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GLOBAL WATCH MISSION REPORT

Exploiting the broadband opportunity: lessons from South Korea and Japan

DECEMBER 2005

Global Watch Missions

DTI Global Watch Missions enable small groups of UK experts to visit leading overseas technology organisations to learn vital lessons about innovation and its implementation of benefit to entire industries and individual organisations.

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Exploiting the broadband opportunity:

lessons from South Korea and Japan

REPORT OF A DTI GLOBAL WATCH MISSION

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FOREWORD

Korea and Japan are leading the world in the deployment of next-generation fixed and wireless broadband services. In 2002, a DTI Global Watch Mission visited Korea to understand how it had come to lead the world in broadband deployment. This 2005 mission provided an opportunity to follow up on that research and understand the impact that widespread deployment and take-up of advanced broadband services is having on the market for content, applications and services in Korea and Japan.

Given the very wide nature of the subject matter, this report is necessarily broad in scope, but not exhaustive in detail. It touches on many markets and technologies that would be worthy of much greater study. The team believes there is potential for further missions to look at IPTV, Mobile TV, and areas such as e-Health and e-Learning, where there is a rich vein of experience that the UK could tap into.

Instead, the aim of this report is to give a snapshot of two countries at the end of 2005 that are at the vanguard of digital convergence. During the mission the team met a cross-section of players from across the value chain in both markets. However, there were many other relevant and interesting companies and organisations that the team could have visited, had time allowed. As a result it should be stressed that the observations and conclusions drawn here are based on impressions gathered through a series of selective meetings over seven days, and do not claim to be a comprehensive market analysis.

Given the above necessary 'health warnings', the team hopes that this report will provide a valuable resource to UK companies developing content, applications and services for both the broadband market and seeking to learn from or collaborate with Korean and Japanese companies.

The team also hopes that the results of this mission will be used to inform the debate about the development of the next generation broadband market in the UK and will be of particular relevance to UK and EU reviews of the Communications Market.

There are many economic, social, cultural and geographic differences between Japan and Korea and the United Kingdom, which can make it tempting to dismiss these countries as simply too different and therefore irrelevant to the UK. However, to do so would be a mistake. The early deployment of new infrastructure, devices, applications and services in these markets means that there is much to learn from both countries. The team does not argue that it is possible or appropriate to 'lift and shift' policy approaches and business models from Korea and Japan to the UK. But it does believe that it is possible to discern trends and issues that are likely to be significant for the UK market.

The team would like to express its sincere thanks to all of the companies and organisations visited during the mission for their warm welcome and the work they put into the many excellent presentations. The team would also like to thank the staff of the British Embassies in Seoul and Tokyo for their assistance and support. Finally, special acknowledgment should go to Phillip White, DTI International Technology Promoter, Japan, who provided invaluable knowledge and expertise to the mission.

EXECUTIVE SUMMARY

With their high population densities and ethnic homogeneity, Korea and Japan have been able to take advantage of economies of scale to encourage rapid take up of broadband and broadband-enabled services.

The unique cultures of Korea and Japan have also shaped the demand for rich content. However, while these factors make these markets distinct from the UK, many of the lessons learnt from the mission usefully inform the UK, which faces a number of the same challenges and experiences as broadband-enabled technologies drive convergence.

Focused ICT policies drive progress towards convergence

Korea and Japan have long prioritised top-down ICT strategic planning, and the latest embodiments of these strategies see both countries aiming to move beyond 'e' to 'u' and a Ubiquitous Networked Society where people and 'things' can be connected anytime, anywhere, any way. Despite their centralised nature, however, both strategies focus on the user experience.

These policies are having a direct impact on both market places. Korea's explicit aim is to develop an ICT test-bed from which to create export opportunities, and its ICT 8-3-9 Strategy makes clear the intention to excel in all areas of technology. In order for this strategy to succeed, Korea recognises the need for a virtuous circle, where early investment in new technologies drives content demand, which in turn creates new revenue streams to fund new technologies. It was widely accepted that this approach is enabling growth and investment in the market.

While the U-Japan strategy looks beyond pure export ambitions towards ICT solutions for the wider socio-economic problems facing the country, such is the wide-scale adoption of the policy that the impact it has on the market is comparable to Korea.

Both countries' focus on ICT policies mean that governments and regulators are happier to intervene in the market place in order to achieve the desired outcomes than is usual in the UK. For example, both countries acknowledge and are relaxed about the fact that the long term investment needed to create the necessary infrastructure may lead to vertical integration, and fewer players.

However, while these policies are certainly stimulating markets (which as a result are marginally more advanced than in the UK), hesitation and uncertainty about how to deal with the convergence that this development has brought about is hampering faster progress.

Ambitious network solutions are being developed to deliver policy aims

Deployment of wired and wireless next generation technologies are vital to the achievement of both countries' ICT strategic objectives, and so operators have been encouraged to invest by suppliers, regulators and government despite apparently weak business cases to do so. This means that both Korea and Japan have increasingly advanced networks and high ambitions (in Korea 20 Mbps to all homes by 2006 and 50-100 Mbps by 2010, and in Japan 30 million FTTH connections by 2010).

Both aim to have NGNs that are future proof, independent of current IP architecture and better able to respond to technological advances.

At the access level a proliferation of technologies is emerging, although it is acknowledged that wireless will play an increasingly important role alongside fibre and other new technologies such as digital multimedia broadcasting, sensor networks and RFID.

Broadband is driving growth in the market for innovative rich content

While not as advanced as some in the UK may speculate, broadband is undoubtedly enabling noticeable growth in otherwise flat content, services and applications markets in both Korea and Japan. The established growth areas are similar to those in the UK: music, games and video-based services. Revenue is already significant, but online still represents only a small percentage of total markets in each genre, and so there is plenty of room for further growth.

Personalised and interactive community sites are also becoming increasingly embedded in Korean and Japanese lives. While this development is having an interesting effect on social interaction and information sharing, it is also proving to be rich ground for business. Companies have taken advantage of the strong appeal of these sites to generate income through micro-payments, and by extracting value from user-generated content, in addition to more traditional advertising, subscription and pay-as-you-go models.

Experience in Korea and Japan confirmed what is already known in the UK, that growth in these markets depends on workable and secure payment systems (especially micro-payments), as well secure identity and authentication, and well-functioning DRM, rights and licensing frameworks. Without these components neither consumers nor rights holders will engage in the market.

Next Generation Networks are leading to disruptive convergence

Prompted by advanced networks, fierce competition and political encouragement, intense repositioning is taking place across the whole broadband value chain as players attempt to defend existing revenue streams and open up new ones, even if those new business models are as yet unproven.

In general, movements can be observed as being away from households towards individuals; from in-home to out-of-home consumption; and from mass to personal consumption. Fixed and wireless services are converging and new product developments, as well as partnerships, mergers and acquisitions were evidently taking place along these lines.

Convergence is a hot topic in the telecommunications and broadcasting markets in particular, as new TV-like services emerge over platforms such as IPTV, VOD and Mobile TV. The imminent arrival of these services means that non-traditional broadcast companies are rapidly acquiring content through partnerships or buyouts, and existing broadcasters are seeking to innovate with their existing content and skills-base.

However, uncertainty surrounding the regulation of these TV-like services is slowing down deployment, meaning that they are not as advanced as other content genres, and that consumer demand is difficult to assess.

Mission conclusions

The overall impression gained from the mission was one of two countries that have taken the decision to invest heavily both publicly and privately in a sector that, for a variety of reasons, is seen as vital to the future economic and social health of their nations.

To date, this investment is reaping encouraging rewards and there is nothing to suggest that once regulatory barriers are overcome and new business models for emerging services are established, growth and innovation will not continue.

Indeed, both countries may well be approaching the convergence tipping point that will propel them rapidly towards what they have termed the 'Ubiquitous Networked Society', but others may simply call the future.

However, success to the scale of the investment currently being made is by no means guaranteed and so two key questions remain: can the same advances be made with less investment or are the negative consequences of not having a highly advanced ICT-enabled society in an ever more competitive global market place too great to risk not taking a leap of faith?

1 INTRODUCTION

1.1 Objectives of the mission

Korea and Japan are leading the world in the deployment of next-generation fixed and wireless broadband services. The deployment of high-capacity connectivity has the potential to enable considerable innovation and growth in the markets for content applications and services. The aim of this DTI Global Watch Mission was to understand what impact the deployment of next generation broadband services in Korea and Japan has had on the content sector, to assess whether these countries are exploiting their advanced broadband infrastructures to competitive advantage, and to identify opportunities that could assist the UK broadband industry.

In particular the mission sought to:

- Understand the underlying business models and technology choices that are enabling the deployment of these new content, services and applications
- Identify the leading growth areas in terms of new media, content, applications and services
- Understand the current commercial and regulatory drivers and barriers affecting these markets

Specifically, the mission addressed the following questions:

- Whether new innovative digital content applications and services are being developed in these countries as a result of the investment that has been made in infrastructure
- The nature of these new services and the factors determining their adoption by consumers and businesses
- The commercial, regulatory and technical enablers and barriers that are supporting or inhibiting the development of these new products and services
- Whether new business models are emerging in response to the development of new markets
- The potential size and scale of the markets for these services and their significance for the wider economy

As the regulatory and commercial debate develops in the UK about the need and business case to support investment in next generation core and access networks, it is critical that the UK has a well-informed view about the new content, media, applications and services that will be necessary to drive future revenues across the broadband value chain. These will be the new growth engines of the converged communications market and a major market opportunity for UK companies (both large and small).

Mission team

Korea and Japan

Antony Walker	Director Intellect and CEO Broadband Stakeholder Group
Mike Short	Vice-President Research and Development, O2 *Chairman Mobile Data Association*
William Jones	CEO Global Village Ltd

Japan only

Stella Creasey	Head of Audience Research BBC New Media BBC *(at time of mission)*
Professor Rahim Tafazolli	Head of Mobile Communications Research, Centre for Communication Systems Research, University of Surrey
Philip Graf[1]	Chairman, Broadband Stakeholder Group *(at time of mission)*

1.2 Key players and companies visited

Korea

- **Hanaro Telecom**, along with KT, is one of the major providers of high-speed internet access, local telephony, multimedia, data and internet data centre services in Korea

- **Ovum Korea** specialises in providing commercial, strategic and regulatory advice to all the players in the ICT and convergent sectors such as operators, broadcasters, vendors, research institutes, regulatory bodies and government agencies

- **The Ministry of Information and Communication (MIC)** is the government department responsible for developing policies that promote and spread the widespread benefits of ICT to the Korean people. It also aims to transform Korea into an ICT hub that is a test-bed for cutting-edge ICT products and a focal point of high-tech R&D activities

- **SK Telecom** is the leading provider of mobile services in Korea, with around 50 per cent market share in 2005. It has been pioneering the use of 3G technology and content, and also owns the highly popular Melon and Cyworld services

- **Korea Telecom (KT)** is Korea's largest telecommunications company. Originally set up in accordance with the Ministry of Communications, it has since been wholly privatised. It was a late entrant into the internet market in 1999, but quickly grew to be the leading player with 52 per cent of the market

- **Nexon** is a pioneer in the online gaming sector. It was established in 1994 and launched its first game in 1996. It operates in several online games segments

- **KISDI (Korean Information Strategy Development Institute)** is a government-funded think-tank and research agency that has played a key role in strengthening Korea's position as an IT powerhouse by providing visions and strategies for the digital world

Japan

- **The Ministry of Internal Affairs and Communications (MIC)** is responsible for creating the fundamental national systems of Japan. Within this department the Information and Communications Policy Bureau and the Telecommunications Bureau govern ICT and telecoms policy. The former works towards 'building a new, Japan-inspired IT society', while the latter works to provide and further upgrade the information and communications infrastructure

- **The Digital Content Association of Japan (DCAJ)** is the result of the merger of two associations – the Multimedia Content Association of Japan and the High-tech Visual Promotion Center – in 1991. Its aim is to promote the production,

1 Since participating on the mission Philip Graf was appointed Deputy Chairman of Ofcom and it should be noted that the observations and conclusions of this report do not represent the official position of Ofcom.

distribution and use of high-quality digital content that will lead the computer networking of society

- **The Ministry of Economy, Trade and Industry (METI)** is the government department for creating competitive industries, deploying external economic policies in East Asia and beyond, promoting energy and environmental policies, revitalising SMEs and regional economies, as well as providing industry and economic statistics

- **Softbank BB** is the largest company of the Softbank Group and provides ISP services and ASDL line products. Its strategy is to move gradually from an infrastructure business, through a portal business, into a content business. It also owns Yahoo! Japan, Japan's leading portal and will be launching an IPTV service, TVBank, in 2006

- **NHK (Japan Broadcasting Corporation)** is Japan's incumbent public service broadcaster. It is financed by a household licence fee, and operates five television channels and three radio services

- **KDDI** is a fixed and mobile operator. It has 30 per cent of mobile phone subscribers and is the largest 3G mobile provider in Japan with 19.5 million subscribers and over 50 per cent market share. It is also a 'quadruple-play' company. It has launched flat-rate broadband mobile access plans to promote the use of rich content services over 3G mobile, which has been the main driver of its net growth share increase over the competition

- **Livedoor** is the largest free ISP in Japan and runs a highly popular web portal and numerous other businesses

- **NTT** is the incumbent telecoms operator. It was split into three companies – NTT East, NTT West and NTT Docomo – in 1998. It has set a target to achieve 30 million FTTH subscribers by 2010

- **Nippon TV (NTV)** is the oldest private broadcaster in Japan. It has recently launched an IPTV service called NTV2

- **WAO Creative College** is part of WAO Corporation, which develops unique services and programmes in the education and entertainment business fields. The company has established various schools across Japan providing courses for children and high-school students, as well as a programme for adults to become digital creators

- **Dentsu** is one of the largest advertising conglomerates in the world, and the number one ad firm in Japan. Its numerous agencies operate in 27 countries and provide creative services for more than 6,000 clients. Dentsu also offers a host of other services, including public relations, media and event planning, and market research

- **Sony** is a global consumer electronics, financial services and entertainment corporation and one of the largest corporations in the world. It is currently developing a number of products that will have an impact on the broadband-enabled market

- **Bandai/Namco** was formed by the merger of the two companies in 2005. The Namco Division of the resulting global entertainment group is involved in three markets: home games, web and mobile games, and arcade games. As revenues from PC games decline and online games grow, Namco believes that gaming and mobile music are the only profitable content markets

1.3 Background to Korea and Japan

Japan and Korea are very different countries with rich and distinct traditions and cultures. However, like Europe, their histories throughout the 20th century have been intertwined by war, reconstruction, reconciliation and cooperation and today they represent two of the leading powerhouses of the 21st century global knowledge economy. Although there are many economic, social, cultural, and geographic differences between Japan and Korea and the UK (as described below), this does not mean that their experience should be disregarded, as there is much that the UK can learn from these two countries that are at the vanguard of convergence.

Although Japan is much larger than Korea in terms of land mass, population and economy, both countries share several characteristics that have enabled them to become world leaders in the deployment and exploitation of new communications technologies. For this reason, this report will address both markets together, and focus on the common themes of: innovation, take-up, enablers, inhibitors, business models, and value and benefits.

1.3.1 Population and geography

Both countries are mountainous (over 70 per cent) with their populations concentrated in large densely-populated urban conurbations – in Japan more than 50 per cent of the population lives on two per cent of land. Korea has a population of 48 million, is 80 per cent urbanised and has a population density of 491 people per km^2. Japan is significantly larger with 127 million people, is 66 per cent urbanised and has a population density of 337 per km^2. (By comparison, there are 243 people per km^2 in the UK, ie Korea has double the population density of the UK.)

Exhibit 1.1 *Approximately 50 per cent of Koreans live in large apartment blocks*

There are 15.4 million households in Korea and 48 million in Japan.

These high population densities and the tendency towards apartment living have been important enabling factors in the early deployment of new fixed and wireless communications infrastructures in both countries (see chapter 3), as they significantly reduce the roll out costs for new access infrastructure.

1.3.2 Culture and consumers

The culture and consumer behaviour of a country has an enormous effect on the way that broadband-enabled content, applications and services are adopted. While the cultures of Korea and Japan are very different from each other, both have played a central role in the way the countries use broadband.

Both countries are ethnically and linguistically homogeneous (99 per cent plus) and are strongly influenced by Confucian ethics, which prescribe duties and obligations upon individuals within society and tend to shape social and professional relationships and business culture (see below).

Consumerism is strong in both societies and Koreans and Japanese are eager adopters of new technology, with new 'features' appealing as much as 'benefits', particularly to the

young. Korean and Japanese consumers tend to be well-informed and demanding, choosing technology for its innovative quality, functionality, look, design, and value for money.

Cultural and linguistic homogeneity also translates into strong demand for indigenous content, services and applications. Koreans especially are very social, like to congregate in groups and share a sense of social identity, which they like to express. As a result there is particularly strong demand for local Korean content – music, television, film and proportionally less interest in international content. This is also reflected in internet traffic data: most P2P data traffic is domestic, whilst web surfing is more international. Online community services such as Cyworld (see page 35) have also seen strong demand and rapid growth.

Total	4.4%
Fixed telephony	1.4 (-4.3% annual growth)
Mobile telephony	2% (9% annual growth)
Television	0.63% (1.3% annual growth)
Internet	0.4% (30% annual growth)

Exhibit 1.2 *Expenditure on communications services as a percentage of disposable household income, Japan 2004*[2]

The Japanese content market tends to be more international than in Korea. Only three of the top ten movies in 2005 were Japanese, and only two of the top ten DVDs were Japanese. Japanese consumers are showing an increasing interest in Korean content and operators are now buying rights to Korean content to meet that demand.

