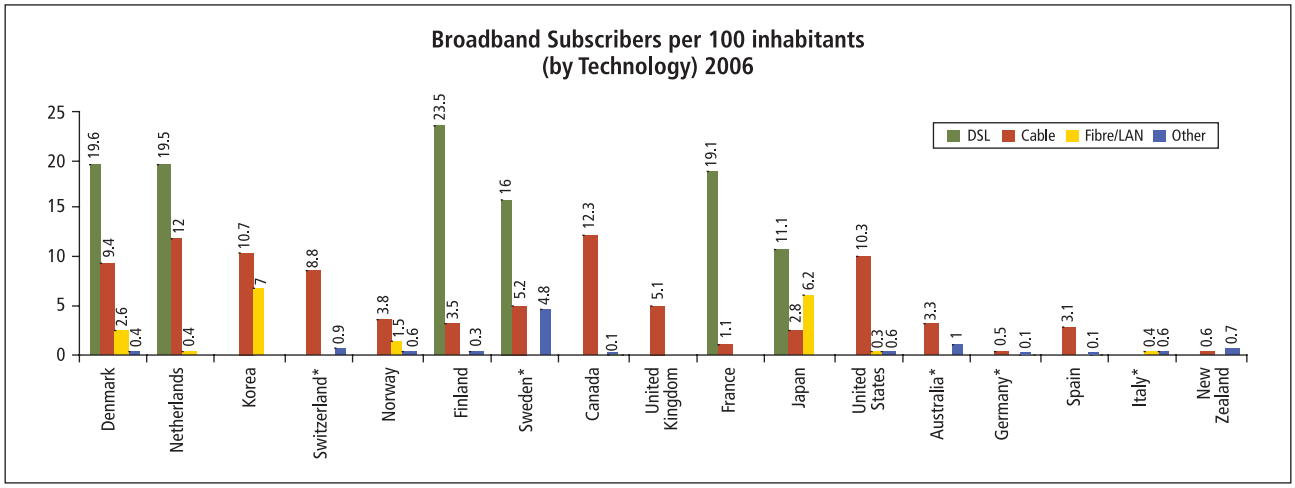
Incumbent operators and their financiers are now required to carefully make very long-term decisions about the kind of network investment they will need in order to develop video services and fend off new competitive threats in their existing markets. Both VDSL2 and FTTP deployments will demand high levels of financial collateral. Incumbent telcos and some alternative operators are investing heavily in a next generation of broadband access suitable for the delivery of digital TV.



Source: OECD, www.economist.com, *2006 CIA World Factbook, SKMM, World Broadband Statistics: Q4 2006, Point Topic*

Broadband Service Take-up: Worldwide Comparatives

European countries sight high broadband penetration rates. In 2006, eight countries (Denmark, Netherlands, Iceland, Korea, Switzerland, Finland, Norway and Sweden) led the Organisation for Economic Co-operation and Development (OECD) in broadband penetration, each with at least 26 subscribers per 100 inhabitants. Denmark and the Netherlands are the first two countries in the OECD to surpass 30 subscribers per 100 inhabitants.

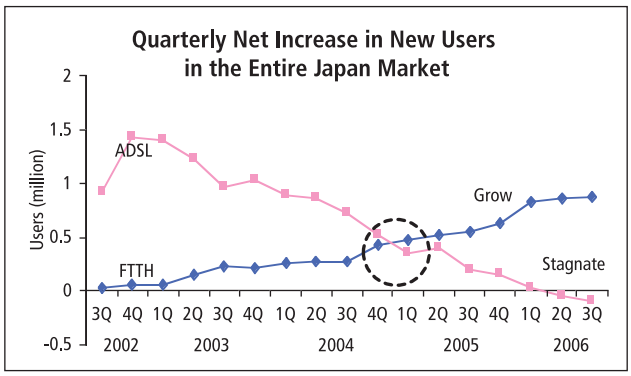


**Data for Switzerland, Sweden, Australia, Germany and Italy are preliminary estimates based on September 2006 data*
Source: OECD

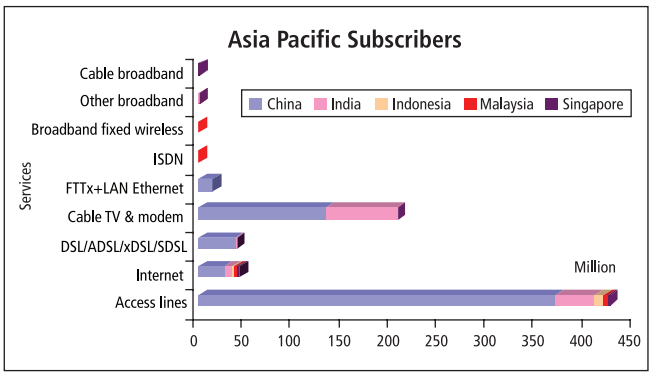
Operators in several countries continue with their upgrades to fibre. Fibre-to-the-home (FTTH) and Fibre-to-the-building (FTTB) subscriptions now comprise nearly 7% of all broadband connections in the OECD and the percentage is growing. Korea and Japan each have more than six fibre-based broadband subscribers per 100 inhabitants. Japan leads the OECD in fibre connections directly to the home with 7.9 million FTTH subscribers in December 2006. Fibre subscribers alone in Japan outnumber total broadband subscribers in 23 of the 30 OECD countries. The total number of ADSL subscriptions continues to fall in Korea and Japan as more users upgrade to fibre-based connections.

DSL continues to be the leading platform in 28 OECD countries. Cable modem subscribers outnumber DSL in Canada and the US. The US has the largest total number of broadband subscribers in the OECD at 58.1 million. US broadband subscribers now represent 29% of all broadband connections in the OECD.

FTTH replace ADSL in Japan



Source: Japan-Malaysia Next Generation IP Network / 3G and Next-Generation Mobile Communications Seminar, 26 June 2007

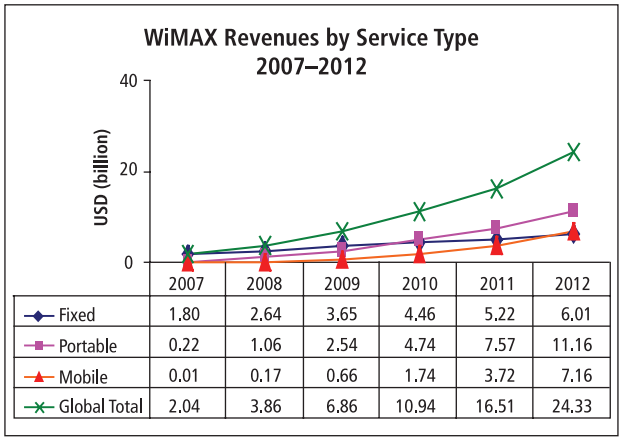


Source: Informa Telecoms & Media

Wireless and Mobile Broadband

Operators are in three separate broadband market space, i.e., traditional fixed broadband (DSL, cable and fibre); wireless or nomadic broadband (Wi-Fi and WiMAX); and mobile broadband delivering high quality TV to mobile devices, via 3.5G protocols such as HSDPA.

Element of WiMAX Revenues	
Type	**Services**
Access charges	Flat rate fees, similar to wired broadband fees, albeit with usage limits; in contrast to the per-megabyte fees charged by some mobile operators
Value-added services	Derived from services aimed at both the consumer and business sector, such as VoIP; e-mail; entertainment (including music, games, interactive TV/VoD and radio); information (including Internet search, news and podcast); and mobile-office/ mobile-work-force products (VPN, intranet access, e-mail and scheduling applications)
Advertising	Expected to start later but promising growth potential



	2007	2008	2009	2010	2011	2012
Fixed	1.80	2.64	3.65	4.46	5.22	6.01
Portable	0.22	1.06	2.54	4.74	7.57	11.16
Mobile	0.01	0.17	0.66	1.74	3.72	7.16
Global Total	2.04	3.86	6.86	10.94	16.51	24.33

Source: Informa Telecoms & Media

Industry analysts foresee the increased take-up of portable and mobile WiMAX services will mean that, starting in 2009, growth in revenues from non-fixed WiMAX services will outstrip growth in revenues from fixed WiMAX services, in which non-fixed revenues will account for almost 80% of total WiMAX service revenues by 2012.

Main Players with Quad Play Products	Voice	Broadband Internet	Video	Wireless mobility
Sprint-Nextel, Comcast, Cox Communications, Time-Warner, Advanced NewHouse	VoIP over broadband Internet by cable service providers	Cable broadband by cable service provider	Broadcast video through cable service provider	Sprint-Nextel's nationwide CDMA and iDEN wireless network
SBC and BellSouth	Fixed-line telephony via existing RBOC infrastructure	xDSL broadband internet via RBOC infrastructure	Announced partnerships through satellite service providers (Dish Network and DirecTV) & investments in new FTTx (Fiber-to-the-premise/curb/node) infrastructure to deliver video broadcast services	Joint ownership of Cingular
France Telecom	Fixed-line telephony via existing infrastructure	xDSL broadband Internet	IPTV through xDSL network	Ownership of Orange the second largest European operator
NTL, a cable operator, acquired Virgin Mobile, a MVNO, to extend its wireless capabilities	VoIP over broadband Internet by cable service provider	Cable broadband by cable service provider	Broadcast video through the cable service provider	MVNO acquisition of Virgin Mobile (GBP920 million)

Source: inCode Telecom Group, Inc.

BT – MANAGEMENT OF GROWTH

The number of fixed-voice calls is no longer the best guide to the success of a telecoms company as BT encourages customers to take up non-voice and subscription-based packages such as broadband and IP VPN. At 31 March 2006, 67% of call revenue in the consumer market was under contract. Traditional revenue sources posted 8% lower revenue in the 2006 financial year (FY 2006). Despite substitution by new wave products, traditional revenue is defended by changes in pricing structure and packages to benefit frequent users and marketing campaigns focusing on key customer service promises.

Financial Data & Business Operations	Revenue (USD billion)	
	2006	2005
BT Retail (Traditional/Fixed Line)	13.17	14.54
Capital expenditure	0.28	0.32
Voice/ISDN connections ('000)	25,709	27,878

Source: Company reports

BT Data and Broadband	Revenue (USD billion)	
	2006	2005
BT Retail (New Wave)	2.53	1.86
Networked IT services	0.67	0.57
Broadband	1.36	0.95
Mobility (BT Fusion)	0.29	0.19
Other	0.22	0.14
Broadband connections ('000)	2,584	1,752

Source: Company reports

In FY 2006, 32% of BT's revenue was from new wave activities – networked IT services, broadband and mobility. In March 2006, BT has 7.9 million lines, including those provided via BT Retail and LLU[7]. In total, 5,501 exchanges were upgraded, making broadband available to 99.7% of UK homes and businesses, delivering speeds of up to 8Mbps. In the highly competitive retail market, BT's market share of consumer and business DSL and LLU broadband connections in the UK is 33% (2.6 million connections).

BT is exploring the feasibility of installing broadband equipment at locations closer to the customer than the BT exchange as well as the possibility of delivering broadband over existing fibre cables. Having conducted trials for broadband speeds of up to 8Mbps in association with a number of service providers, BT launched BT ADSL Max and BT ADSL Max Premium broadband services nationally effective 31 March 2006.

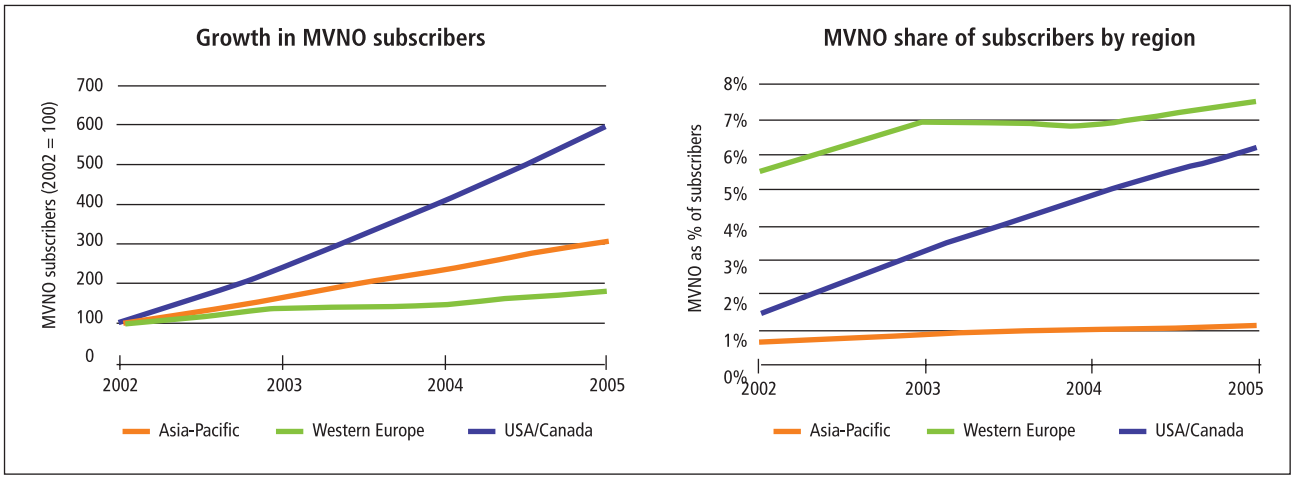
[7] LLU (local loop unbundling) enables other operators to use the lines connecting BT's local exchanges to BT customers, and to install equipment in BT exchanges.