In both countries, new media consumption is displacing the consumption of traditional media and high levels of digital literacy have done much to fuel this move. Both societies place a very strong value on education – 96 per cent of Japanese high school graduates attend a university, junior college, trade school, or other post-secondary institution. In Korea the government has invested in major digital literacy programmes targeted at older age groups, which have seen very high levels of take-up. Korean families have also been quick to harness technology to improve educational opportunity for their children, with the internet being used by 29 per cent of users for educational purposes (compared to information searches: 94 per cent; games/entertainment: 91per cent; e-mail/chatting: 90.4 per cent; shopping/reservation: 44 per cent[3])

1.3.3 Economy and business culture

Korea

The Republic of Korea is a developed, stable, democratic republic, which has achieved an impressive record of growth and integration into the high-tech modern global economy, and is the tenth largest economy in the world. For a small country with limited resources, this is a considerable achievement, particularly given that South Korea had one of the lowest levels of GDP in the world in the aftermath of Korean War.

Success since the late 1950s has been achieved through a carefully focused export-led development strategy, a system of close government-business ties, including directed credit, import restrictions, sponsorship of specific industries, and a strong labour effort.

However, the Asian financial crisis of 1997 exposed some longstanding weaknesses in Korea's development model, including high debt/equity ratios, massive foreign borrowing, and an undisciplined financial sector.

2 MIC Ministry of Internal Affairs and Communications, Japan

3 MIC Ministry of Information and Communications, Korea

The crisis forced considerable changes in the corporate landscape. The long-dominant position of the chaebol (government-assisted, family-controlled conglomerates such as Hyundai, Samsung and Daewoo) has been challenged and by 2003 only four of the 18 largest chaebol remained. Their influence continues, however, and there remains a strong tradition of centralised planning and close coordination between business and government. It is worth noting, for example, that the current Minister for Information and Communications was formerly a senior executive in the ICT sector.

Following the 1997 financial crisis the Korean government set a clear policy for Korea to become the world's IT powerhouse and 20 per cent of GDP now comes from the ICT industry. Government policy seeks to balance encouraging competition with the need to enable long-term investment early in the life cycle of new technologies. Today Korea's solid economy is characterised by moderate inflation, low unemployment, an export surplus, and fairly equal distribution of income.

GDP $925 billion (£535 billion)
GDP pc $19,200 (£11 billion)
High R&D spend (3.09% GDP)
ICT exports $79.4 billion (£46 billion)
ICT employment 655,000

Exhibit 1.3 *Korean economic statistics*

Japan

Government-industry cooperation, a strong work ethic, mastery of high technology and an emphasis on education helped Japan advance with extraordinary speed since the Second World War to become the world's second largest by market exchange rates and the third largest by purchasing power parity

Exhibit 1.4 *Tokyo*

(PPP) after the United States and China. For three decades, overall real economic growth was spectacular: a ten per cent average in the 1960s, a five per cent average in the 1970s, and a four per cent average in the 1980s. Growth slowed markedly in the 1990s and government efforts to revive economic growth were hampered in 2000 to 2001 by the slowing of the US and Asian economies. However, the economy has seen signs of strong recovery in 2005, averaging over four per cent growth in the first half.

GDP $3.745 trillion (£2.2 trillion)
GDP $29,400 (£17,000)
High R&D spend (2.96% GDP)

Exhibit 1.5 *Japan economic statistics*

Distinguishing characteristics of the Japanese economy include the working together of manufacturers, suppliers, distributors, and banks in closely-knit groups called keiretsu (for example Mitsubishi and Nissan); the powerful enterprise unions and close relations with government bureaucrats. Japan's parliamentary structure is very similar to that in the UK, although the homogeneity of the political and business elites plays an important role in the process. The responsibility for the development

of telecommunications and broadcasting policy lies within the Ministry of Internal Affairs and Communications (MIC, Japan).

Japan has the highest life expectancy in the world (81.15 years in 2005) and one of the lowest population growth rates (0.05 per cent). In 2007 more than 20 per cent of Japan's population will be over 65. This is a major strategic issue for Japan, and much thought is going into how technology can be harnessed to enable Japan to cope with the economic and social implications of an ageing and declining population (see below). Finally, both Korea and Japan feel the heat of competition from China's burgeoning economy more acutely than European industry does.

They are aware of China's scale impact on the ICT sector and have prioritised ICT leadership and exploitation as part of their strategic response to China's growing economic and political influence.

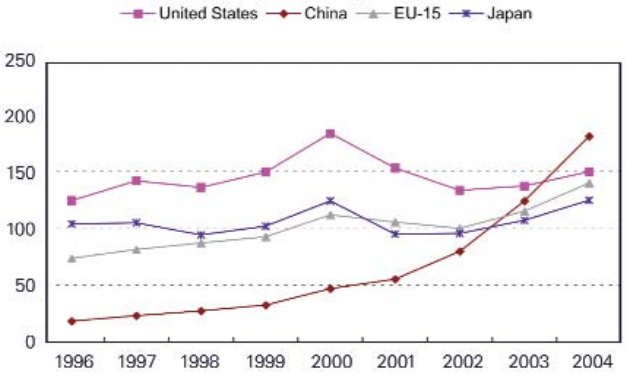


Exhibit 1.7 *Imports and exports of ICT goods, billions of USD in current prices, 1996-2004 (US, China, EU15, Japan)*[5]

Society & living	• Stop population decline in 2007 • Create livable environment for the aged • Win back faith in food safety • Enhance local community relationships
Labour & employment	• Employment opportunities for older people • Job opportunities for younger people • Improve working environment for women • Secure job-hopping and skills-based systems
Health care/welfare	• Realise a patient oriented remote medical system • Reduce malpractice by disclosing information • Pension system reform
Education/human resources	• Education emphasising maths and science • Reduce adolescent crime • Enhance international competition among undergraduate studies
Government services	• One-stop administrative service in relocating • Administrative cost cutting by computerisation of procedures
Transport and distribution	• Reducing traffic accidents, alleviating transport congestion and train crowding • Create barrier-free environment for the aged and disabled
Public safety and disaster prevention	• Dissolve fear against terrorism and serious crimes • Measure earthquakes, typhoons and major accidents
International	• Presence in international organisations such as UN • Tight relationships with Asian Countries
Environment/energy	• Stop the evolving global warming • Reduce waste and facilitate recycling • Develop natural energies such as solar power • Proper use of biotechnologies
Economy/industries	• Recover economy and enhance competitive power • Prevent deindustrialisation in the manufacturing industry • Promote efficiency by ICT-based business management • Promote Japanese culture and arts

Exhibit 1.6 *Critical social, economic and political challenges facing Japan and technology based solutions*[4]

4 MIC

5 OECD ITS Database

2 POLICY AND REGULATION

In Korea and Japan government policy has long been an enabler and driver of investment and innovation in new technology and services. Both countries have prioritised the development and exploitation of ICT as a driver of growth and competitiveness. Initial broadband deployment was accelerated through the implementation of comprehensive strategies addressing both supply and demand and these strategies have now been developed to support the development of 'next generation' services. Both countries are pursuing visions of the 'ubiquitous networked society' (UNS) and have developed detailed 'U' strategies (described below) to achieve these visions.

As a consequence of these policies, the convergence of media and communications sectors has been accelerated. However, this has revealed a 'clash of approaches' between broadcast and communications regulators, which is yet to be fully resolved in either country. Lack of regulatory certainty about the market for IPTV services has slowed down investment for some players, and caused problems for operators seeking to develop new services for this emerging market.

2.1 Strategic approaches

Korea and Japan have developed comprehensive national 'Ubiquitous Network Society' strategies for the next stage in the development and exploitation of ICT. These are 'top down' strategies that take an integrated approach to the entire value chain, rather than focusing on the individual horizontal markets. They take a holistic view of the impact of R&D, economics and commercial requirements across the whole value chain and were developed in close collaboration between government ministries, 'think-tanks' (such as KISDI[6] and NRI[7]), technology suppliers and network operators.

However, whilst being supplier led, U-Korea and U-Japan attempt to be 'user centric' by putting user benefit and experience at the centre of policy and strategy. They are also probably more forward looking, longer-term and visionary than any of the equivalent national strategies in Europe and are certainly much more detailed than the EU's i2010 strategy.

Ubiquitous network society

The concept of the 'ubiquitous network society' is common to both the Japanese and Korean approaches and has become the mid- to long-term vision driving ICT policy. It envisages a world where 'things', as well as people, are constantly connected to a network, anytime, anyplace, anywhere. It captures the convergence between a number of technological fields, such as broadband, mobile, RFID and sensor networks, and explores their implications for the economic, political and social aspects of society.

Policy makers argue that addressing the implications of ubiquitous networked society requires a paradigm shift in thinking from the traditional approaches taken to 'e'- strategies. Both countries have now adopted 'u' strategies that seek to optimise the opportunities and mitigate the risks associated with the UNS vision. The U-Japan and U-Korea strategies set out a series of detailed priorities and targets, based in R&D all the way through to delivery.

6 KISDI: Korean Information Society Institute

7 NRI: Nomura Research Institute

(For a more useful summary of the U-Korea and U-Japan Strategies see the case studies prepared for the ITU 2005 Ubiquitous Network Society workshop on the ITU website[8].)

2.1.1 U-Korea

Korea's primary economic goal is to increase GDP to $20,000 (£11,500) per head. The exploitation and utilisation of ICT is seen as critical to achieving this objective and it is the government's policy to enable and encourage Korean companies to invest early in the life cycle of new emerging technologies that have global export potential. The IT 8-3-9 Strategy has been developed to implement U-Korea and defines specific measures to achieve this goal. It aims to create a favourable cycle for the development of the IT industry by linking and developing eight IT services, three IT infrastructures and nine new growth engines.

IT 8-3-9 is essentially an IT promotion policy designed to make Korea a global IT test bed where Korean companies and their partners can develop and refine new products and services (and increasingly business models) that can then be developed and exported around the world. The strategy recognises that to be successful, Korea needs to have an advanced national infrastructure as well as a market of eager early adopters of new technologies. The GDP benefits for Korea lie in the potential export opportunities related to these new technologies, applications and services (but mainly the technologies – semi-conductors, handsets, displays etc).

MIC announced that it will seek to grow the Korean software industry ten-fold by 2010. To do this Korea will need to find a niche area in the software market (such as web software and games platforms). This will require good human resources and strong language skills to export software into other markets.

The IT 8-3-9 Strategy[9]

The selection of this list of services, infrastructures and growth engines reflects a determination to develop strengths in all of the key technologies that have the potential to become global growth markets. There is also a strong emphasis on the convergence of networks, platforms and services. Specific goals and targets have been set for each of the services, infrastructures and growth engines, such as take-up targets, network and service deployment goals or the achievement of international market share within given timescales. To achieve these goals, the strategy calls for government initiatives such as model projects, support for technological development and the provision of subsidies. Efforts to achieve these targets are well underway with governmental organisations playing a central role.

8 Services	3 Infrastructures	9 new growth engines
• 2.3 GHz portable internet service • Digital multimedia • Broadcasting (DMB) service • Home network service • Telematics service • RFID-service • W-CDMA • Terrestrial digital TV • Internet telephony	• Broadband convergence network • Ubiquitous sensor network • IPv6 • Digital content • Telematics	• Fourth generation (next-generation) mobile communications devices • Digital TV • Home network • IT SoC (system-on-chip) • Next-generation PC • Embedded software

Exhibit 2.1 *The IT 8-3-9 Strategy*

8 http://www.itu.int/osg/spu/newslog/ITU+Workshop+On+Ubiquitous+Network+Societies.aspx

9 http://www.mic.go.kr/index.jsp

The strategy explicitly recognises the need to develop a virtuous circle within the ICT value chain that enables network operators to find new revenue streams necessary to enable continued massive investment in upgrading their network infrastructures. Underlying this is an assumption that consumers will only pay for next generation services if there is a high quality of service, which in turn requires large-scale investment in next generation core and access networks.

IT 8-3-9 does not really focus on the wider externality benefits associated with the exploitation of ICT across Korean economy or society. Instead, the contribution to Korea's GDP goal is expected to come directly through increasing market share in the global ICT and related industries (currently about 20 per cent GDP). The following quote highlights the focus the need for new services to drive export growth:

'In terms of production amount, the IT industry is expected to grow 12.3 per cent yearly, reach $131.8 billion (£75.8 billion) of export by 2008. Whereas the growth rate of telecommunications service sector will decrease due to the market maturity (5.1 per cent), IT equipment will lead the overall IT industry with production and export growth rates of 14 per cent and 17.8 per cent, respectively. These indicate that the future growth of the Korean IT industry is strongly dependent on foreign IT markets and the development of new services[10].'

2.1.2 U-Japan: The Ubiquitous Network Japan Strategy

The e-Japan Strategy (2001-2005) was developed by a cross-government body called 'IT Headquarters' to make Japan one of the most advanced IT nations by 2005. Initially it focused on network infrastructure development and the shift from narrowband to broadband. e-Japan is regarded as having been highly successful by the Ministry of Internal Affairs and Communications (MIC).

The U-Japan Strategy further advances this strategy and aims at promoting the development of a ubiquitous network infrastructure that that enables 'easy access to the network at anytime, by anything and anyone'. MIC (Japan) developed the U-Japan Strategy in cooperation with a cross-government and industry body called the U-Japan Policy Roundtable[11].

U-Japan envisages the next generation of the ICT society of 2010 with the following characteristics:

- **Ubiquitous:** Connects everyone and everything
- **Universal:** People friendly – contacts from heart to heart
- **User-oriented:** Integration of the user viewpoint
- **Unique:** Generation of individual vitality

'The U-Japan strategy is more user-centric than Korea's IT 8-3-9 strategy. According to MIC, by 'integrating ICT into all aspects of everyday life and by creating applications generating completely new forms of value' the ubiquitous network will help address the critical social, economic and political challenges facing Japan[12].'

Main Features of the U-Japan Strategy

The strategy has three pillars: the development of a seamless ubiquitous network; the use of ICT to resolve 21st Century issues; and the upgrading of the ICT usage environment. Success of U-Japan will be measured in terms of whether citizens are satisfied with the utilisation of ICT and recognise the value of ICT in resolving their everyday issues and problems (see chart below) and will be

10 KISDI : Mid-term Market Forecast of Information and Communications Industry(2003~2008)

11 IT Headquarters is expected to publish a paper 'Beyond e-Japan' in early 2006

12 See issues on page 17

Establishing a seamless ubiquitous network	By 2010 100% of citizens to have high-speed or ultra-high-speed internet access
Developing seamless access environment of both fibre networks and wireless networks	• Open frequency policy • Convergence of fixed and mobile networks • Convergence of telecoms and broadcasting • Upgrading IP infrastructure to IPv6
Nationwide establishment of broadband infrastructure	• Alleviation of broadband divide • Promoting ICT in local communities • Promoting digital broadcasting • Promoting competition policy
Networking real objects	• Developing IC tags, sensor networks and network robots • Networking of consumer electronics • Creating applications of ITS and GIS • Developing ubiquitous terminal
Developing infrastructure for network collaboration	• Developing ubiquitous platform • Securing interoperability among different networks • Securing high network reliability • Developing infrastructure for e-commerce
Enhancing ICT Usage	By 2010 80% of citizens to appreciate the role of ICT in resolving issues
Social system reform by ICT	• Enlightening social and business reform by ICT usage • Administrative reform fostering ICT usage • Reform of product distribution system • Promoting e-government and local e-government
Promoting creation, trading and use of contents	• Supporting transactions such as trading and settlement of digital contents • Promoting creation and use of digital archives • Creating attractive contents • Establishing the 'Japan' brand by soft power
Promoting universal design	• Development of advanced agent technology • Enhancement of user interface • Ensuring information accessibility • Building support systems of ICT usage for the aged and disabled
ICT human resource development	• Nurturing human resource with high ICT skill • Supporting incubation of ICT venture business • Literacy and education reform • Encouraging civil participation
Development of the usage environment	By 2010, 80% of citizens to feel comfortable with ICT
Identify issues related to negative impacts	• Identify 100 negative aspects of the ubiquitous network society in 10 categories
Promoting ICT safety and security 21 Strategy	• Identify 21 priority issues with significant social impact and develop strategies for addressing them
Establish a Ubiquitous Network Society Charter	• Comprehensive charter for worldwide release setting out the basic principles and shared understanding of ubiquitous network society
Other cross-cutting policy initiatives	Putting world-leading ubiquitous network technology to practical use
International Strategies	• International link-ups to strengthen international presence of Japan • Asia Broadband Plan to make Asia a world centre for information
Technical strategies	• R&D strategies for the ubiquitous network society • Promoting standardisation

Exhibit 2.2 *U-Japan Work Packages [Source MIC]*

evaluated through user surveys.

Key characteristics of u-Japan

- **Visionary:** User centric but essentially visionary in nature – imagining an environment where you can seamlessly connect anytime, anywhere, anyone and anything (ie object as well as people)
- **Holistic:** forward-looking, strategic approach to the impact of ICT focusing on the combined societal impact of converging technologies
- **Pragmatic:** Realistic about both the pros and cons and the component challenges of maximising benefits and mitigating threats, associated with the UNS
- **Paradigm shift in thinking:** From 'broadband' to 'networks'; from 'utilisation' to 'value creation'; from 'usage' to 'solutions'; from 'digital content' to 'everything'

2.2 Telecoms policy

2.2.1 Korea

The Ministry for Information and Communications (MIC) is responsible for policy implementation and regulation of the ICT sector. There is a close relationship between industry, manufacturers and operators in Korea. The policy and regulatory bodies are structured differently to the UK and are generally more strategically interventionist, setting out policy approach to achieve the strategic vision and national goals described above.

The Convergence Virtuous Circle

Korean policy appears to be designed to deliberately stimulate and maintain a virtuous circle in the development and manufacturing of ICT equipment; infrastructure investment and content development. Success at each stage of the circle drives growth in the next. This approach is based on a holistic understanding of the economics driving the whole value-chain and a recognition of the interdependencies between the development of new technology, investment in infrastructure, and the emergence of new compelling content services. The Korean policy approach is to encourage investment early in the life cycle of new technologies and to create an environment that encourages the virtuous circle to start turning.

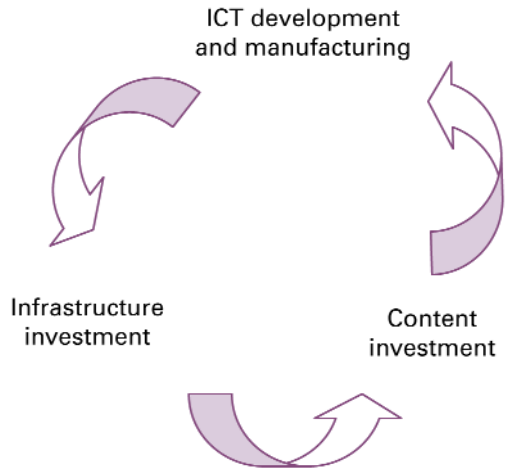


Exhibit 2.3 *The Convergence Virtuous Circle*

In the 1990s the Korean government promoted facilities-based competition as a key regulatory enabler to drive competition in the market for telecommunications and broadband. This proved to be very successful as the rapid take-up of broadband and mobile services demonstrates. As a result, there has been considerable investment in new content, services and applications by a range of different players across the value chain (see chapter 4) and this is opening up new revenue streams for operators. The appeal of these new services is now driving demand for more bandwidth and investment in the development of a new generation of devices, services and applications.

The high costs associated with infrastructure

deployment and the development of new content and services appears to be driving trends towards vertical integration, fixed wireless convergence and consolidation in the operator market in Korea. Regulators and policy makers seem to believe that to achieve Korea's ICT export objectives, operators need to be able to make long term sustainable investments and that vertical integration and consolidation is an inevitable and tolerable evolution of the market. Officials in MIC argued that as a result of convergence, regulators would need to define markets more broadly and that it was likely that the market would not be able to sustain the same levels of competition as in the earlier phase. It therefore seems that the policy balance between promoting competition and 'boosting ICT' has tipped in favour of industry promotion.

2.2.2 Japan

Japan has taken a similar policy approach to Korea, with a clear recognition of the interdependencies within the value chain and a focus on integrated value chain economics. The division of NTT into separate entities and the promotion of local loop unbundling has successfully stimulated competition in the market and accelerated the deployment and take-up of new services. However, as in Korea, market convergence is leading to more vertical integration and consolidation and again, policy makers seemed relaxed about this.

2.3 Broadcast policy

The convergence of broadcast and telecoms markets is leading to new regulatory challenges. Uncertainty about whether new IPTV services will be regulated as ICT or broadcast services has delayed investment in both countries. Conflicts of interest have emerged between ministries responsible for the ICT sector and those responsible for traditional broadcasting and cultural issues. In Korea, it was suggested that this policy impasse would only be resolved by the intervention of the President's Office. The Korean ICT Minister has suggested that IPTV services should be defined as delivering Internet Content on Demand (iCOD) and that it should not be regulated as broadcasting or require a broadcasting licence.

Lack of regulatory certainty about the market for IPTV services has slowed down investment for some players, and caused problems for operators seeking to develop new services for this emerging market.

2.4 Other key issues

2.4.1 Intellectual property

In the absence of an overall framework for online content rights operators are having to negotiate on a case-by-case basis with rights holders for content rights for new media services. It is widely agreed that this is inefficient and not sustainable going forward. A number of organisations are seeking to develop standard criteria to assess the value of online rights.

MIC has established a copyright database and is helping to develop a system for the clearance of copyright. The Federation of Economic Organisations in Japan has developed guidelines on copyright tariffs for broadband content delivered by IP. MIC also administers the Providers Responsibility Limitations Law, which sets out the responsibilities of the service providers and operators in respect of IP protection and the prevention of piracy. Market players observed that until the issue is permanently resolved, development market growth will be inhibited.

In June 2005 the Intellectual Property Policy Headquarters (IPPH), a cross-government cabinet level group looking at issues related to IP, launched the Intellectual Property Strategic Program for the creation, protection and exploitation of IP, with the following seven objectives:

- Reinforcement of measures against piracy
- Movement towards global patents and prevention of technology leaks
- Support for SMEs to protect IP
- Strategic public and private efforts related to international standardisation
- Promotion of Japanese brands and moving towards being a content distribution nation
- Promotion of human capital in IP (specifically doubling the number of people employed in IP rich sectors within 10 years)
- Making collaborative research easier through rules and systems for academic, governmental and industrial liaisons

Content distribution – copyright and IPR issues

The Japan Copyright Office is responsible for DRM and copyright management and has designated strategic fields for developing a comprehensive copyright policy:
(1) streamlining laws and regulations,
(2) developing smooth distribution systems,
(3) dealing with international issues,
(4) reinforcing education on intellectual property.

2.4.2 Trust, authentication, safety and security

Both the Korean and Japanese u-strategies recognise the risks and challenges for users living in the ubiquitous network society and considerable attention has been paid to resolving potential problems, such as digital inclusion, safety and security, identity and authentication that might arise. In a 2003 survey, MIC (Japan) identified the following consumer concerns relating to UNS (see below).

Failure to address these issues at the same time as other market development policies could lead to consumer rejection of new technologies and services. In the ubiquitous networked society, robust systems to ensure trust, safety, security, privacy and reliable authentication become even more critical than today. The U-Japan Strategy puts a strong emphasis on the need to resolve these issues and identifies 21 of the issues relating to safety and security to be addressed by 2010. These issues are grouped under 10 categories. See Appendix D for details.

Authentication and Identity: Social security numbers are very important for authentication in Korea. MIC (Korea) wants to ensure the integrity of this data going forward and wants to move away from using social security numbers for casual authentication to ensure the integrity of the social security number system going forward.

2.4.3 Digital inclusion

Overcoming urban/rural divides

In Korea, 97 per cent of the population can

Fraud and unscrupulous methods of business	62.7%
Leaks and improper use of personal information in the possession of businesses	59.7%
Improper access to and use of personal information	58.2%
Increasing complexity of services and devices	49.2%
Infection by computer viruses etc	37.8%
Possibility of being monitored by third parties including family	37.5%
Excessive reliance on ICT devices	35.7%
Decline in thinking abilities and reading/writing skills	34.7%
Weakening of personal relationships	24.7%
None in particular	7.7%
Other	2.3%
No response	1.2%

Exhibit 2.4 *Japanese user concerns relating to their use of ubiquitous network services (2003)*[13]

13 Source: MIC White Paper 2004

currently access broadband (2Mbps) and the plan is to reach 100 per cent by 2007. However, policy makers expect a divergence in the bandwidth available in urban and rural areas to remain for the foreseeable future.

In Japan broadband coverage is about 90 per cent. The government has been using rural and agricultural development funds to subsidise the deployment of infrastructure in rural areas. However, there is uncertainty about how much funding will be available in the future for these schemes. Increasingly, this funding is being used to deploy wireless networks rather than fixed. MIC is providing R&D and support for education programmes to train users.

Age & disability

The U-Japan goal is to have a society in which everyone can participate using ICT without regard for age or disability. With a declining birth rate, Japan has an ageing society. By 2015 one in 4 people will be 65 or over[14]. This is a very high ratio when compared with other developed nations. An ageing society will bring with it an increase in the disabled. The digital divide will most acutely be felt by this group unless accessibility issues are addressed.

Similar figures exist for internet adoption by age and gender in Korea. Japan is taking relevant policy measures to ensure the improvement of ICT accessibility by establishing national standards and promoting accessible public services. For broadcasting it is promoting closed-captioned programs and descriptive video services. The government is also subsidising R&D costs on assistive technologies and communication/broadcasting services for the disabled.

There are a variety of examples of accessible products:

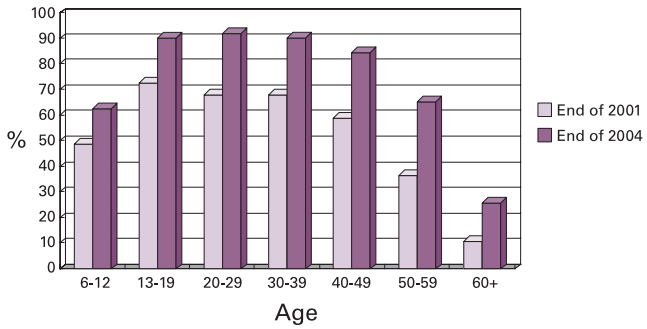


Exhibit 2.5 *Internet usage rates by age group*

- NTT DoCoMo FOMA Raku-Raku phone. It has a 'read aloud' function which reads out messages and operation guides. The 'clear voice' function enables clear hearing amidst noisy surroundings. It also has a large display with easy-to-read text
- The TU-KA/ Sanyo bone conduction cellular phone transmits sound to auditory apparatus using bone vibration in the skull
- Subtitle delivery system for deaf people (Iida Electronic Design Co)

A portal site for technology assistance was launched in November 2005. The portal site contains details of how to support the disabled and information about assistive devices.

Proposed Ubiquitous Network Society Charter – Japan

In order to address unforeseen problems that might emerge in the future, a Ubiquitous Network Society Charter has been proposed in Japan to establish the basic principles and shared understandings between stakeholders. The charter would seek to achieve a balance between free and diverse information distribution; safe and secure information distribution; and the construction of new social infrastructure. It was not clear from the team's conversations to what extent commercial players were supportive of this proposal.

14 MIC ICT Policy Measures for Bridging the Digital Divide

3 INFRASTRUCTURE AND TECHNOLOGY

3.1 Introduction

Korea and Japan are among the most advanced ICT markets in the world. Early deployment of broadband and wireless services has been met with strong demand from consumers. Both countries see the deployment of wired and wireless next generation access technologies as vital to the success of their strategies. Operators have been encouraged by suppliers, government and regulators to continue to invest in the development and deployment of new services, making both countries leading test beds for the next generation of fixed and wireless content, applications and services.

3.2 Market structure and network development

In 2004, Korea had 24.9 broadband subscribers per 100 inhabitants, equating to more than 75 per cent household penetration. In addition, Koreans have some of the cheapest and fastest residential connections in the world. ADSL broadband connections at 2 Mbps are on offer at less than $25 (£14) per month and VDSL broadband connections, at 20-40 Mbps, cost consumers less than $40 (£23) a month.[19]

Most Korean households have a choice of two or more broadband technologies. ADSL is available to 90 per cent of homes with cable television networks passing around 60 per cent of households. In addition, many Koreans have access to apartment LAN technology (essentially Ethernet wiring in the building connected to the ISP via fibre), wireless local loop, and satellite connections – each of which have extensive coverage.

The 2003 DTI Global Watch Mission to Korea concluded that the rapid roll-out and take-up

	Korea 15.8 million households	Japan 42 million households	United Kingdom 22.4 million households
Fixed			
Total	11.9 million (Dec 04)[15]	20.5 million (June 05)[16]	8.8 million (Sept 05)[17]
Broadband	6.9 million (Dec 04)	14 million (June 05)	6.4 million (Sept 05)
xDSL	4 million (Dec 04)	3.25 million (June 05)	2.4 million (Sept 05)
Cable	1 million (Dec 04)	3.25 million (June 05)	_
FTTx			
Mobile[18]			
Total mobile	38.3 million (Q4 2005)	90.2 million (Q4 2005)	65.5 million (Q4 2005)
2G	25.8 million (Q4 2005)	61 million (Q4 2005)	60.6 million (Q4 2005)
3G	12.5 million (Q4 2005)	29 million (Q4 2005)	4.9 million (Q4 2005)

Exhibit 3.1 *Basic indicators*

15 Korea Broadband Stats, end 2004: Source: ITU

16 Japan Broadband Statistics, June 2005: Source: NTT

17 UK Broadband Statistics, September 2005: Source Point Topic

18 Mobile Statistics end 2005: Source: Informa

19 Source KT

of broadband services in Korea had been achieved through a combination of six key factors: geography and demographics, government leadership, facilities-based competition, the PC bang phenomenon, pricing, and the emergence of clear user benefits.

These findings were confirmed by the 2005 mission. In particular:

- Dense housing patterns deliver significant economies of scale for broadband network deployment and the fact that 80 per cent of Koreans live in densely populated urban areas (and 49 per cent live in large apartment complexes) means that Korea has the ideal geography for the cost effective deployment of broadband infrastructure.

- The Korean government has played a key role in the development and implementation of a detailed and sophisticated strategy for broadband deployment, focusing on both supply and demand side issues. This has been supported with public investment which, while modest, has proved significant in impact.

- The Korean broadband access market is characterised by strong facilities based competition in both fixed and mobile markets. There are 130 ISPs, but the top three fixed operators have 82 per cent market share. Strong facilities-based competition has put downward pressure on prices, has encouraged the aggressive roll-out of services and has forced service providers to compete on quality of service.

Korea: fixed broadband operators	Market share
KT	52%
Hanaro	23%
Thrunet	7.8%
Others (incl Powercom, Daicom etc)	17%

Exhibit 3.2 *Fixed line operators by market share, Korea*

The pricing and performance of services offered by KT's main competitors are roughly similar. Most KT and Hanaro customers opt for the lower speed (sub 20 Mbps) services. However, ADSL numbers are now actually starting to fall as customers upgrade to VDSL and Fibre LAN services. This process has been accelerated by the arrival of a new entrant into the market called Powercomm[20], which is aggressively marketing its 100 Mbps symmetric 'Xpeed Fibre LAN' service at a significant discount to the three main players.

Brand	Service	Technology	Speed	Price	Place
Megapass	Lite	XDSL, Satellite, BWLL, LAN	4Mbps (Up/Down)	$25 (£14.45)	Households
	Premium	XDSL	4Mbps Up 13 Mbps Down	$34 (£19.65)	Households
	Special	VDSL	4 Mbps Up 20/50 Mbps down	$38 (£21.95)	Large apartments
	Ntopia	Ethernet	100 Mbps (Up/Down)	$30 (£17.34)	New buildings & apartments
Nespot	Nespot Family	WLAN	11-54 Mbps (Up/Down)	Megapass + $10 (£5.80)	SOHO, SME, Hotspot

Exhibit 3.3 *KT's product portfolio*[21]

20 Formerly part of the Korea Electric Power Corporation, Powercomm traditionally supplied the leased line business, however, it entered the retail broadband market in September 2005 with an aggressive plan to acquire 500,000 customers within a year.

21 KT

The Government plans on having 20 Mbps connections available to all homes by 2006 and KT confirmed that, where line lengths permit, it is likely to voluntarily upgrade its ADSL customers to VDSL in the coming year.[22] By 2010, Korea plans to have between 50-100 Mbps available to all homes.

Japan

The e-Japan strategy included a target to have 10 million broadband households by 2005. Japan easily exceeded this target and reached 20.58 million broadband subscribers at the end of June 2005.

Japan added 2.2 million FTTH subscribers in 2005, making it the only market in world to add more FTTH subscribers than DSL subscribers.[23] Combined with VDSL, which is used to serve multiple dwelling units, half of all Japanese households have access to some sort of next generation broadband. In its mid-term strategic plan, NTT set a target to achieve 30 million FTTH connections by 2010.

NTT is targeting the end of 2008 for the full deployment of the next generation network. This is defined as integration with the mobile network and the provision of broad-based internet access, IP telephony, multi-cast transmission for video by directional data for communication and Ethernet services. It has set itself a target of 30 million users of FTTH by the end of fiscal 2010. The team discovered no explicit business model for return from this.

3.3 Next Generation Networks (NGN)

In Japan, the Next Generation Network (NGN) aim is to create network integration architecture with a long-term perspective into the future, including photonic networks, ubiquitous networks and next generation backbone networks. This architecture should be independent of the current internet architecture.

This will enable the network to respond to rapid increases in traffic and at the same time allow autonomous connection and selection of optimum network access and greater freedom for allocating network resources. This will result in higher quality than the current 'best-effort' network. Research is ongoing for 100 Tbps optical routers that support multi-domain/multi-layer networks and can provide wavelength paths on gigabit scale according to user demand.

Brand	Service	Technology	Speed	Price	Place
Yahoo! BB ADSL	8M	ADSL	8 Mbps Down, 1 Mbps Up	$26 (£15.03)	Household
	12M		12 Mbps Down, 1 Mbps Up	$30 (£17.34)	
	26M		26 Mbps Down, 1 Mbps Up	$33 (£19.10)	
	50M		50 Mbps Down, 3 Mbps Up	$34 (£19.65)	
	50M Revo		50.5 Mbps Down, 12.5 Mbps Up	$36 (£20.80)	
Yahoo! BB Hikari	Hikari Home	Fiber to the Home	100 Mbps (Up/Down) Access line 1 Gbps Backbone 60 Gbps	$58 (£33.53)	Individual house
	Hikari Mansion	Fiber to the apartment block then Ethernet	100 Mbps Down 50 Mbps Up Access line 1 Gbps Backbone 60 Gbps	$25 (£14.45)	Apartment within an apartment block

Exhibit 3.4 *Japan: Yahoo! BB's Product Portfolio (a Softbank company)*

22 65 per cent of the Korean population live within 500m of optical drop point and could therefore access VDSL

23 Dittberner & Associates, 1 March 2005

The longer term plan by 2015 is that next generation architecture should be able to support new address, routing and signalling technologies for more sophisticated and enhanced functionality and survivability, through an all-optic network. One of the most important features of the NGN is independency to current internet technology, making it useable for post-IP.