BT Products and Services	No. of Customers/Notes
BT Together Packages – Option 1, 2 and 3 packages with 67% of consumer call revenue under contract by package (2005: 64%).	16.2 million
BT Privacy – Caller display service which enables customers to preview incoming call numbers and filter out unwanted calls.	3.7 million @ 31 Mar-06
BT Text – Text-to-speech service enabling users to send and receive texts on their home landline phones.	268,000 @ 31 Mar-06; 1.2 million messages sent a week
BT Openzone – Leading providers of Wi-Fi services in the UK and Ireland, operating their own network of high-quality sites and offer more wholesale and roaming connections than any other UK Wi-Fi network operator, BT Openzone	Customers have access to 8,400 hotspots in UK and Ireland with more than 30,000 globally.
BT Fusion – World's first intelligent mobile service that switches calls to a BT broadband line when user is at home; offering customers mobile coupled with cost and quality advantages of a fixed-line phone. Includes mobile services, e.g., text and picture messaging. Users can connect PCs, laptops, games consoles, printers & broadband wirelessly via BT Hub along with BT Fusion.	24,000 @ 31 Mar-06; In Feb-06, BT launched a version of BT Fusion for SMEs with a mobile phone but have rates similar to those for fixed lines.
BT Vision – Broadband TV for home entertainment offering on-demand film, music, TV programming and interactive services. Such next-generation TV is possible through combined digital broadcast TV and broadband technology. Microsoft provides the software platform over which BT Vision runs. Philips does set top boxes.	Access to Freeview Digital TV channels as standard, on demand films and TV programmes from 29p to £2.99. Recordings of radio and TV shows with V-Box citing in-built DVR.
BT's twenty-first century network (21CN) programme – An end-to-end next-generation IP network, designed to consolidate BT's complex network & systems infra to deliver services fast & cost effectively. Procurement from Alcatel, Ciena, Cisco, Ericsson, Fujitsu, Huawei, Lucent and Siemens.	Full, national roll out of 21CN will be substantially complete by 2010.
BT Softphone – For broadband customers to use enhanced VoIP service, with secure Internet voice calling, It will also form an integral part of BT's plan to roll out additional multi-media features and services in the future.	For BT Broadband Talk or Pay-as-you-go customer with local, national and broadband talk rates @3p/min.
BT Movio – First mobile operator in Europe to offer digital TV and radio content on a mobile device using broadcast technology.	Access to a package of TV channels & 400 DAB digital radio stations.

Source: Company reports

MVNOs

The MVNO[8] business model has been used since the mid-1990s and remains popular, with now more than 200 MVNOs worldwide. More ventures have followed in Virgin's path (the model's pioneer), with the MVNO model going through a number of iterations. As the MVNO market continues to expand, a new category of players, MVNEs[9], has emerged, i.e. Visage Mobile, Telcordia, mPortal, Versent Mobile and TynTec Limited driving strong MVNO growth. Another factor is MVNOs' successful execution of low-cost business models. However, despite these two factors, Western Europe's market share of MVNOs typically remains less than 10% and industry forecasts MVNOs around the world will have a total of 133 million customers by 2011, roughly 4.5% of the total mobile market.



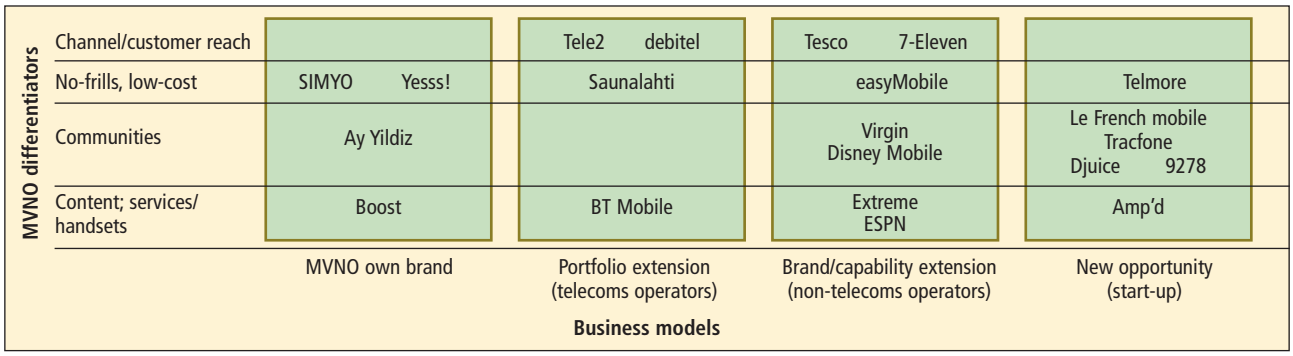
Source: MVNO subscriber development, WCIS, Analysys, 2006 www.analysys.com

[8] "*Mobile Virtual Network Operators: Blessing or Curse? An Economic Evaluation of the MVNO Relationship with Mobile Network Operators*", Christian Dippon and Aniruddha Banarjee, NERA Economic Consulting

[9] Mobile Virtual Network Enabler (MVNE) provides infrastructure and services such as billing and back end network elements to enable MVNO's to offer services and have a relationship with end-user customers

In order to increase market share, MVNOs are turning to a wide range of business models and differentiators. The diagram below shows a trend whereby MVNO is launched by high-profile, content- or community-driven new entrants such as Disney or ESPN. The MNOs on their part have responded to the competitive pressure from MVNOs hosting 'own branded' MVNOs (such as SIMYO, Yesss!, or Ay Yildiz), or buying MVNOs out (for example, TDC buying Telmore, or Elisa buying Saunalahti).