The National Institute of Information and Communication Technology (NICT) launched the Japan Gigabit Network (JGN), a high-speed communication infrastructure with a communication speed of 5 bps, in 1999. It was upgraded in 2004 to JGN-II, providing 20 Gbps network speed, and is now widely available for public sector, national research institutes and universities. The future NGN will use JGN-II technology to achieve its longer-term goal. In summary, the plan for realisation of NGN is shown in the table below.

	2010	2015
Network architecture	• Integration of fixed and mobile communications with speeds of up to 100 Tbps with autonomous configuration for best access network and resource selection. • Traffic control mechanism for various priority and quality. • Conduct laboratory tests.	• Achieve greater sophistication and enhanced functionality in addressing, routing and signalling techniques. Increase high reliability and survivability features. • Develop autonomous/distributed operation and control technology for support of systems such as RFID tags and various types of sensors for provision of ubiquitous network environment and conduct demonstrations and tests.
Flexible management/control technology that can meet needs	• Establish multiformat node technology for support of various data types and granularity and support of different access networks. • Technology to enable access at 10 Gbps.	• Establish transmission processing capacity at the petbit level, technology that enables fine-tuning and flexibility in optical path bandwidth control, and integrated route control technology for multilayer/multidomain networks. • Develop interserver transmissions at the terabit level, ultra-high-speed storage access and ultra-high-speed optical data distribution.
The most advanced photonic node technology	• Develop network control technology that can handle combination of optical and IP networks and 100 Tbps optical routers to resolve bottlenecks at the core network. • Establish basic optical RAM technology for optical packet routers able to process several hundred optical labels. • Develop optical communication systems with low standby/high-efficiency (above 2 bps/Hz)	• Develop integrated routers that support all-optical packet processing through all-optical ultrahigh-speed processing using optical RAM. • Develop maximum speed possible in optical communications within the Shannon limit

Exhibit 3.5 *NGN evolution*

NGN basic concept

NGN will be based on a layered, structured model that facilitates better response to technological advances and service diversification, as shown in exhibit 3.6 below.

3.4 Access technologies

Access technologies are going to continue to multiply in the public broadband space. This will be heavily dependent on specific policy initiatives as well as economies of scale. However, to achieve these new long-term access technologies, both existing spectrum-based technologies and their evolution and also the interoperability of new technologies with those that exist today are being considered.

Exhibit 3.7 (see page 27) describes a wide range of wireless access technologies that are being considered in Japan. Some of the frequencies under consideration would require international agreement to be implemented in Europe.

3.5 Wireless

While xDSL and cable technologies make up the brunt of connections, technologies will have a much more pronounced roll in the future. KT's Nespot (WLAN) service has built an extensive Wi-Fi access network around the country and continues to grow. Korea Telecom has announced that it will launch WiBro on a test basis to about 200 of its employees in Seoul. Competitively, the service will be pitted against SK Telecom's 3G mobile service, but SKT also eventually plans to launch WiBro.

WiBro (wireless broadband), is a wireless-based technology being developed by the Korean telecoms industry. It uses the 2.3 GHz spectrum and can theoretically offer downstream bandwidth of around 3 Mbps. Initial field trials were producing speeds consistently around 1 Mbps. The technology will also offer quality of service which allows for WiBro to stream video content and other loss-sensitive data more reliably.

Digital Multimedia Broadcasting (S-DMB and T-DMB)

Satellite Digital Multimedia Broadcasting S-DMB is a new business concept in broadcasting service to mobile. The service uses the 2.6 GHz radio frequency band. It consists of a large number of various

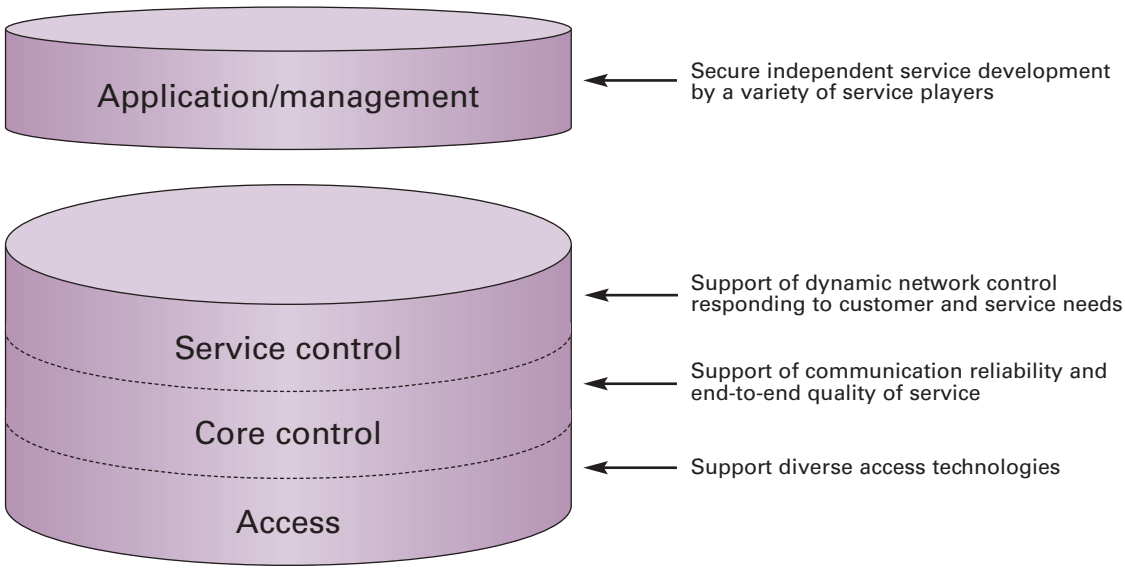


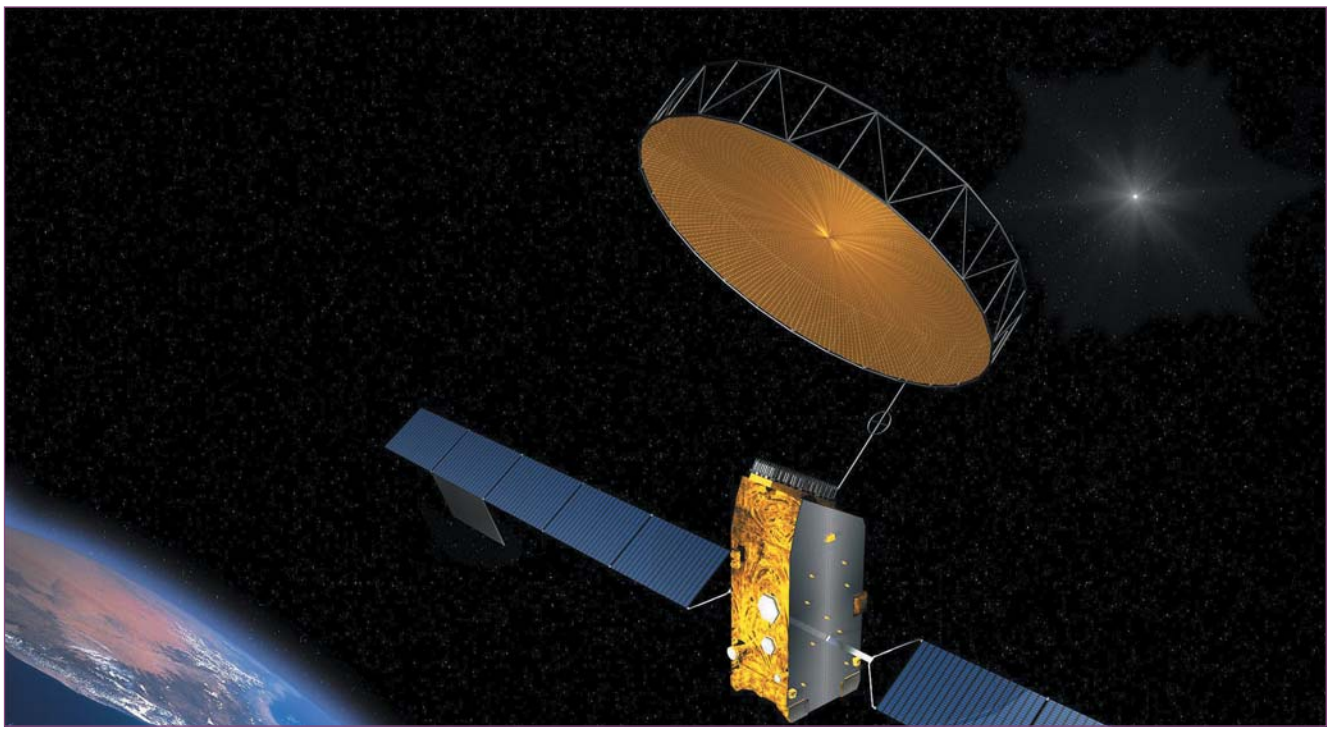
Exhibit 3.6 NGN will be based on a layered, structured model

multimedia broadcasting programmes, such as high-quality digital audio programmes, video programmes and also data transmission to be received by vehicular and small portable receivers in mobile environments. S-DMB services have been launched in Korea with 300,000 subscribers. S-DMB will be offered by NHK, the public broadcaster in Japan.

A new terrestrial (T-DMB) service was also launched in Korea at end of November 2005.

Category	System	Outline	Frequency allocation planned	Transmission speed (expected)	Service area coverage	Transmission distance
4G	Mobile	IP-based	800MHz, 1.7GHz 2GHz 5GHz	100Mbps	Country wide	-
Mobile MAN	WiMAX	IEEE 802.16e	2 to 6GHz	75Mbps	Metropolitan area	2-3km
FWA (Fixed Wireless MAN)	WiMAX	IEEE 802.16, 16a, 16d	Under 3.5GHz	10-100 Mbps	Country wide and Bullet train	-
FWA	Long distance using milli-wave		60-80GHz	-	Metropolitan and rural areas	2-3km
Wireless LAN	Nomadic wireless broadband	Based on IEEE 802.11	5GHz	100Mbps	-	-
Broadband for Transportation	Broadband for rail	Based on IEEE 802.11a	5GHz	Max 36Mbps	Between train and ground	1km
Broadband for transportation	ITS	Communication between vehicles, dedicated short range	5.8GHz 60 GHz 76 GHz	100Mbp	Between vehicles	10-200m
Satellite broadband	45/40 GHz For disaster prevention	Satellite communications systems using portable equipment to send pictures	45/40 GHz	1.5-155 Mbps	Between site and satellite and ground	Between earth and satellite
Satellite broadband	Marine	Internet access for ships	C:5712MHz Ku:12~18GHz	-	Between ships, satellite and ground stations	Between earth and satellite
Satellite broadband	WINDS	Satellite communication systems equipped with multi-port amplifier, Ka-band active phased array antenna	Ka-band Ka:27~40GHz	155 Mbps	Everywhere in the hemisphere	-

Exhibit 3.7 *The expected future (mid to long term) broadband access technologies using NGN (Japan)*



Mobile phone-combined

Car built-in

Maximise customers' convenience through diverse receivable handset support

Portable

PDA-combined

Exhibit 3.8 *Potential S-DMB applications*

3.6 Sensor networks & RFID

Ubiquitous sensor networks enable sensors to detect the status of people and objects and their surrounding environment, dealing with them in real-time through autonomous circulation of information between sensors. Through the development of this technology, it is expected that ICT support be strengthened in a wide range of social and economic activities, such as medical care, welfare, crime prevention, security, disaster management and environmental risks. MIC (Japan) plans to undertake research and development in this area from 2005, thereby contributing to the creation of diverse applications and new services.

4 CONTENT, SERVICES AND APPLICATIONS

4.1 Introduction

The rapid adoption of broadband and mobile services is creating an important new growth opportunity for digital content in the context of an overall flat or declining content market. In both countries new media consumption is displacing the consumption of traditional media, as the figure below demonstrates.

Consumers are keen on having the latest technology in order to keep up with their friends, and the threshold for products to hit mass market is therefore lower than in Europe. Services or technologies that reach 15 per cent penetration are well on their way to becoming mass-market products.[25] This also means that product or service life cycles can be shorter as consumers move on or upgrade to the next 'new thing'. By contrast, there is not a large market for pre-owned and second hand goods in Japan or Korea and online auction services have been slow to take off (although auction sites, such as Itembay that trade virtual games items have been successful. See Cyworld on page 35).

The content genres driving this growth are largely the same as in the UK and Europe, namely music, games and increasingly video-based services. In Japan, online music sales have seen 700 per cent growth since 2001 and are continuing to grow, with the popularity of MP3 players driving demand. Online games have experienced 1,300 per cent growth over the same period, although internet text content sales have remained stable. However, in both countries the surprise development has been the growth and popularity of a wide variety of 'community' based social networking services, and the emergence of the active/creative consumer.[26]

There has also been considerable growth in content purchased over mobile platforms, with KDDI reporting that the proportion of users purchasing content has increased since the introduction of 3G. Music distribution on mobile has doubled in growth since 2001 and mobile gaming content has seen 350 per cent growth over the same period. New content offerings over mobile, such as electronic Manga and e-learning, are providing potential new business areas for operators.

The growing popularity of online and mobile content is attracting new advertising revenue, with online advertising having doubled since 2001 and mobile advertising also seeing good growth over this period, and there are many examples of services that blend elements of

	Average		
Weekly internet use	312.9 hours	Male = 14.1 hours	Female =11.5 hours
Weekly TV watching	18.4 hours	Internet user = 16.3 hours	non-internet user = 23.6 hours
Weekly newspaper reading	4.5 hours	Internet user = 4.5 hours	non-internet user = 4.9 hours

Exhibit 4.1 Korean consumer behaviour: internet use vs TV and Newspaper reading[24]

24 KISDI

25 ITU Ubiquitous Network Societies: Japan Case Study, April 2005

26 Digital Content Association of Japan

subscription, micro-payment, advertising and sponsorship business models.

However, although these markets are already sizeable (KDDI estimates the Japanese digital content market to be worth around ¥2 trillion) and growing rapidly, digital distribution still represents only a very small proportion of overall sales by genre, suggesting that there remains a huge opportunity for growth in these areas over the coming years.[27]

- Online games represent only 1.8 per cent, ¥19.3 billion (£9.6 million), of games content sales, and games for mobile phones only 3.3 per cent, ¥35.4 billion (£172 million), with arcade games and software packages still taking the lion's share of games sales

- Internet video delivery only represents 0.4 per cent of video content sales, ¥17.3 billion (£84 million), and mobile phone video and image delivery represents 0.7 per cent, ¥31.4 billion (£152 million). Broadcast and DVD sales take the largest share of video content sales

- Internet distribution represents 9.7 per cent, ¥552 billion (£2.7 billion), of sales of books, newspapers, images and text (including advertising), while mobile phone distribution represents 1.3 per cent , ¥74.3 billion (£361 million)

Students at WAO Creative College, Tokyo

The mission met a number of young computer animation students at the WAO Creative College in Tokyo. Clearly this was a group of tech-savvy young people for whom computers, mobile phones and the internet were all entirely unexceptional parts of their everyday life. However, they insisted that they used technology in much the same way as their wider circle of family and friends and did not see themselves as being particularly

Exhibit 4.2 *Students at WAO Creative College, Tokyo*

advanced users. When asked if they had to give up either their TV, mobile or broadband subscription, all but one said they would give up their TV first.

Community: All had their own PCs and were always connected whenever they were at home. When not working on coursework they said they made regular use of community sites. All of them used a site called 'Mixi' that catered for creators and designers, and functioned as a source of ideas, encouragement and support from their peers. Others mentioned more mainstream community services and blog sites such as 'Cafesta', which they visited regularly, often 'snacking' on these sites when they wanted a break from work. Several mentioned that they had got to know people through sites such as Cafesta and had met up offline and become friends.

Communication: Communication was probably still the most valued application and all of the students kept in touch with friends and family through e-mail, instant messaging and SMS and used the internet for accessing information at home or on the move.

Content: All of the students said they used online services to access free content, but only one admitted to ever illegally downloading music or films. Most said that they still preferred CDs to downloading

27 Digital Content Association of Japan

music. Most were aware that they could access TV content from P2P sites on the internet, but weren't sure how to do it. In a society where the TV is almost always on in the background, they valued the ability to personalise online and mobile content and enjoyed the experience of making new discoveries online that they could share with friends. Some made use of mobile QR codes and language translation software.

As well as growth within these markets, there are also many services (also beginning to be introduced in the UK) which are yet to fully take hold. For example, the large-scale impact of new 'IP and Mobile TV services' has not yet been felt in the market, as these services are still in their infancy. However, there is a very high degree of interest in the commercial potential of these services to deliver personalised, on-demand content to the consumer. Operators are competing to secure content rights and in some cases acquire content assets.

As we will see in the following pages, the key drivers and enablers for growth in these online/mobile content, applications and services include:

- DRM
- Rights and licensing framework
- Payment systems
- Trust and security
- Media literacy
- Authentication
- Search
- Personalisation

There is also a wide range of content, products and services which are proving popular, but which the mission did not have time to fully investigate. Take-up of VoIP services, for example, continues to grow in Korea and Japan and each of the operators are developing their own VoIP services. However, this was not raised as a major issue in many of the meetings. Equally, the market for messaging remains huge, with KISDI quoting anecdotes about high school students sending 400 messages per day in Korea and, despite early difficulties with spam, mobile email has been widely adopted.