The future success of independent MVNOs depends on their ability to differentiate themselves in a sustainable manner whereby mobile operators in contrast are unattractive or find it difficult to operate in. For MNOs, the key challenge is to assess whether the ability of a particular MVNO to differentiate itself makes it an attractive target, which is either to host or to buy out.

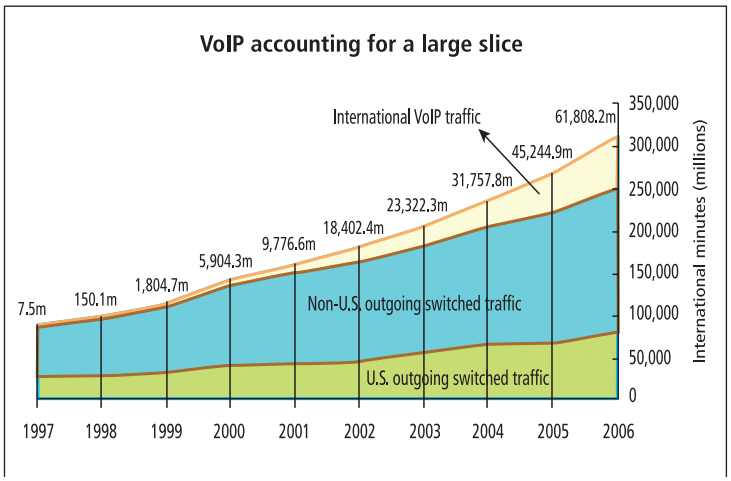


Source: MVNO business models, Analysys, 2006 www.analysys.com

IP ERA

Internet Protocol (IP) has been around for as long as the Internet; since the 1970s. However, today's IP situation sees significant "transgression" of VoIP technology into the telecom mainstream services. In-Stat Research expects wholesale VoIP market to accelerate as retail VoIP expands; in the US, where VoIP is prevalent, consumer VoIP adoption will drive wholesale VoIP revenues to USD3.8 billion by 2010 from USD1.1 billion in 2006. International VoIP traffic grew from less than 10 million minutes in 1997 to 61.8 billion minutes in 2006 (up 37% year-on-year and a 9-year CAGR of 172.3%)

Among the factors[10] driving VoIP wholesale are the higher takeup of VoIP in both business and consumer markets; broadband service providers packaging VoIP as part of data offerings; regulatory liberalisation on use of VoIP services as a substitute for PSTN services; cost efficiencies; growing use in backbone networks, and more NGN rollout.

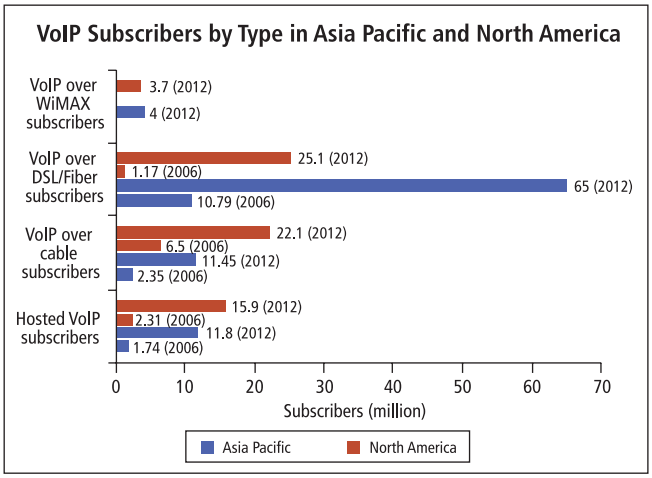


Source: TeleGeography Research

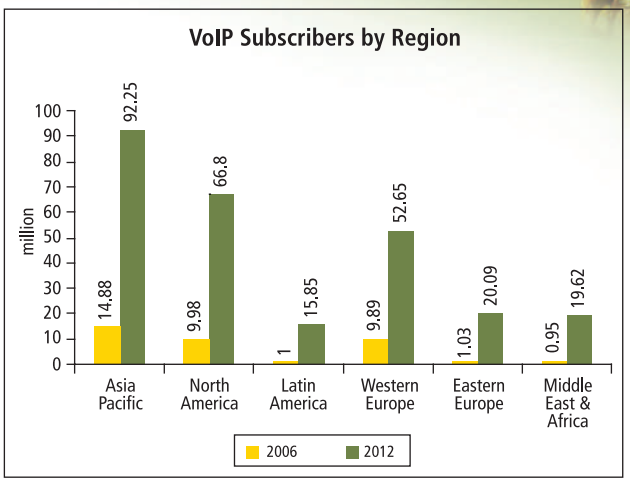
VoIP and Skype substituting Switched Voice		
	2005	2006
Total minutes (billion)/ Growth	272	313 (+15%)
Switched traffic	80.6%	75.8%
VoIP traffic	16.6%	19.8%
Skype traffic	2.8%	4.4%

Source: Telegraphy

[10] Telecom Asia March 2007



Source: ABI Research



Source: ABI Research

Overall, the global telecom landscape[11] is in transition with shifting business models in new competitors and tactics; service packaging and service delivery in Internet time and cost. There is need for new architecture such as any-to-any network and endpoint access; open distributed service access, integration through standardisation; web model for VoIP applications and IP multimedia systems (IMS). SIP base applications are driving a new generation of blended IP applications. Therefore, new business models are expected to have a competitive advantage if there is fast economical application service delivery supports.

Trends in Network Evolution (not Network Revolution)			
Network	Traditional TDM	Transition Hybrid	Next Generation VoIP
Architecture	Centralised Integrated Design	Open & Distributed TDM-IP Migration	Open & Distributed -All IP and IMS
Signaling	SS7, ISDN	SS7-SIP; ISDN-SIP	SIP-SIP
Media	TDM	TDM-IP conversion	IP-IP
Applications	Discrete Applications	SS& services over IP; IP services over TDM; TDM becomes IP-enabled	IMS; SIP services – IM, presence, video, messaging, conferencing, gaming

Source: Cantata Technology in CommunicAsia 2007 presentation on "Creating next generation services from now generation networks"

IPTV

The vendors providing the components of IPTV platforms are aligning themselves ahead of a battle over standards. Although the technical platforms are ready to be rolled out on a commercial scale, incompatibility between different systems could prove to be a barrier to mass market deployment. Nevertheless, IPTV or broadband TV is here to stay as stakeholders prepare to claim or reap their stake in this services going forward.

IPTV Vendors – Industry Opinion

Vendor	IPTV Customers	Strengths	Weaknesses
NDS-Nortel	Auna, Telekom Austria, Numericable	DRM, experience & pay-TV market share	Lack of experience working with telecom operators
Alcatel-Lucent "Imagenio"	Telefonica	Behind one of Europe's earliest IPTV deployment	Little apparent interest outside of Telefonica
Alcatel-Lucent/ Microsoft	BT, Deutsche Telekom, Swisscom, TDC	Good user interface, scalable, many incumbent	Closed system, PC-centric
Erricsson	Vodafone Iceland	Extensive customer base, large-scale experience	Joined comparatively late, few existing deployment
Nokia-Siemens	Belgacom	Hardware, network expertise, many IPTV developments	Little experience of broadcast, apart from IPTV
Thomson	France Telecom, SiOL	Has working, scaled deployments	No end-to-end package
Cisco	Neuf Cegetal	Integrates well with other networks	Provide only parts of the network

Source: Telecom Markets

[11] Cantata Technology in CommunicAsia 2007 presentation on "*Creating next generation services from now generation networks*".

A LONG CONTINUUM IN TELECOMS WORLDWIDE

The global telecommunications market comprises fixed line, wireless, mobile, VoIP and broadband connectivity. The telecoms industry in 2006 has experienced a mix balance of growth, decline and packaged services. The strongest growth has been in developed countries, balancing the decline in fixed line connections with other new services and business models involving broadband networks which enables delivery of the growing use of packaged offerings. Due to rapid technological change and new competitors, incumbent operators in developed countries spot mergers and acquisitions to defend market share and generate new revenue sources.

With mass subscriber base and technology development, the Asia Pacific market is poised to become the next emerging market in telecoms; loaded by the weight of China of course.

Region / Operator	Total Revenue (USD billion)		Annual Change
	4Q05	4Q06	(%)
Asia Pacific			
China Mobile (China)	8.3	10.5	26.5
China Unicom (China)	2.7	2.3	-14.8
KDDI (Japan)	5.4*	5.9*	9.2
NTT DoCoMo (Japan)	8.9*	10.3	15.7
Hutchison Whampoa (Hong Kong)	2.2	2.3	4.5
SingTel Mobile (Singapore)	0.1*	0.7*	600.0
SK Telecom (South Korea)	2.6	3.0	15.4
Telekom Malaysia (Malaysia)	0.5	0.7	40.0
Americas			
Verizon Communictions (US)	8.7	10.1	16.1
Sprint Nextel (US)	8.2	9.0	9.8
AT&T (US)	8.8	9.7*	10.2
America Movil (Latin America)	4.9	6.0*	22.4
Europe			
T-Mobile International (Germany)	9.3	10.9	17.2
KPN (Netherlands)	1.9	2.1	10.5
Orange (France)	7.9	6.8	-13.9
Telenor (Nordic regions)	1.9	2.7	42.1
TeliaSonera (Nordic & Baltic regions)	1.6	1.7	6.2
Vodafone (UK)	12.6	n.a.	n.a.
Telekom Austria (Austria)	0.8	0.9	12.5
Other regions			
Vodacom (Africa)	1.4	n.a.	n.a.
VimpelCom (Russia)	0.9	n.a.	n.a.
Etisalat (UAE)	n.a.	0.7	n.a.
Mobile Telesystems (Russia)	0.9	1.3	44.4
MTC (Kuwait)	0.6	0.2	-66.7
Orascom (Egypt)	0.7	1.0	42.9
Turkcell (Turkey)	1.1	1.2	9.1

**Operating revenues n.a. not available Source: Informa Telecoms & Media*

BLURRING OF TRADITIONAL SECTOR BOUNDARIES

New Services and Revenue Sources

Today, the telecommunications business faces pressure to retain subscribers, higher acquisition costs for subscriber, and innovative ways to maintain or gain market share in a competitive market situation already intense amongst established players and new entrants.

While this threatens the incumbent operators, sources for new services, revenues and creating new business models are within each of the organisations plans. The explosive growth of broadband and wireless technology is revolutionising the way the telecommunications industry conducts business. Key needs for telecoms operators are higher volumes and new services to sustain revenue growth, and

improved cost efficiency to protect margins. The telecoms market is expanding substantially and rapidly in some regions of the world while it is consolidating or moving up the service value chain in other regions.

Overall, growth now depends on new innovations in technology and continuous evolution of business models. Unprecedented growth supported by advancement in IP and data technology, have enabled operators to roll out NGN or IP communication, in which the eventual substantive take off of NGN networks is expected in Asia and in North America following the lead taken by Europe, Japan and Korea. Europe remains amongst most advanced markets, with progressive activities in convergent technology development. The migration towards IP communications and further towards converged intelligent networks is likely to be accompanied by dramatic changes in the industry value chain, with emerging network technologies like IMS – NGN, SIP, and soft-switching. As a result, there is shifting of focus from voice to data services support.

Apart from the innovation of technology for new products and services, many operators are also looking to expand by moving to emerging markets, tempted by the prospect of enhancing operating revenues by increasing subscriber numbers. Vodafone, for example, made huge investment to enter emerging markets such as the relatively small European and Middle East markets. Vodafone's direct strategy is to offset declining voice revenues and slow take-up of data services by increasing subscriber bases.

Selected IMS-related deals in December 2006			
Vendor	**Operator**	**Operator Type**	**Comment**
Ericsson	Cyta, Cyprus	Fixed/mobile convergent	Ericsson is supplying converged IMS-core infrastructure, application servers and service enablers.
Ericsson	Versatel, Germany	Broadband	Ericsson is supplying all-IP next generation access network, with potential to add IMS.
Nokia	MegaFon, Russia	Mobile	Nokia is supplying core-network equipment, including mobile softswitching and IMS subsystem for fixed and mobile, as part of MegaFon's GSM/GPRS/EDGE-network expansion.
Nortel	Verizon Wireless, US	Mobile	Nortel is developing and deploying IMS-based services to expand network to support IP-based services, including base stations, switches and IP platforms.
Nortel	R Cable y Telecomunicaciones, Spain	Cable	R is deploying IMS-ready carrier-hosted VoIP and multimedia system to offer multimedia and advanced IP services, such as telephony, video and IM.
Genband	Xfone USA	–	Genband is supplying IMS-based G6 universal media gateway, with integration by Solunet/Dynavar, to support development of VoIP and VoATM services in US.