However, the most significant growth area that the mission was unable to fully investigate was e-Government and other public policy areas. Both countries have sought to exploit the benefits of ICT within key public services and have implemented extensive e-health, e-learning, e-transport and e-procurement programmes in accordance with their Ubiquitous Network Initiatives, with positive results. In Korea, it was argued that improvements in government procurement systems through eGovernment have significantly improved government efficiency. In Japan, MIC considers that 80 per cent of people need to use a government service in order for it to be successful, but also that it should make a significant difference to daily lives, and so this is a key objective. This is a rich and interesting area in which ICT is being used in both countries, and warrants further investigation. For further information, see the references below.[28]

4.2 Online games

Games companies have been at the forefront of innovation in the digital content market for many years and have been very successful in exploiting the potential for online and mobile distribution and game playing. In Korea, the video games market is predominantly PC- rather than console-based and Korean companies pioneered the market for Massively Multiplayer Online Role Playing Games (MMORGs), such as NCSoft's

28 MIC newsletter: www.soumu.go.jp/joho_tsusin/eng/newsletter.html, MIC White Papers: www.soumu.go.jp/joho_tsusin/eng/whitepaper.html, MIC Study Groups Reports including 'ICT R&D Programs for the Ubiquitous Networked Society': www.soumu.go.jp/joho_tsusin/eng/studygroupreport.html, Special Report on e-Learning in Korea: www.ica.or.kr/en/journal_read.asp?board_seq=250&seq=2038&page=1

Lineage, where hundreds of thousands of players can co-exist in a virtual world.

The games sector in Korea is dynamic and competitive. Development costs for new games are high and lead times can be long. However, in order to grow the market, Korean companies, such as Nexon, Hangame and NCSoft, have been very innovative in developing new business models and widening the range of games genres in order to attract new, non-traditional audiences.

As well as exploiting basic subscription, pay-as-you-go, and advertising business models, games companies pioneered the 'Items Selling' business model, where users can play games for free but are encouraged to buy items to personalise their 'avatars' or games characters. To do this, access to very low cost micro-payment systems was essential. Profits from items and avatars for the Japanese company Namco exceeded profits from online subscription games services by twelve times in 2005.[29] Games companies have also been quick to recognise the potential of developing community-type services for their players that not only allow them to meet and chat online, but also provide targeted channels for e-commerce.

Since the 2003 DTI Global Watch Mission, it is clear that the Korean online games market has grown quickly on the back of rapid broadband take-up and domestic ARPUs are continuing to increase. Korean companies are now moving into other international markets, including Japan, US, China, Taiwan and Europe as the deployment and take-up of broadband increases. Fast broadband connections and the availability of a variety low-cost micro-payment systems are seen as critical enabling success factors for the online and mobile games market.

In contrast to Korea, the Japanese games market is more console-based than PC and as a result the online market has grown more slowly. Online games account for only 1.8 per cent (¥19.3 billion (£94.5 million)) of the total industry, with arcade games and software packages still taking the lion's share of sales. However, this is changing as new generations of consoles incorporate broadband connections.

Namco (Japan)

Bandai/Namco was formed with the merger of two games companies in 2005. The Namco division is involved in three markets: home games, web and mobile games, and arcade games.

Namco's view is that gaming and mobile music are the only profitable contents markets. Its main online business model is a free game attached to a community site which drives profits. The MMORPG games are communities with strongly bonded users and, according to Namco, are the strongest way of forming a community.

One game site generated ¥5 billion (£24.5 million) in 2005 from a mixture of sales of avatars, specific items on the site and 1.8 million (out of 16 million members of the community site) paying a fee for the upgraded chargeable site, targeting users with specific interests. In addition, the sites generate e-commerce opportunities from sales of content or music.

There are two forms of revenue:

- A monthly subscription of between ¥180 – 500 per month. As of September 2005 they had over 1 million subscribers.
- Or pay per download at ¥160 – 500 per download. As of September 2005 they had 1.3 million downloads per month.[30]

29 Namco

30 Namco

4.3 Music

Strong demand for indigenous music content in Korea and the early deployment of commercial music download services has meant that domestic companies dominate the Korean online music market. A range of services exists that allows customers to download or stream music to a variety of fixed and wireless devices. The mobile operator SK Telecom has developed a particularly successful service called Melon (see opposite).

According to analysts, 5 million music downloads to mobile phones are sold every day in Japan and 99.8 per cent of music downloads are to mobile phones and 0.2 per cent are to PCs and portable MP3 players.[31] However, global brands such as iTunes are becoming more evident. Operators such as KDDI are actively developing their own music services for both PCs and mobile phones. KDDI has started selling the 'MUSIC-HDD' mobile phone with a built-in 4 Gigabyte hard disk drive (HDD), which can store approximately 2000 songs or 18 hours of 15 frame/second QVGA movie video. The MUSIC-HDD phone has as much memory as the top end iPodNano, and with its new 'LISMO!' music service KDDI clearly aims for the same market as iPod/iTunes. LISMO! integrates an internet music store for PC downloads, with PC music management software, and music phones.

Key to the success of music downloading in both markets is workable payment and security systems. Melon's success (see opposite) is reliant on the fact that the portal-based flat-rate rental-type music service model has become very popular with the customers, indicating that the market for paid content is taking root. It's a win-win situation – music copyright holders are compensated in a systematic and transparent manner, and service providers and customers also benefit from easy to use models. In Japan, KDDI use a security system linked to the mobile number of the user to give comfort and protection, particularly to the music industry, allowing downloading of songs either as a ring tone or directly from the radio or television.

Melon (Korea)[32]

SK Telecom's Melon is a wired and wireless multimedia portal with a catalogue of over 700,000 songs, as well as video and photo albums. It was launched in November 2004 and had four million subscribers by December 2005.

Melon allows users to download music files and play them on a mobile handset, PC and MP3 player. To do this, SK established strategic partnerships with domestic manufacturers of MP3 players, PDAs and mobile phones.

In addition, the 'Melon Shop' was opened in December 2005 – a shopping mall in which customers can purchase almost everything related to music in a one-stop-shop manner – MP3 players, CDs, tickets for musical performances, a variety of musical accessories etc. Melon also sells 'Cutting Bell' (a variant of the 'ring tone' model) service designed to let customers create cellular bell sounds on their own. This service is becoming increasingly popular among the younger generation of customers.

Melon is a rental-based model. The monthly-based subscription model options are:

- $3 (£1.70) for unlimited streaming
- $5 (£2.90) for unlimited monthly rental (effective lifetime for each file is one month)
- $0.5 (29p) for downloading mp3 files with unlimited lifetime

Of the Melon subscribers 31 per cent take the streaming only plan whilst 69 per cent take the monthly rental plan, making Melon $5 million revenue per month.

31 Eurotechnology.com

32 SK Telecom

4.4 Community/social networking services and user generated content

One of the most notable developments evident on the mission was the growth of community or social network sites (SNS). MIC Japan estimated that there were four million users of Social Network Sites in Japan in September 2005.[33] However, this figure may underestimate the extent of the use of such services as they become increasingly diffused. Approximately 50 per cent of daily hits to the Livedoor portal (Japan's third largest portal) are to its community sites.[34] Livedoor offers these sites free to the user by allowing advertising on the sites. But they also offer chargeable services that give higher community functionality such as increased personal storage. Perhaps the most impressive example of a community service is Cyworld in Korea (see opposite), which has taken hold of the country to such an extent that 90 per cent of young people are said to be addicted to it.

User generated content, especially in the form of blogging, is also rapidly expanding. There were 7.7 million bloggers in Japan in September 2005.[35] Not only are broadband users sending and receiving digital photos or movies that they have taken, but blogs are being used as forums for uploading creative work for others in the community to critique. Using broadband for this form of creative development offers a huge opportunity for users to seek advice both nationally and internationally from more experienced creators in their fields. Discussions with students at the WAO Creative College also demonstrated that blogs are being used for e-learning purposes.

Commercial companies such as Livedoor, NTT and Softbank are exploring how they can exploit the user generated content phenomenon to build content on their own services. Softbank, for example, is looking at creating grass roots communities or stimulating participation in user generated content as part of their service offering. It is an attractive area for these businesses to pursue as users will potentially fill the service with free content for others to build on.

The huge growth of both blogs and community sites in Korea and Japan illustrates broadband's ability to act not only as an information source, but also to enable communities to develop, allowing commerce and social interaction to take place. However, the success of sites like Cyworld and OhmyNews is reliant on secure payment, identity and trust.

Cyworld (Korea)

Cyworld is an immensely popular community portal/web site used by a quarter of the population of Korea. It is essentially a duplication of the real world, where users can create and decorate their own personal space or mini homepages with flowers, furniture, music and other personalising features, and use the space to network with friends and relatives. Cyworld is set up in such a way to allow you to make new cyber friends who have similar interests to you.

The Cyworld online community is also a commercial success. SK Telecom bought the site in 2003, and it is now making up to $1million (£575,000) a day, charging small units of money (dotori, which means acorn in Korean) to buy furniture and other things for your personal spaces. It is also possible for users to make real money on the site through gaming and role playing games. This is done by trading virtual items in role playing games for instance, a rare bandana. 'Itembay' was created to trade items and it is possible to make $40,000 (£23,000) a year if a player is at the top of a role playing game.

33 MIC (Japan)

34 Livedoor

35 MIC (Japan)

A key driver of Cyworld's success is the growth of digital cameras and mobile phones. Koreans, in particular young people, are using Cyworld to store and share their photos and therefore also their lives.

Exhibit 4.3 *Cyworld can be accessed from fixed and mobile devices*

OhmyNews (Korea)

Another community-based content model enabled by broadband is OhmyNews, an online newspaper where the majority of the content is supplied by the general public. With 10 million people using its services, OhmyNews is judged to be the sixth most influential media in Korea and the most important media for younger people. It is also having a dramatic effect on the nature of journalism, shifting news from print and television to online and challenging the way that news is gathered and reported – its motto is 'every citizen is a reporter'. It was even suggested during the mission that the paper has advanced democracy in Korea. While a coup in Korea would have been considered possible 20 years ago, no one believes that one would be possible today, such is the influence that ordinary people can have on reported information.

OhmyNews has 35,000 'citizen reporters' (ordinary people) who submit stories to editors, who edit the story but retain the emotion and vividness of the original account. Contributors/journalists are paid $5 -$15 depending on how high the article is ranked on the website.

OhmyNews is free at the point of use, and is supported by an advertising business model, which generates 70 per cent of revenues. However, there is also a premium product which contains breaking news or special news. OhmyNews is a private company.[36]

Mixi (Japan)

Students studying computer animation at the WAO Creative College demonstrated an interesting use of community sites for e-learning. Students use a range of sites, the most popular being Mixi.

Mixi (http://mixi.jp) is a community site for animation developers, where well-known creators and designers meet virtually. The WAO students use Mixi as a tool to get information, but they can also attend live 'animation community' events typically attracting 30 to 40 people. Prior to the Mixi community site, students made their own bulletin boards because there was no equivalent.

Creative students enjoy and are motivated by Mixi. It allows them to communicate with their peers and enables them to meet respected designers for mentoring and review. They can also use the site to introduce their own URL, to help sell things or get peer or family review/feedback on creative work.

36 There is an international edition of the paper available in English at http://english.ohmynews.com

4.5 Television

The convergence of telecommunications and broadcasting was perhaps the most discussed subject on the mission. The intense debate centred around how new IPTV, VOD and Mobile TV services will evolve and the impact that they will have on traditional broadcast services, which are, at the same time, moving towards full digital distribution and high definition (HD).

A variety of different models for new personalised, interactive, on-demand TV-like services are being developed by fixed and mobile operators, ISPs and broadcasters, based on a range of different technologies, platforms and devices. However, widespread service deployment has been delayed due to: regulatory uncertainty; negotiations over online content distribution rights; merger and acquisition activity; and uncertainty about the strength of potential business models. As a result IPTV, VOD and Mobile TV services are only just emerging and many are still in their trial phase making it difficult to assess consumer demand and to predict which services are likely to prove most successful.

4.5.1 Switchover from analogue to digital HDTV

Both Korea and Japan have set target dates for digital switchover, but unlike the UK they will use this as an opportunity to move to HD rather than just standard definition (SD) digital television.

In Korea, HDTV programs have been available to TV viewers since 2003, and a KRW 10 billion (£5.9 billion) project was conducted to fund digital broadcasting production. The government planned to increase the mandatory broadcasting time of high-definition programs from 10 hours in the first service year to 20 hours a week in the first half of 2005. To reduce the financial burden imposed in the early stage of the analogue-to-digital conversion, the government provided loans to terrestrial broadcasters (KRW 50 billion (£29.5 billion) in 2003, KRW 60 billion (£35.4 billion) in 2004, KRW 30 billion (£17.1 billion) in 2005) and extended the tax reduction period for imported digital broadcasting equipment (85 per cent of tariff rates), from 2001 to the end of 2006.[37]

The digital television market in Japan has only seen moderate growth when compared with broadband and significant penetration of chargeable multi-channel broadcasting has yet to take place. The cable TV market in Japan has 23 million subscribers. There are only 11 million Digital Satellite TV subscribers and 6 million Digital Terrestrial (DTT) subscribers. Despite this, total switchover from analogue to digital television is set for 2011. As in Korea, switchover will be to HD Digital TV. By the time of switchover in 2011 MIC (Japan) has a target for DTT to reach 48 million homes and has realised that it will need to further promote switchover take up to accelerate.[38]

NHK, Japan's incumbent public service broadcaster, is having to reposition itself as prime time revenues decline, and HDTV is at the core of its strategy. At present it is simultaneously transmitting HD and SD, but estimates that 12 million digital HDTV sets will be in use by the World Cup in mid 2006. It assumes 36 million sets by the Beijing Olympics in 2008, heading for 100 million by the time of the digital switch off in 2011. NHK anticipates that terrestrial HDTV services would be available to 60 per cent of Japanese households by the end of 2005.

In this context, it has become apparent that Japanese consumers have chosen to readily adopt broadband, perhaps at the expense of digital television. The government has recognised this and MIC published a report in July 2005 stating that in order to promote digital television switchover, IP should also be utilised for TV. This report has caused some confusion

37 Dynamic Digital Korea White Paper, 2004, MIC

38 MIC (Japan)

within the industry with regards to IPTV and the definition of copyright between broadcasters and telecommunications companies.

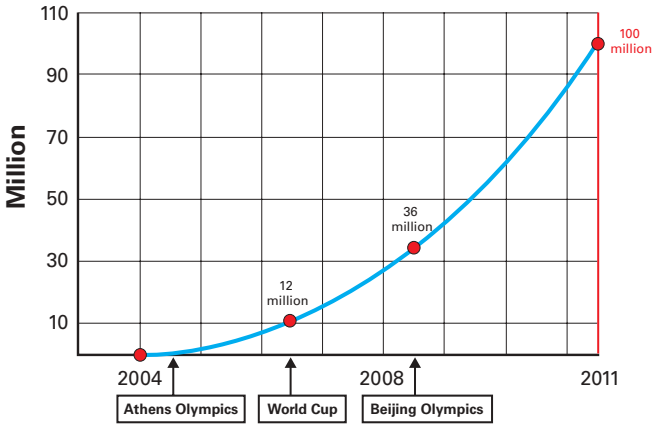


Exhibit 4.4 *Number of digital HDTV sets*

4.5.2 IPTV and VOD

The take-up and deployment of next generation broadband access was seen as a critical enabler for IPTV. High bandwidths are seen as essential in order to achieve sufficient quality of service. The announcement of national targets for next generation access deployment have triggered increased interest in IPTV (in Japan, NTT's commitment to achieving 30 million FTTH customers by 2010 was quoted as a stimulus for the development of IPTV services). However, innovation and market development has been held back in both countries because of uncertain regulatory environments. Various models are being developed for new IPTV and VOD services using different technologies and platforms. IPTV positioning can vary according to the competitive situation of related industries and their position in the value chain. Key success factors vary by content, platform, network and terminal.

Hanaro (Korea)[39]

Hanaro would like to launch a full multi-channel IPTV service, based on IP multicasting and providing linear channels and PVR enabled time shifting. However, the absence of a clearly defined legal framework in Korea for such services has prevented it from doing so. Instead it has been trialling an interactive IPTV portal service which would provide access to a range of content genres, including: hobbies, games, children's programmes, music, entertainment, news, lifestyle and community. Hanaro argues that IPTV services should be positioned as a new business area distinct from current broadcasting services to minimise disagreements or conflicts among the businesses concerned.

NHK (Japan)

NHK is focusing on developing new 'server type' IPTV services that integrate DTT, broadband and a PVR for local storage within a single STB to deliver personalised, interactive and on-demand services. It will also launch a Mobile TV service in 2006, which will simulcast existing DTT channels. However, unresolved rights issues are holding back progress again. NHK is attempting to negotiate with rights holders for internet and mobile distribution rights for archive material. Lack of agreement means that NHK is unable to exploit the 1 million items in archive and for which it has metadata.

Nippon TV (Japan)

At the end of October 2005, Nippon TV, Japan's oldest commercial broadcaster, launched Nippon TV 2 (NTV2) – a broadband portal for accessing its archive content online and via mobile. The innovative 3D animated portal is based on a 1950s Japanese shopping arcade,

39 Other than Hanaro a range of Korean companies provide VOD services, including broadband portals, such as DAUM, terrestrial broadcasters and interactive video providers such as Its-TV.com which uses STBs to receive videos delivered over broadband (at speeds of about 4 Mbps). However, these companies were not visited on the mission.

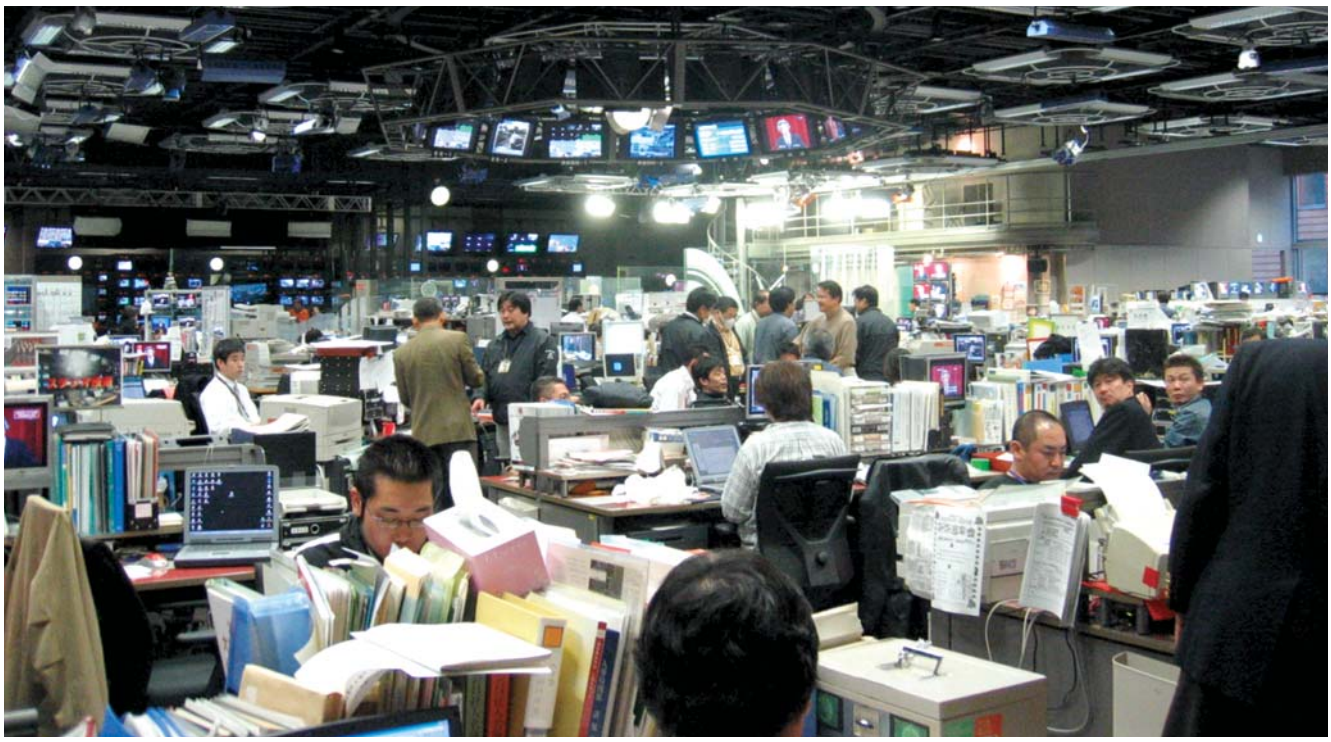


Exhibit 4.5 *The news room at NTV*

which the user can explore to discover content, which is categorised by mood (happy, angry, sad, fun). The shopping arcade environment provides attractive opportunities for non-intrusive ambient advertising that blends into the rich visual experience, and the whole interface appears more like a games virtual world than a traditional portal website. NTV2 currently offers 38,000 hours of news films and 172,000 hours of programmes. However, the content offered has again been limited by negotiations with rights holders. By December there were 100,000 subscribers to NTV2, and they forecast 3.5 million subscribers by May 2006.[40] The industry is eagerly tracking progress against these forecasts and key commercial sponsors will review their strategies once sufficient user data has been generated in the start-up period.

Softbank (Japan)

Without a broadcast licence, Softbank is unable to broadcast live TV programmes over IP and as a result it has signalled its long-term interest in acquiring a broadcaster. In the meantime, it is trialling an IPTV service called TVBank, which it hopes to launch in 2006. Softbank believes there is a growing market for non-Japanese content, driven by the popularity of Korean soap operas, and is developing relationships with a variety of international content providers to aggregate this content through its new service.

The three major categories of content on the TVBank service will be sport, animation and news. Its core services will be video streaming, VOD and video search. Content and scheduling strategy will be targeted at both older 'passive' consumers and younger 'active' consumers. For VOD it plans to have three more themed channels: a Taiwanese channel; a channel linked to Japan's largest model agency and a Korean channel. For video search its objective is to provide video clips of events from archive with consumer advertising and Google search related advertising. Its aim is to be market leader in video content search, which they regard as a powerful advertising business model. Softbank is also working to stimulate user-generated content through competitions.

40 Nippon TV

TVBank will use an advertising model incorporating banner, text-based and movie film advertisements and a pay-per-view model. It will not incorporate an e-commerce model for advertisers but will have a billing and payment system with Yahoo content, pre-subscription and credit card billing.

Other routes to multi-channel viewing

A number of factors could temper demand for IPTV or VOD services over the internet or TV.

Firstly, the visit to leading advertising agency Dentsu suggested that the advent of broadband has created a dual screen living room environment in Japanese homes, where the PC/laptop has been moved to the living room. This has been facilitated by widespread use of wireless broadband. Viewers use both the TV and PC screen simultaneously, but for discreet tasks.

Japanese homes have the TV on much of the time in the background. The TV is considered an information provider and is used for entertainment and a way to relax. It provides social currency. Alternatively, a text-based culture has grown around the PC screen, which is used as a convenient tool to browse and instantly capture snippets of information on demand.

When the TV and PC are on in the living room, users will automatically use the most comfortable screen – the TV screen – to watch rich audiovisual content. When a keyword comes on the TV screen they may start searching under this keyword on the internet. So rather than convergence, the dual screen experience suggests that Japanese people are not necessarily changing their behaviour yet to adopt the use of rich audiovisual content over broadband.

Secondly, the growing market for consumer electronics devices that are able to time shift viewing is clearly affecting IPTV take-up. Sales of DVD HDD recorders have also been growing, reaching 5.5 million in 2005. These boxes will soon have an internet connection to receive HD programmes over the internet.

Sony (Japan)

Sony's LocationFree TV product provides an alternative way for consumers to access time shifted, on-demand content regardless of location. The product combines a portable LCD television panel that uses WiFi technology to receive video content and access the internet from a broadband-enabled base station. When combined with an intelligent PVR it means that users can access a large amount of locally stored content from anywhere in the home, or from any location where there is a broadband connection.

In 2006, Sony will launch the X Video Station. A PVR with eight tuners and two terabytes of hard disk memory, it can automatically record the last three weeks of the schedule across eight channels and can be watched via PC or TV or played via the LocationFree network. Users can also browse and undertake contextual searches and time shift remotely. However, this would require a fast uplink broadband connection as well as downlink and could stimulate demand for more symmetrical broadband services.

Exhibit 4.6 *Mobile TV*

As mobile simulcasts have not yet launched in Japan it is impossible to say what the real consumer usage and uptake of these services will be. Research conducted in Japan in 2004[41] suggests that 52 per cent of mobile users are attracted to watching television over mobile, and 57 per cent have a purchase intention, although the majority will do so at the time of replacing their handset. It is anticipated that it will mostly be used for killing time while waiting, commuting home from work on public transport, and on long distance journeys. Handsets currently only have a battery life of two hours so this may limit the amount of content users will watch via mobile. It should also be noted that social etiquette around mobile phone usage in Japan prevents voice calls being made or received while on public transport, as it is seen as impolite. It is, however, perfectly acceptable to listen to music, send and receive text messages and play games or browse the internet via mobile when commuting. Network operators and broadcasters are hoping that Mobile TV will be easily added to the suite of other mobile activities.

However, in April 2006 KDDI is launching simultaneous broadcast to mobile. The service will feature NHK and NTV broadcast channels, among others. This is primarily seen as another distribution platform for broadcasters. Current broadcast law prevents mobile operators from charging extra for Mobile TV, so they need to find a business model to make it sustainable. In this context, network operators are exploring the viability of combining Mobile TV watching with web browsing via mobile. Live programmes will be used as triggers to direct the viewer to sites for services/e-commerce. Linked advertisements, collaboration with TV stations and sales of on-air tunes will provide the revenue streams. Broadcasters see mobile as increasing the opportunities of TV viewing time, filling the network capacity at times which might otherwise have lower viewing rates such as commuting times.

In Korea there are 300,000 Satellite DMB customers and Terrestrial-DMB was launched during the mission. It is expected that D-DMB will grow into a significant niche market, which will incorporate automotive telematics and traffic information/navigation systems. Until recently, telecom operators were restricted from subsidising handsets, but that regulation expired at the end of 2005. Subsidies may be allowed for new services and for customers who have been with a network for three years.

Business models for dual mode cellular/DMB are still being explored, but tensions remain with who regulates if converged, payment arrangements for content, technology 'push' or consumer 'pull' and the type/range of content available.

The Korean experience is very useful as a laboratory for Mobile TV given that DMB UK trials, and DAB-IP UK variant planned service have both been announced.

4.6 Advertising

In the past ten years advertising revenues as a whole have halved in Japan, from ¥6 trillion (£29.4 billion) to ¥3 trillion (£14.7 billion) in 2004, although 2005 saw a pick up in advertising in Japan as the economy recovered. In contrast to this trend, internet advertising revenues have seen healthy growth, as in the UK. In 2004, internet advertising grew 53 per cent year-on-year to a total of ¥1.81 billion (£8.8 million). This includes mobile advertising which represents about 10 per cent. In 2005 online advertising is predicted to have grown to ¥2.8 billion (£13.6 million).[42] This trend has been

41 Mobile 2004 field survey – Mobile phone marketing data by Video Research

42 Dentsu

Dentsu's Head Office in Tokyo

Exhibit 4.7 *Dentsu's impressive head office in Tokyo*

accompanied by a decrease in profitability for large above the line advertising agencies, and a strong rise in the fortunes of below the line sales promotional agencies that specialise in advertising.

Search advertising is performing strongly, as users are tolerant of the text-link based approach, which does not slow down their service. Text links are also attractive to advertisers as they offer direct fulfilment for customers at low cost, and are seen as driving the use of the internet as an advertising medium. This method is therefore beneficial for both parties, and has proved successful for portals such as Yahoo, for whom text sales represent two-thirds of online sales. By comparison, running television commercials over broadband has not increased traffic or proved successful in terms of sales in Japan.

Dentsu (Japan)

Dentsu, the largest and most successful Japanese advertising agency, sees two different models of advertising evolving: a click-through interactive style, which is not dependent on broadband and a broadband spot type advertising, which is not necessarily click-through. Click-through is cost efficient, search oriented, based around URLs and does not require rich broadband. Traditional television type advertising – rich media – requires broadband, video and quality sound. Yahoo! has the largest revenue from advertising in Japan, around ¥20 billion (£97.9 million) from search revenue and ¥10 billion (£48.9 million) from 'traditional' advertising revenue. Dentsu argues that this dichotomy means that within the agencies and clients there are different departments and approaches to calculating value of advertising on the web. Click-through/search is more akin to a traditional sales promotion model than traditional television advertising.

'Always on' internet changes the model so that the advertiser URL drives traffic directly from, for example, a television programme to a site. Dentsu argues that the convergence of broadcasting television and telecommunication is a technology model, not a business model, and there is no evidence of a truly converged revenue model functioning. Television remains a cultural reference point and a window to the wider world. It is driven by a different production culture and people are in reality using the television and the PC simultaneously. This is not converged behaviour and users switch between the two as required. Furthermore, Dentsu argues that the value of on-demand advertising on the internet is limited, because of the limited usage of television and the internet together, and that the internet screen itself would be too small for television advertising.

5 COMPETITION AND COOPERATION

5.1 Introduction

The regulatory and political environment sets the scene for the nature of competition and business models in Korea and Japan. The top down, all embracing approach of U-Korea and U-Japan sets a context that is very different from the much greater free market approach being taken in the UK. The wide-ranging approach of both initiatives embraces everything from using telecoms and IT investments to deliver broad government social objectives to detailed spectrum policy and R&D investment.

This in turn has an impact on the competition policy, attitudes towards incumbents, the nature of the economic models and approaches towards co-operation within the marketplace. Therefore, the attitude towards return on investment by operators and more generally, in the provision of infrastructure is clearly different to that of UK plc. It would appear that the government policymakers would be relaxed if there was further consolidation between the major players in the most significant markets.

5.2 Convergence

The scope and spread of deployment of broadband infrastructure is clearly highlighting and bringing forward a number of major changes, similar to those taking place within the UK marketplace. Many companies across the broadband value chain are experiencing the disruptive impact of convergence and are seeking to defend existing revenue models while developing new ones. All of the major players are concerned about value shifting from their part of the value chain to new competitors. Most recognise the need to develop innovative new business models. However, as long as these remain unproven investment is difficult. This is particularly true for continued investment in infrastructure, which seems to be driven by long-term public policy objectives, and managed competition, rather than the short-term commercial interests of the operators concerned. It is difficult to see a commercial logic for some key plans, NTT's roll-out plan to have 30 million FTTH connections by 2010 having no discernable business justification, for example.

Trends towards fixed/wireless convergence are evident throughout the value chain, from the plans of equipment manufacturers through to the actions of operators and the behaviour of consumers. The convergence of fixed and wireless broadband is seeing the emergence of 'quadruple-play' operators who offer voice, internet, TV and mobile services. This trend is driving a shift in the way companies are addressing their customers, from:

- fixed to mobile
- households to individuals
- in-home to out-of-home consumption
- mass consumption to personal consumption

There is increased focus on personalised rich content services, as content availability is enlarged through mobile broadband, and mobile network operators become established distribution platforms for content providers (music, movies, ringtones). The development of convergent portals is also emerging. KDDI's 3G mobile portal is now being applied to a web environment called Duogate – a portal having two entrances – one via mobile and one via PC.

NHK and NTV are the two major television networks in Japan and they are both being forced to look at major changes in models. The decline in prime-time revenues is prompting NTV to move into the on-line market and into a series of alliances, and into the mobile and PVR technologies. NHK is developing HDTV technology as well as mobile and PVR services.

5.3 Co-operation

Co-operation and the development of alliances across the value chain is key in this new converging environment as there is a need for content and distribution players to work together.

- Mobile operators in both Korea and Japan have been particularly successful in developing effective partnerships with innovative content developers to develop new applications and services for their platforms (in part enabled by the lack of RTTE-type restrictions)
- Cooperation will be required to resolve the issue of online content rights. Until this is properly resolved it is hard to see how a number of the models that are being proposed, particularly IPTV, will fully be able to develop. Softbank has got around this issue by using Korean content extensively on its IPTV services
- NTT is also moving into IP-based TV broadcasting services. It provides broadcast services in partnership with KDDI since KDDI is registered as a broadcaster and provides Hikari Plus TV, broadband multi-channel broadcast and VOD service
- NTT plans to expand its content distribution business by forming alliances with broadcasters or content owners, for example, by jointly establishing sales and operating companies that offer multichannel pay TV services using optical fibre

5.4 Acquisition

Access to content has come to be seen as critical and there has been a trend towards network operators, portals and ISPs pursuing proprietary or exclusive content deals and setting up their own entertainment funds to finance media acquisitions. In Korea, both SK Telecom and KT have bought television and film production companies through media subsidiaries.

In Japan, Livedoor famously attempted to purchase the commercial broadcaster Fuji TV in 2005. It met considerable opposition to this attempt but has formed an alliance whereby Livedoor now has a 51% stake in Fuji TV, and Fuji TV is a 10% shareholder of Livedoor. Softbank has also signalled its wish to purchase a broadcaster in order to build its new media business.

5.5 Consolidation

Further consolidation is expected between network operators. In Korea in particular, operators are close to saturation point in terms of connectivity and struggling to generate new sources of revenue. The trend towards fixed/mobile convergence; the high cost of continued investment in next generation access; and the trend towards the acquisition of content assets is likely to lead to consolidation among smaller operators. Policy makers and regulators appeared comfortable about this from a regulatory perspective, and recognised the need to define markets more broadly and move away from narrow 'pre-convergence' market definitions.

A similar trend towards consolidation is evident in Japan, where Vodafone recently confirmed that it has held talks with Softbank about selling its mobile business.

6 CONCLUSIONS

6.1 Different? Yes; irrelevant? No!

There are many economic, social, cultural and geographic differences between Japan and Korea and the UK. Both countries are highly urbanised, providing economies of density that reduce the cost of deploying new fixed and wireless communications infrastructures. They are linguistically and ethnically homogeneous and both societies place very high value on education which tends to lead towards the rapid take up of new services and strong demand for indigenous content. Both countries have strong ICT manufacturing sectors and spend more on R&D as a proportion of GDP than most countries in Europe. They also share a common approach to economic development, putting greater emphasis on centralised strategic five-year plans than is traditional in the UK.

These differences can make it tempting to dismiss the experience of Korea and Japan as irrelevant to the UK's market development. However, just because these countries are different, it does not mean their experience should be disregarded. Both countries have deliberately put themselves at the vanguard of convergence and the global knowledge economy. Korea describes itself as the world's 'ICT test bed'. The early deployment of new infrastructure, devices, applications and services in these markets means that there is much to learn from both countries.

The purpose of the mission was to:

- Understand the underlying business models and technology choices that are enabling the deployment of these new content, services and applications
- Identify the leading growth areas in terms of new media, content, applications and services
- Understand the current commercial and regulatory drivers and barriers affecting these markets

Specifically, the mission addressed the following questions:

- **Innovation:** Whether new innovative digital content applications and services are being developed in these countries as a result of the investment that has been made in infrastructure
- **Take-up:** The nature of these new services and the factors determining their adoption by consumers and businesses
- **Enablers and inhibitors:** The commercial, regulatory and technical enablers and barriers that are supporting or inhibiting the development of these new products and services
- **Business models:** Whether new business models are emerging in response to the development of new markets
- **Value and benefit:** The potential size and scale of the markets for these services and their significance for the wider economy

6.2 Innovation

The types of content, services and applications currently being developed, deployed and used in Japan and Korea are broadly similar to those being developed or deployed in the UK, including: music, games, video, community services, P2P applications,

VoIP, e-learning and e-commerce. However, in most cases the services seem to be more developed, incorporating more rich media, including video, and the take-up seems to be more extensive. Overall, there was a sense that the pace of change was faster, but that neither market was as advanced as some might have anticipated.