Source: Informa Telecoms & Media

THE CALL FOR STANDARDISATION

Interestingly, the necessity for standardisation in the telecommunications sector appears to be led by the operators themselves rather than government. There are various criteria that attracts stakeholders to come together for mutual benefit. As indicated by a study done by OXERA[12] there are social and private incentives to standardise. Social benefits for communications networks, where direct network effects are important, includes the common standard expanding the size of the total network, relative to incompatible networks. In other words, the consumer can derive added value when he or she subscribes to a network and need not fear of making the wrong choice of network that necessitates handset or equipment replacement. Indirectly, standardisation for hardware and software systems can be translated to lower production costs due to economies of scale realised due to the greater market size achieved. Private incentives to standardise may occur where a firm introduces a new product in a market so that it is compatible to existing products to encourage take-up or replacement with minimum disruption. In the case of mobile telephony – GSM, for example, the need to standardise is high. So it is for operating systems, Internet and Free-To-Air digital broadcast.

[12] Oxford Economic Research Associates in a Study on Interoperability, Service Diversity and Business Models in Digital Broadcasting Markets, February 2003

Standards Setting in Three Industries plus Digital Broadcasting					
Criteria	Operating systems	Mobile telephony	Internet	Digital broadcast – Pay	Digital broadcast – *FTA/PSB
Incentive to standardise	High	High	High	Low	High
Interest in standard choice	High	Low	Low	Medium	Low
Standards process	Competition to determine standard	Coordination	Imposition	Private good case – standard may not arise	Coordination
Outcome	Dominant standard	Single standard	Single standard	Co-existence of incompatible technologies	?

**FTA/PSB – Free To Air / Public Service Broadcasting*
Source: OXERA Study on Interoperability, Service Diversity and Business Models in Digital Broadcasting Markets, pg 81, Volume II, Appendices, February 2003; www.oxera.com

Pressures to Standardise in Three Industries plus Digital Broadcasting					
Criteria* Standard:	Operating systems Windows	Mobile telephony GSM	Internet TCP/IP	Broadcasting	
				Pay 'an API'	FTA/PSB 'an API'
Importance of the standard for user-to-user communications (direct network effects)	Medium	Low	Very high	Low	Low
Importance of economies of scale in applications writing (indirect network effects)	Very high	Medium	Medium	Medium	Medium
Importance of centre controlling customer equipment directly (network manageemnt issues)	Low	High	Low	Very high	High
Importance of end-user mobility (geographic)	Low	Very high	Low	Low	Low
Importance of end-user portability	Low	Very high	Low	Low	Medium
Ability to deliver further ecnomies of scale in hardware manufacture (ie, extra economies, associated purely with standardisation)	Low	Very high	Medium	Low	High

Source: OXERA Study on Interoperability, Service Diversity and Business Models in Digital Broadcasting Markets, pg 77, Volume II, Appendices, February 2003; www.oxera.com

OXERA sees standardisation driven by at least one of the identified criteria*. In the cases of operating systems and Internet Protocol (IP), indirect or direct network effects are sufficient to result in a single standard, regardless of the process used to get there. For GSM, objectives of portability and scale economies pressured a single standard outcome.

Pay digital broadcast is still a much debatable area in respect of standardisation; debatable in the sense that the horizon for services like mobile broadcast is just turning bright. So far, each network can cope with issues in an independent way with control exercised over set top box (STB) configuration or until an economic incentive to standardise emerges. In terms of non-subscription broadcast, the issue of attaining economies of scale in STB management and production, and the importance of solving network management issues, i.e., secure and high quality service, are factors to standardisation. Nevertheless, standardisation is dependent on vested interest in choice of standard and ability to coordinate the process.

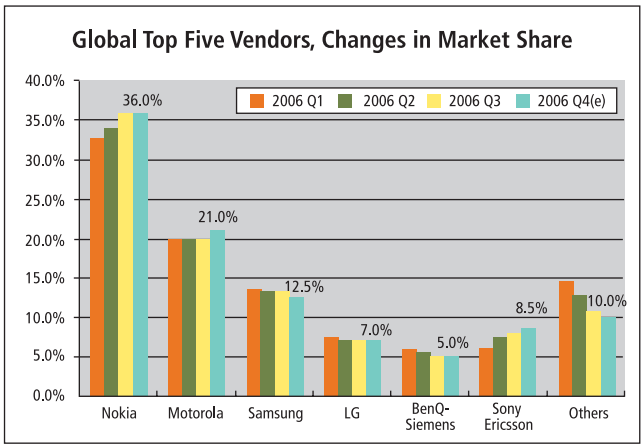
Standardisation in mobile telephony with accompanying economies of scale to reap low cost mass production with an eye to the fast growing markets in China and India is a highly viable strategy. There are many more standards and standardisation activities, alliances and forums around the world today in the arena of communications services going across countries and across traditional industry boundaries. Many more alliances have formed, especially by region and by areas previously not under the telecommunications umbrella such as content or specifically, broadcast content.

HANDSET/DEVICES DEVELOPMENT

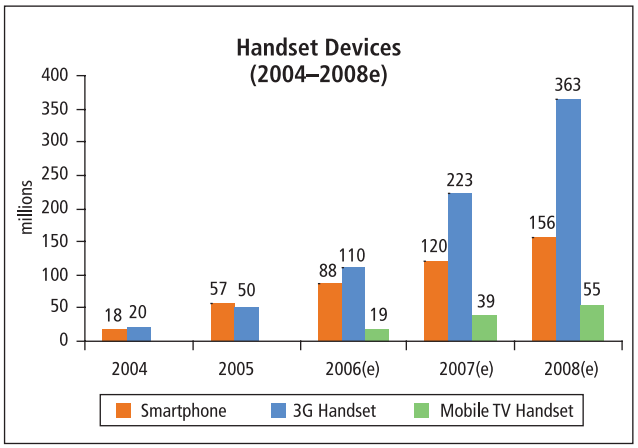
In the first half of 2006, Nokia and Motorola grew their global market shares by concentrating on low cost handsets. In emerging markets, thanks to low cost handsets, new phone demand will be the leading trend. In addition to product mix or portfolio, a well-planned distribution channel is an essential criteria for vendors to succeed and survive in emerging markets such as China, India, South East Asia and South America.