Nevertheless, significant investments in next generation networks capable of delivering a higher quality of service are being made in order to support continued innovation in new value-added services and being ready for post-IP technology. This may accelerate the pace of change still further.

6.3 Take-up

Take-up of broadband and mobile has stimulated strong demand for a wide range of personalised, interactive on-demand services and applications across a wide range of content genres. Online and mobile advertising revenues are growing and the market for digital content is expanding in an otherwise flat market. The popularity of community services including Cyworld and others was particularly impressive and the continued trend towards user-generated content and social networking appears to be very significant. User-generated content will drive demand for more symmetrical broadband services. IPTV and Mobile TV are still in their infancy and it is not yet clear how consumers will adopt these services, although commercial interest is strong.

6.4 Enablers

There are a number of critical enablers that have supported the development of new content, services and applications. The top down, strategic approaches developed by government and the industry have helped to create investor confidence about government commitment to the sector. Infrastructure competition has stimulated the market and players are increasingly being driven to seek competitive advantage through the provision of compelling new content services. As a result, larger players have sought to acquire content assets, such as TV and film production companies, and even broadcasters. Vertical integration seems to have been encouraged by regulators in the interests of sustainable investment.

Close collaboration between equipment manufacturers and operators has been unencumbered by RTTE-type restrictions (particularly in mobile) and has led to the development of platforms on which content developers have been encouraged to innovate. Most players interviewed believed that the availability of high-speed connections with a high quality of service has been an essential trigger to the take up of new rich media services. Other critical enablers include access to affordable micro-payment systems, secure and trusted authentication systems.

6.5 Inhibitors

The accelerated pace of change brings with it disruptive opportunities and threats for players across the value chain. Commercial uncertainty about appropriate business models, timing for market entry, technology choices and the value of assets such as content rights, can delay investment, particularly in expensive new services that have the potential to cannibalise existing revenue streams. As a result, in both markets it has been in the interests of some key commercial players to slow down the pace of change as they reposition themselves in the market. Uncertainty about the regulatory framework for IPTV services has inhibited investment in both markets, and delayed the deployment of these services.

6.6 Business models

Many of the successful new services have become profitable on the back of traditional subscription, advertising, or pay-as-you-go business models. However, in both countries, the games industry has tended to be most innovative, leading the development of new business models such as 'Items selling', which are now being developed by other sectors. Access to a variety of low cost micro-payment systems was a critical enabler for these models to succeed. Games companies were also amongst the first to recognise the revenue potential of communities and to monetise social networking services.

Many of the larger operators are focusing on the ability to deliver 'quadruple play' services and the integration of fixed and wireless services. Some mobile operators are moving to flat rate for some wireless services in order to encourage the use of on-demand rich content services. Most of the major players remain uncertain about the potential business models for new Mobile TV and IPTV services, and are exploring a range of possible options. Few believe that subscription or advertising alone will be sufficient.

Convergence, in all of its forms, is driving trends towards greater cooperation and alliances between players across the value chain, the acquisition of content assets by network operators, portals and IPSs and consolidation between operators.

6.7 Market opportunity and wider benefits

Despite significant growth, online or mobile distribution methods for digital content still only represent a very small percentage of total content sales by genre, suggesting that there is a huge opportunity for growth in these areas in the coming years. There are early signs in Japan of a growing interest in international and niche content, which could open up new opportunities for UK content companies.

Korea has set a clear policy to become the world's ICT powerhouse and the wider benefits to the Korean economy and society are grounded in the export potential of the ICT sector, which currently accounts for 20 per cent of GDP. Japan defines the value of ICT more broadly. While recognising that it is critical to the success of its own ICT sector, it is also seeking to integrate ICT in to all aspects of everyday life in order to address the key social and economic challenges facing the country. Particularly those stemming from the impact of an aging population and declining birth rate.

6.8 Further findings

Japan and Korea are responding to the impact of China

The mission delegates came away with the strong impression that Korea and Japan feel the heat of competition from China's burgeoning economy more acutely than we do in Europe. They are aware of China's scale impact on the ICT sector and have prioritised ICT leadership and exploitation as part of their strategic response to China's growing economic and political influence.

ICT is being prioritised as a key economic driver

The countries visited have recognised the implications of broadband enabled ICT for their economic and social development and are measuring their progress in this area and its direct and indirect contributions to society and GDP.

ICT is being recognised as a driver of social change

Broadband and convergence are driving and enabling social and societal change in diverse ways. In particular the emergence of new

community social network services and the trend towards user generated content is shifting power towards the consumer/citizen. Perhaps the best example of this is the online news service OhmyNews in Korea, which is a revolutionary development in news media and citizen empowerment.

Perhaps the most impressive statement about the societal impact of the internet was made by a government official in Seoul. In his view, it was now impossible to envisage a military coup ever taking place in Korea. This was not the case even ten years ago and he attributed this change to the democratising impact of the internet.

Strategies and visions are user centric

Korea and Japan have developed comprehensive national strategies for the development and exploitation of ICT. In both countries these have been developed in close collaboration between government ministries, professional 'think-tanks', trade associations, technology suppliers and network operators. However, whilst being supplier led, both attempt to be 'user centric' by putting user benefit and experience at the centre of policy and strategy. They are also probably more forward looking, longer-term and visionary than any of the equivalent national strategies in Europe and are certainly much more detailed than the EU's i2010 strategy.

Next generation access is a leap of faith

Even with high economies of density in Korea and Japan and the benefit of overhead distribution, the deployment of deep fibre into the network requires huge capital expenditure. The mission found no evidence of a clear business case to support the investments being made in fibre deployment by operators. Instead there was a belief that future demand for bandwidth would continue to grow and that the success of next generation services would depend upon the ability to guarantee high quality of service in the access layer. The prevailing view seemed to be that 'the move to fibre deployment was inevitable and it was better to make the investment early rather than later'.

It seems unlikely that operators would have come to this conclusion alone, without strong government and supplier backing for the comprehensive ICT strategies set out in U-Japan and U-Korea vision. One impact of this policy may be continued consolidation between operators. The fact that policy makers and suppliers have an eye on international markets may be giving them the confidence to invest in new technologies without pondering too much on future demands at home.

Payment, identity and trust just as important as speed

Payment systems, identity, security and trust are critical enablers for innovation and growth and will become increasingly important in a more networked society. This is an area where government can play an important role in working with the industry to ensure a benign user environment in the ubiquitous networked society.

7 RECOMMENDATIONS RESULTING FROM THE MISSION

There are a number of recommendations emerging from the mission and we suggest that industry works with the specified government department in each case to investigate further work in these areas.

1 Korean and Japanese approaches to market regulation should be studied as part of the EU Communications Framework Review – DTI/ Ofcom
Given the trends towards vertical integration and consolidation in Korea and Japan, the regulatory approaches being taken in these markets should be assessed to determine whether they offer useful lessons that could be applied in the current review of the EU framework.

2 Establish UK Digital Readiness Index – ONS (Office of National Statistics)
There is a measurement philosophy in Korea and Japan – what gets measured gets done. The UK should establish effective metrics to assess the UK's digital readiness.

3 Establish a focus on payment-identity-trust in a broadband world – DTI
In an increasingly networked society, the challenges of ensuring a safe and trusted user environment will increase. UK government and industry should be enhancing their collaborative efforts now, to address issues that will be critical to consumers in five years' time.

4 Strategic initiatives to be considered:

a) Review options for Next Generation Access (NGA) deployment and publish a plan – DTI/ BSG.
The UK will need to develop its own mid- to long-term route map for the evolution towards NGA in the UK.

b) Digital health for patient-centred care – DTI/DOH
Although not the primary focus of this mission, there are clearly significant and economic and social benefits to be gained from the diffuse application of ICT in patient centred-healthcare. More could be learned form the Asian experience in this area.

c) Connected car and connected roads KTN (Knowledge Transfer Network) – DTI/DOT
Again, although not the primary focus of this mission, both Japan and Korea are seeking to exploit the application of ICT in transport for economic, social and environmental benefit. A connected cars initiative in the UK could build on the recent Intelligent Networks Foresight study.

d) Digital Olympics challenge – DTI/DCMS/IAP (Information age partnership)
The relevance of the Ubiquitous Networked Society Vision should be considered in the context of the 2012 Olympics.

5 Consider follow-up missions on IPTV – Intellect
Many forms and flavours of IPTV services are emerging in Japan and Korea. Consumer reaction to these services and the evolution of the related business models will be instructive for UK players large and small, therefore a more detailed follow-up mission in this area would be valuable for UK companies.

6. Consider undertaking a major review on the impact of China-DTI/FCO
The strategies being developed in Japan and Korea are, in part, incentivised by a recognition of the potential impact that China will have on the global ICT market. DTI should consider undertaking a review of the strategic impact of China on the UK.

Appendix A

KOREA AND JAPAN: COUNTRY PROFILES

Indicator	Japan	Korea	UK
Geography			
Capital	Tokyo	Seoul	London
Area	377,835 sq km	98,480 sq km	244,820 sq km
Demographics			
Population*	127,417,244	48,422,644	60,441,457
Population growth rate*	0.05%	0.38%	0.28%
Urban population#	65.7%	80.8%	89.2%
Population density (inhabitants/km2)*	337	491	243
Life expectancy at birth*	81.15 yrs	76.85 yrs	78.38 yrs
Ethnic groups*	Japanese 99%, others 1%	Homogeneous (except for about 20,000 Chinese)	white 92.1%, black 2%, Indian 1.8%, Pakistani 1.3%, mixed 1.2%, other 1.6%
Economy			
GDP**	$3.745 trillion	$925.1 billion	$1.782 trillion
GDP/capita**	$29,400	$19,200	$29,600
GDP growth**	2.9%	4.6%	3.2%
Consumer inflation**	-0.1%	3.6%	4.8%
Industrial productivity growth rate**	6.6%	10.1%	0.9%
Unemployment**	4.7%	3.6%	4.8%
Imports**	$401.8 billion	$214.2 billion	$439.4 billion
Exports**	$538.8 billion	$250.6 billion	$347.2 billion
Expenditure on R&D (as % of GDP)°	3.09%	2.96%	1.9%
Currency	Yen	Won	British pound
Mobile penetration	90.2 million	38.3 million	65.5 million
Broadband penetration	12.2 million	20.5 million	8.8 million

* Central Intelligence Agency www.cia.gov/publications/factbook/index.html at July 2005

** Central Intelligence Agency www.cia.gov/publications/factbook/index.html at July 2004

\# UN Common Database http://globalis.gvu.unu.edu/ at 2005

° Organisation for Economic Co-operation and Development www.oecd.org at 2001

Appendix B

COORDINATING BODIES AND MISSION TEAM

Coordinating bodies

The mission was coordinated by Intellect with support from BSG and MDA.

intellect

Intellect is the leading trade body for the UK based information technology, telecommunications and electronics industry. It has approximately 1,000 members who employ more than 1.1 million people in the UK. Combined these companies account for around 10% of UK GDP. www.intellectuk.org

BSG
Broadband Stakeholder Group

The Broadband Stakeholder Group (BSG) is the government's key advisory group on promoting the adoption of broadband services. The BSG works as a facilitator, bringing together stakeholders from across the broadband value chain to share knowledge and work in partnership to support the UK's ongoing transition towards being a world leading connected economy by 2010. Membership of the BSG is voluntary and is open to companies, organisations and individuals throughout the broadband value chain. www.broadbanduk.org

mda
MOBILE DATA ASSOCIATION

The Mobile Data Association (MDA) was established in 1994 to increase awareness of mobile data amongst users and their advisers. Over the past ten years, the association has grown to become the forum for the international mobile data community. As well as providing a focal point for industry participants to meet and share information on technical and business issues, the MDA actively works to promote the uses and benefits of wireless value added services through industry and business press, conferences, seminars and the maintenance of a website. www.mda-mobiledata.org

Exhibit B.1 *The mission team in Tokyo*

Delegates to both Korea and Japan

Antony Walker
Director, Intellect

Intellect is the trade association for the UK hi-tech industry. Intellect's membership comprises organisations both large and small from the UK's information technology, telecommunications and electronics sectors.

UK hi-tech companies participate in Intellect in order to influence government and regulatory policy, improve the markets in which they operate and enhance their business performance.

Intellect was formed in May 2002 from the merger of CSSA (Computer Software & Services Association) with FEI (Federation of the Electronics Industry)

E-mail: antony.walker@intellectuk.org

Intellect
Russell Square House
10-12 Russell Square
London WC1B 5EE
www.intellectuk.org

Mike Short
Chairman, Mobile Data Association
Vice President Research & Development, O2

The Mobile Data Association is the non-profit, global association for vendors and users of mobile data and their advisors.

O2 is a leading provider of mobile communications services in Europe, with wholly owned businesses in the United Kingdom, Germany, Ireland and the Isle of Man. It has nearly 25 million customers, approximately 15,000 employees and reported revenues for the year ended 31 March 2005 of £6,683 million.

E-mail: mike.short@O2.com

O2
260 Bath Road
Slough, Berkshire
SL1 4DX
www.o2.com

Mobile Data Association
13 Foster Way
Great Cambourne
Cambridge CB3 6BP
www.mda-mobiledata.org/mda

William A Jones
CEO, Global Village Limited

Bill has developed and led European and global converging communications, media and IT businesses for over 20 years with Fortune and Times 100 companies (eg Motorola, MCI, C&W), in most cases their largest international businesses. He has also undertaken investment and M&A work in convergence globally as well as technology venture capital and investment work throughout the US.

Global Village is an SME. It is creating next-generation businesses using next-generation technologies in convergence, digital media management and trusted communications solutions. The company recently won the prestigious EU GUIDE Award for Online Excellence under the EU eContent programme. It is partnered with global leaders in its industry.

E-mail: bill@globalvillage.ltd.uk

Global Village
The White House
50 Camp Road
Gerrards Cross
Bucks SL9 7PD
www.globalvillage.com

Delegates to Japan only

Stella Creasey
Head of Audience Research BBC New Media (at time of mission)

The BBC (British Broadcasting Corporation) is the public service broadcaster for the UK. The BBC has 26,000 employees and offers television, radio, online and other new media services such as wap, VOD and interactive TV.

E-mail: stella.creasey@bbc.co.uk

Broadcasting House
Portland Place
London W1A 1AA
www.bbc.co.uk

Professor Rahim Tafazolli
University of Surrey

Professor Tafazolli is a Professor of Mobile/Personal Communications and Head of Mobile Communications Research at the Centre for Communication Systems Research, the University of Surrey. He has been active in research for over 20 years and has authored and co-authored more than 300 papers in refereed international journals and conferences.

Professor Tafazolli is consultant to many mobile companies, has lectured, chaired and been invited as keynote speaker to a number of IEE and IEEE workshops and conferences. He has been technical advisor to many mobile companies, the Home Office and the European Union, all in the field of mobile communications. He is the founder and past Chairman of IEE International Conference on 3rd Generation Mobile Communications.

E-mail: R.Tafazolli@surrey.ac.uk

The University of Surrey
Guildford, Surrey, GU2 7XH
www.surrey.ac.uk

Philip Graf CBE
Chairman of the Broadband Stakeholder Group (BSG) (until December 2005)

Philip Graf served as Non-executive Chairman of the UK's Broadband Stakeholder Group between February and December 2005. After working primarily in regional newspapers during his early career, he joined Trinity in 1985, became chief executive in 1993 and was promoted to chief executive of Trinity Mirror when the company merged with the Mirror Group in 1999. He resigned from Trinity Mirror in September 2002 and was appointed Chairman of the Press Standards Board of Finance, which funds the Press Complaints Commission.

In August 2003 the Secretary of State for Culture, Media and Sport commissioned Philip to undertake an Independent Review of BBCi and his report – The Graf Report – was published in May 2004. Philip Graf was awarded the CBE in 1993 for services to regional newspapers. In January 2006 he was appointed Deputy Chairman of Ofcom.

Phillip White
International Technology Promoter, Japan, IT Electronics and Communications – a DTI Global Watch Service managed by Pera

DTI Global Watch Service Technology Partnering is characterised by a network of DTI International Technology Promoters (ITPs) – specialists working with UK organisations to facilitate inward technology transfer and broader technology collaboration.

Phillip White is the DTI International Technology Promoter (ITP) with specific responsibility for Japan, widely recognised as one of the world's leading investors in technology development.

Phillip's main objective is to access technology-based opportunities in support of the UK IT, electronics and communications industries, though he welcomes enquiries from any UK company seeking a Japanese technology partner.

Phillip graduated from Cambridge University with a degree in Electronic Engineering and a postgraduate course in Production Methods and Management. He has more than 25 years' experience in engineering, with over 16 years spent working in Japanese companies in the electronics and automotive industries. He hopes that UK companies will be eager to take advantage of his technical experience, language skills and pragmatic approach to working with Japanese companies.

E-mail: phillip.white@pera.com
www.globalwatchservice.com/itp

Appendix C

MISSION PROGRAMME

Part 1: Korea

Thursday 1 December 2005

09:30 – 10:00
The British Embassy
Taepyeongno 40
4 Jeong-dong
Jung-gu
Seoul 100-120
www.britishembassy.gov.uk

10:30 – 12:00
Hanaro Telecom
Shindongah Fire & Marine Insurance Building
43 Taepyeongno2-Ga
Jung-Gu
Seoul 100-733
www.hanaro.com

12:10 – 13:45
Ovum Korea
22nd Floor
Kyobo Life Insurance Building
#1, Jongno-1Ga, Jongno-Gu
Seoul 110-714
www.ovum.com/about/korea/default.en.asp

14:00 – 15:30
Ministry of Information & Communication
Telecommunication Center Building
100 Sejongno, Jongno-gu, Seoul 100-777
www.mic.go.kr/eng/index.jsp

16:00 – 17:30
SK Telecom
11, Euljiro
2-ga, Jung-gu
Seoul 100-999,
http://www.sktelecom.com/eng/

Friday 2 December 2005

10:00 – 11:30
Korea Telecom
206 Jungja-dong
Bundang-gu
Seongnam-city,
Kyeonggi-do, 463-711
www.kt.co.kr/kthome/eng/index.jsp

13:00 – 14:30
Nexon
Sekang Bldg 694-11
Yeoksam-dong
Gangnam-gu Seoul 135-917
www.nexon.com

14:30 – 16:00
KISDI
1-1Juam-Dong
Kwachum
Kyunggi-Do, 427-710
www.kisdi.re.kr/wwbs/eng/main.html

Part 2: Japan

Monday 5 December 2005

10:00 – 12:00
Ministry of Internal Affairs and Communications
1-2 Kasumigaseki 2-chome
Chiyoda-ku.
Tokyo 100-8926
www.soumu.go.jp/english/

15:00 – 18:30
British Embassy (seminar and reception)
1 Ichiban-cho
Chiyoda-ku
Tokyo, 102-8381
www.uknow.or.jp/be_e/

Tuesday 6 December

10:00 – 12:00
Ministry of Economics, Trade and Industy (METI) and Digitial Content Association of Japan (DCAJ) Joint meeting
www.dcaj.org/outline/english/index.html

Ministry of Economics, Trade and Industry
3-1 Kasumigaseki
1-Chome
Chiyoda-ku
Tokyo
www.meti.go.jp/english/

15:30 – 17:30
Softbank BB
Tokyo Shiodome Building
1-9-1, Higashi-shimbashi,
Minato-ku, Tokyo 105-7303
www.softbank.co.jp/en

Wednesday 7 December

10:00 – 12:00
NHK
2-2-1 Jinnan,
Shibuya-ku,
Tokyo 150-8001
www.nhk.or.jp/english/

13:30 – 15:30
KDDI
Garden Air Tower,
10-10, Iidabashi 3-chome,
Chiyoda-ku,
Tokyo 102-8460
http://www.kddi.com/english/

16:00 – 18:00
Livedoor
Mori Tower
10-1, Roppongi 6-chome
Minato-ku Tokyo, 106-6138
http://www.livedoorinc.com/

Thursday 8 December

10:00 – 12:00
NTT
3-1, Otemachi 2-chome
Chiyoda-ku
Tokyo 100-8116
http://www.ntt.co.jp/about_e/index.html

14:00 – 16:00
Nippon TV (NTV)
6-1, Higashi-Shimbashi
Minato-ku
Tokyo
www.ntv.co.jp/english/

19:00 – 20:30
WAO Creative College
(Wao Corporation)
Meiho Bldg.
1-21-1 Nishi-Shinjuku
Shinjuku-ku
Tokyo, 160-0023
www.wao-corp.com

Friday 9 December

10:00 – 12:00
Dentsu
1-8-1, Higashi-shimbashi,
Minato-ku,
Tokyo 105-7001
www.dentsu.com

13:30 – 15:00
SONY
6-7-35 Kitashinagawa,
Shinagawa-ku,
Tokyo 141-0001
www.sony.net

15:30 – 17:00
Namco
9F Taiyo Life Shinagawa Building
2-16-2, Konan, Minato-ku, Tokyo, 108-0075
www.bandainamco.co.jp/en

Appendix D

POLICY AND REGULATIONS

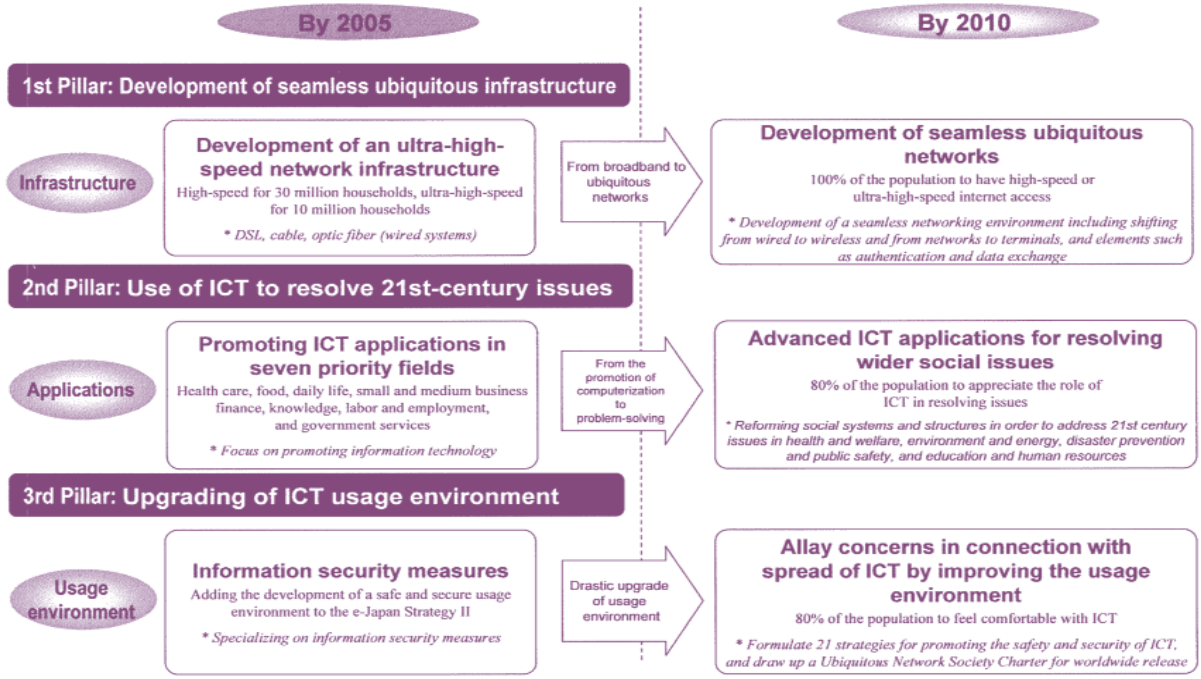


Exhibit D.1 *Main features of the u-Japan policy*

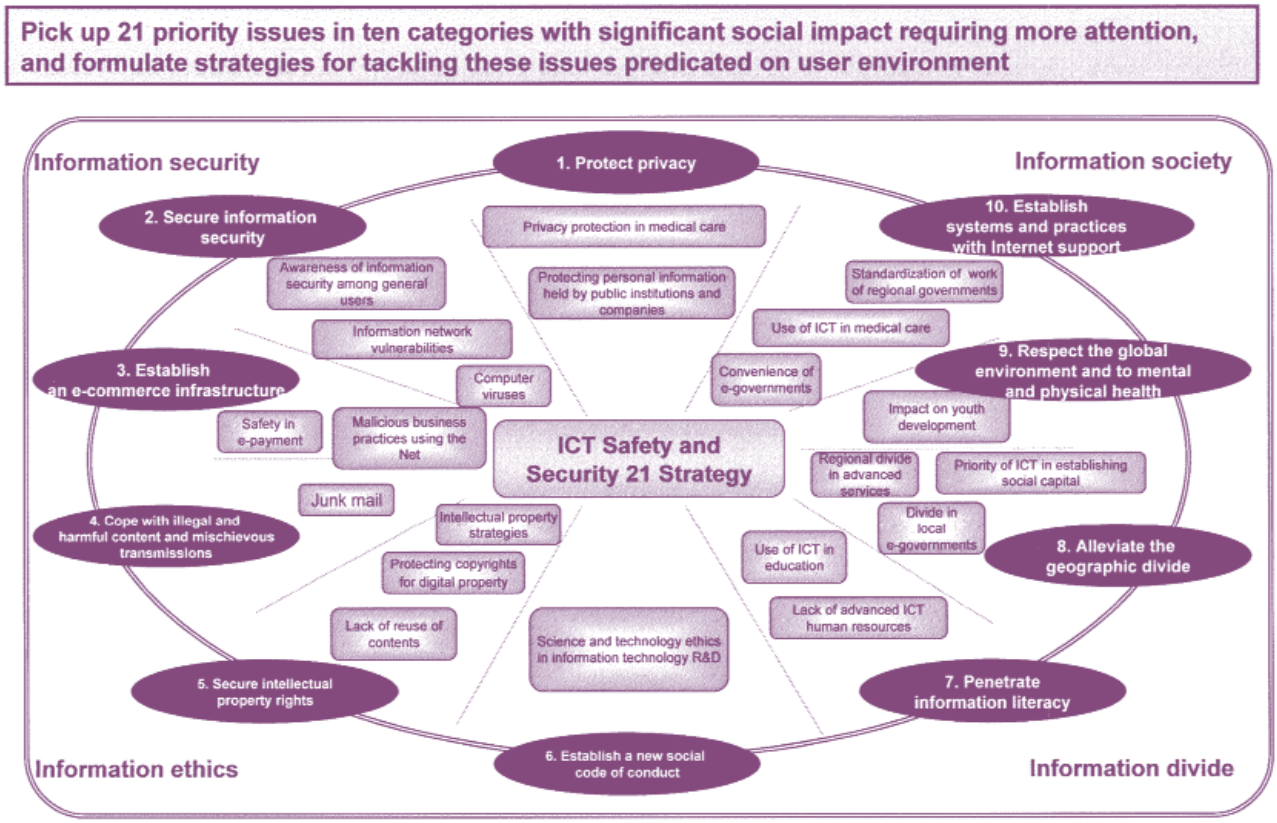


Exhibit D.2 *ICT safety and security 21 strategy*

Appendix E

ACKNOWLEDGMENTS

The mission team wishes to express its thanks to:

- All of the host companies and organisations in Korea and Japan for spending so much time during the visit, and for their patience in answering so many questions. Many senior executives gave up their time to provide the team with their views and to share their experience for which the team is extremely grateful.

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- Pera for its support and patience in designing and printing this report.

Finally, very special thanks go to Phillip White, DTI International Technology Promoter for Japan, who has made an invaluable contribution throughout.

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Appendix G

GLOSSARY

AAC+	advanced audio coding +
ADSL	asymmetric digital subscriber line
APRU	average revenue per user
B2B	business to business
BBC	British Broadcasting Corporation (UK)
BcN	Broadband Convergence Network
bps	bits per second
C2B	consumers to business
CDM	code division multiplex
DAB-IP	digital audio broadcasting - internet protocol
DCAJ	Digital Content Association of Japan
DMB	digital multimedia broadcasting
DOH	Department of Health
DOT	Department of Transport
DRM	digital rights management
DTI	Department of Trade and Industry (UK)
DTV	digital television
DVD	digital versatile disc
EIRP	equipment identity register procedure
EPG	electronic program guide
EV-DO	evolution data optimised
FCO	Foreign and Commonwealth Office (UK)
FTTH	fibre to the home
F-VOD	full video on demand
Gbps	gigabits per second
GDP	gross domestic product
GHz	gigahertz
GIS	geographic information system
HDD	hard disc drive
HDTV	high definition television
HFC	hybrid-fibre coaxial
HSDPA	high-speed data/downlink packet access
Hz	hertz
iCOD	internet content on demand
ICT	information and communication technology
IEEE	Institute of Electrical and Electronics Engineers
IP	intellectual property
IP	internet protocol
IPPH	Intellectual Property Policy Headquarters
IPR	intellectual property rights
IPTV	internet protocol television
IPv6	internet protocol version 6

ISO	International Organisation for Standardisation
ISP	internet service provider
IT	information technology
ITS	Intelligent Transport Systems
ITU	International Telecommunication Union
JGN	Japan Gigabit Network
kbps	kilobits per second
KDDI	Mobile Operators
KII	Korea Information Infrastructure
KISDI	Korean Information Society Institute
km	kilometre
km2	square kilometres
KT	Korea Telecom
KW	kilowatt
LAN	local area network
MBCO	Mobile Broadcasting Corporation (Japan)
mbps	megabits per second
MBSAT	mobile broadcasting satellite
MHz	megahertz
MIC	Ministry of Information and Communication (Korea), Ministry of Internal Affairs and Communications (Japan)
MMORGG	massively multiplayer online role-playing games
MP3	moving picture experts group layer-3
MPEG	moving picture experts group
NGN	next generation network
NICT	National Institute of Information and Communication Technology
NRI	Nomura Research Institute
NTT	Nippon Telecom Group
NTV	Nippon Television Network Corporation (Japan)
N-VOD	near video on demand
OECD	Organisation for Economic Co-operation and Development
ONS	optical networking system
P2P	peer-to-peer
PC	personal computer
PDA	personal digital assistant
PMP	portable media player
PPC	pay per content
PPP	purchasing power parity
PPV	pay per view
PSTN	public switched telephone network
PVR	personal video recorder
QoS	quality of service
QR	quick response
R&D	research and development
RAM	random access memory
RFID	radio frequency identification
RTTE	Radio and Telecommunications Terminal Equipment
R-VOD	restricted video on demand

S-DMB	satellite digital multimedia broadcasting
SIC	start-up investment company
SKT	South Korea Telecom
SME	small and medium-sized enterprise
SMS	short messaging service
SNS	social network sites
SoC	system-on-chip
STB	set top box
S-VOD	scheduled video on demand
Tbps	terabits per second
TDM	time division multiplex
T-DMB	terrestrial digital multimedia broadcasting
UN	United Nations
UNS	ubiquitous network society
URL	universal resource locator
VCR	video cassette recorder
VDSL	very high bit-rate digital subscriber line
VOD	video on demand
VOIP	voice over IP
WAO	WAO Creative College
W-CDMA	wideband code division multiple access
WiBro	wireless broadband
WiMAX	Worldwide Interoperability for Microwave Access
xDSL	x digital subscriber line (of any type)

Other DTI products that help UK businesses acquire and exploit new technologies

Grant for Research and Development – is available through the nine English Regional Development Agencies. The Grant for Research and Development provides funds for individuals and SMEs to research and develop technologically innovative products and processes. The grant is only available in England (the Devolved Administrations have their own initiatives).
http://www.dti.gov.uk/r-d/

The Small Firms Loan Guarantee – is a UK-wide, Government-backed scheme that provides guarantees on loans for start-ups and young businesses with viable business propositions.
http://www.dti.gov.uk/sflg/pdfs/sflg_booklet.pdf

Grant for Investigating an Innovative Idea – is designed to help UK businesses develop innovative products, processes or services that are in the very early stages of development.
http://www.dti.gov.uk/innovative-idea/index.htm

Knowledge Transfer Partnerships – enable private and public sector research organisations to apply their research knowledge to important business problems. Specific technology transfer projects are managed, over a period of one to three years, in partnership with a university, college or research organisation that has expertise relevant to your business.
http://www.ktponline.org.uk/

Knowledge Transfer Networks – aim to improve the UK's innovation performance through a single national over-arching network in a specific field of technology or business application. A KTN aims to encourage active participation of all networks currently operating in the field and to establish connections with networks in other fields that have common interest.
http://www.dti.gov.uk/ktn/

Collaborative Research and Development – helps industry and research communities work together on R&D projects in strategically important areas of science, engineering and technology, from which successful new products, processes and services can emerge.
http://www.dti.gov.uk/crd/

Access to Best Business Practice – is available through the Business Link network. This initiative aims to ensure UK business has access to best business practice information for improved performance.
http://www.dti.gov.uk/bestpractice/

Support to Implement Best Business Practice – offers practical, tailored support for small and medium-sized businesses to implement best practice business improvements.
http://www.dti.gov.uk/implementbestpractice/

Finance to Encourage Investment in Selected Areas of England – is designed to support businesses looking at the possibility of investing in a designated Assisted Area but needing financial help to realise their plans, normally in the form of a grant or occasionally a loan.
http://www.dti.gov.uk/regionalinvestment/

The DTI Global Watch Service provides support dedicated to helping UK businesses improve their competitiveness by identifying and accessing innovative technologies and practices from overseas.

Global Watch Information
Global Watch Online – a unique internet-enabled service delivering immediate and innovative support to UK companies in the form of fast-breaking worldwide business and technology information. The website provides unique coverage of UK, European and international research plus business initiatives, collaborative programmes and funding sources.
Visit: www.globalwatchservice.com

Global Watch magazine – distributed free with a circulation of over 50,000, this monthly magazine features news of overseas groundbreaking technology, innovation and management best practice to UK companies and business intermediaries.
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subscriptions@globalwatchservice.com

UKWatch magazine – a quarterly magazine, published jointly by science and technology groups of the UK Government. Highlighting UK innovation and promoting inward investment opportunities into the UK, the publication is available free of charge to UK and overseas subscribers.
Contact:
subscriptions@ukwatchonline.com

Global Watch Missions – enabling teams of UK experts to investigate innovation and its implementation at first hand. The technology focused missions allow UK sectors and individual organisations to gain international insights to guide their own strategies for success.
Contact:
missions@globalwatchservice.com

Global Watch Technology Partnering – providing free, flexible and direct assistance from international technology specialists to raise awareness of, and provide access to, technology and collaborative opportunities overseas. Delivered to UK companies by a network of 22 International Technology Promoters, with some 8,000 current contacts, providing support ranging from information and referrals to more in-depth assistance with licensing arrangements and technology transfer.
Contact: itp@globalwatchservice.com

For further information on the Global Watch Service please visit
www.globalwatchservice.com

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