In 2007, ultra low cost handset (ULCH) market continues to be a main focus. Due to replacement demand and market for low-cost handset, there is expected more competition over ASP (Average Selling Price) among vendors in 2007. Smartphones with more compact design, battery and improved technology are forecast to lead replacement demand in high-end handsets. Therefore, global vendors are said to be in a hurry to add smartphones into their portfolios. As smartphone markets grow further in 2007 with the expansion of 3G services, this is expected to have positive impact on data services, e.g., e-mail, mobile video and Push-To-Talk (PTT). In June 2007, Apple unveiled its iPhone that combines iPod, cellular phone and Internet access functions and runs a version of OS X. Under an exclusive multi-year deal, the iPhone will be available in US, Europe in 2007 and Asia in 2008.

Among the Global Top Five vendors, Nokia is expected to strengthen its position in the market by increasing slimphones in their portfolio. Following Nokia's strategies, Sony Ericsson is cited to be a strong player in 2007. LG is expected to be active in the GSM market, while Motorola will concentrate on reducing costs and its RAZR Series. Samsung is to focus on Ultra Series. Observing the progress of these strategies will be an important point in estimating the overall performance of the Global Top Five vendors during 2007.



Source: ROA Group (Reference: SA, Piper Jaffray, 2006. 11)



Source: Deutsche Bank Research, ROA Group

TOP FIVE HANDSET VENDORS – SELECTED REGIONS Q107 Market Share (%)

US Handset Market	US Market Share (%)	Asia-Pacific Handset Market	Asia-Pacific Market Share (%)	Western Europe Handset Market	Western Europe Market Share
Motorola	35	Nokia	45.8	Nokia	36
Samsung	17	Sharp	12.5	Motorola	17
LG	15	Fujitsu	9.5	Samsung	16
Nokia	10	Motorola	8.7	Sony Ericsson	6
Sanyo	4	Other	23.5	LG	3

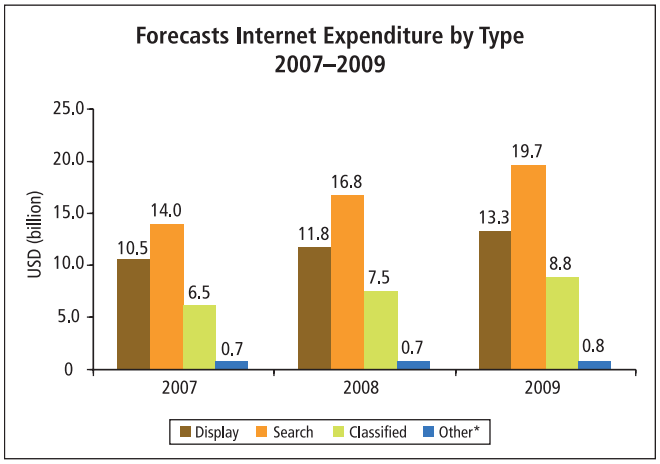
Source: The NDP Group, IDC, Canalsys

BROADCAST/MOBILE ADEX

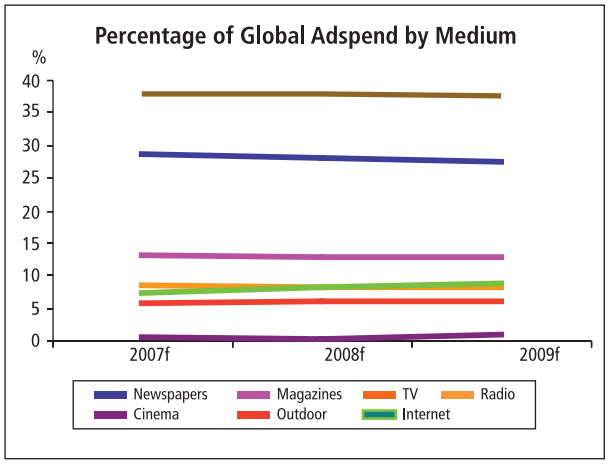
Adex in the broadcast and now the telecoms sector is inseparable. Opportunities for advertisers are plenty as mobile services join the "digital video communications" industry. Sharing this market as well are the broadcasters, content providers, service platform operators, Internet companies and device manufacturers.

Mobile TV is seen as a potential outlet for mobile advertising, amidst more sophisticated mobile handsets, offering more ad delivery avenues from SMS and MMS to WAP, streaming media and mobile video. Many major international operators have entered the mobile advertising field, and service providers sight an increase interest from both advertisers and venture capitalists. Experts' view the response rate to mobile advertising can be high versus other media due to flexibility of the medium and users' 24-hour link to mobile phones. Ease of providing 'rewards' for watching mobile advertising, e.g., US Virgin Mobile reward of free minutes for responding to an ad promises new business models.

Another platform prospecting high revenues for advertisers is online advertisements through the Web. Merrill Lynch predicts global online ad spend will reach USD14.5 billion in 2007 – up 24% from 2006; and Asia will be the driving engine. High growth rates for 2007 are to be from China (50%), Australia (42.6%), South Korea (30.5%) and Japan (30%).



*e-mail and mobile advertising
Source: Zenith Optimedia



Source: Zenith Optimedia

THE LURE OF CONSUMER EXPECTATIONS

Content Is King

As the media landscape changes and no matter which platform we use, which devices or technology, the key driver for telecommunications growth still boils down to consumers. However, consumers, being brand-biased would only react to new media outlets if they get sufficient personalisation. As such, content is the ultimate driver for consumer who would pay for speed, efficiency and personalisation. However, issues such as the complexity of rights associated with content and the way they are currently licensed today threatens to hold back the development of new content markets. Different segments are affected in different ways and there are differences from country to country. Mobile TV for example, have not only provided new experiences for operators but also identified key new directions such as collaborations for shared mobile TV broadcast infrastructure.

Industry experts view that interoperability of TV content across service boundaries could be challenged by the complexity of rules and regulation and could hinder mobile TV roaming. As the digital content business is developing, content protection and service protection play a key role in the development and growth of digital content for mobile and multimedia platforms.

Consumer Is King

Today, consumer can own a number of digital devices and has access to a variety of channels. They are no longer satisfied with having consumption of a particular type of media limited to a specific device or channel. Instead, they increasingly expect access to all types of content such as web pages, games, music and video files, from a single device. Telecoms companies nowadays, especially the mobile sector are looking at ways to strengthen their brand, reduce customer churn, attract new customers and increase revenues by offering premium content and services, such as ringtones, video downloads and mobile TV. Meantime, cable and broadband providers are also heading the same way, looking towards triple-play or quadruple-play packages.

Quad Play Market Trends Multi-play offerings are taking off, driven by ISPs, Altnets and Cable
• Triple Play + dual-mode WiFi (Free in France)
• Triple Play + dual-mode WiFi + Mobile (Neuf in France)
• Triple Play + Mobile (Tele2, Telewest/Virgin, Telenet in Europe)
In the US, Comcast and Time Warner Cable have announced mobile services through Sprint's network
Dual-mode WiFi/cellular services are being launched across the world and are bundled with triple play offerings: Orange France, T-Mobile US, Hello, BT, Free, Neuf, Arcor, SingTel, TM

Source: "Creating Service Value with Quad Play", Comverse, CommunicAsia 2007 Summit

It is vital to identify consumer demands and trends in order to market personalised content experience. For this to truly happen, barriers between content delivery channels need to be broken down. Content can then be targeted to each individual user based on their usage behaviour, which in turn can generate other revenue opportunities.

Convergence

Fixed mobile services have been around the telecoms industry for quite some time now but it has not really captured the audience needs. Operators are finding it difficult as yet to deliver the combination elements of fixed and mobile network services completely and seamlessly to suit consumers deserved services and are looking for ways to integrate next generation network products, IP technologies (including IMS) to support efficient, high-value services and capture greater market share.

Operator	Service	Description
Vodafone, Germany	"At Home"	Provides fixed network alternatives at preferential tariffs.
O2, Germany	Genion	A service cleverly designed to promote EMS by providing customers with convenience of mobile, but landline prices in their "homezone".

Source: CeBIT trade show, Hanover; FMC-Strategies for Success, Accenture Global Convergence Forum 2006

FMC: For attractive proposition
It has to work and be easily understandable and at a a reasonable price
Availability of high-speed access to key applications
Has to meet two immediate customer needs: simplicity and cheap prices

Source: Fixed Mobile Convergence-Strategies for Success, Accenture Global Convergence Forum 2006

Commercial Convergence	Device Convergence	Services Convergence
Involves the bundling of fixed and mobile subscriptions with linked or unified billing	Integrates various access types into one device, typically WLAN 802.11 b/g and GPRS or 3G. Also the user is given one number for several handsets and one simple, personalized application set	Offers subscribers the same services regardless of whether they are using the fixed or mobile connection, through a single device that can make voice or data calls or both.

Source: Fixed Mobile Convergence-Strategies for Success, Accenture Global Convergence Forum 2006 Breakout Session

Different service combinations effectively target different user needs
• Broadband access + fixed IP telephony
• Broadband access + fixed IP telephony + IPTV
• Mobile + broadband access + fixed IP telephony +IPTV
• Etc.

Source: "Creating Service Value with Quad Play", Comverse, CommunicAsia 2007 Summit

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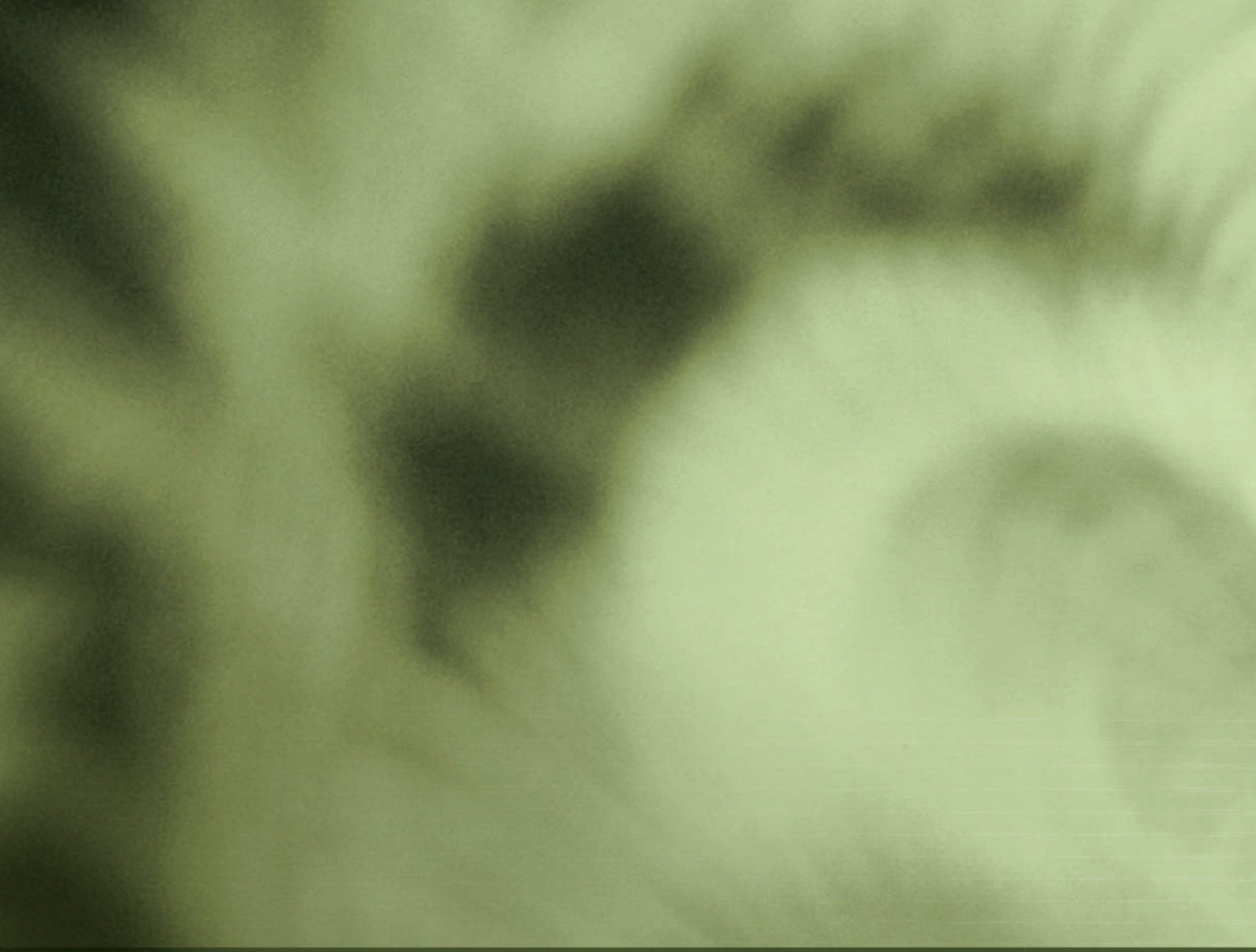

ISSN 1985 - 0522

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