



Global Business Dialogue on Electronic Commerce

GBDe 2006 Issue Group

**Ubiquitous Network Society
“Emerging e-Business Opportunities”**

Issue Chair: Dr. Teruyasu Murakami, Chief Corporate Counselor, Nomura Research Institute, Ltd., Japan
Issue Group Member: Dr. Jyh-Sheng Ke, President, Institute for Information Industry, Taiwan

1. Introduction

The wide spread of the “Ubiquitous Network Society” (UNS) concept is well underway throughout the Internet. This is more prevalent in the Asian region with Japan, Taiwan and Korea all actively developing Ubiquitous Network Society policies. In order for this kind of concept to be successfully implemented, there needs to a framework of support provided by National IT Strategies.

Last year, the GBDe studied the Ubiquitous Network Society from the aspect of future use, services, and potential applications. This year, selected National IT Strategies are re-examined and, with the maturing of the UNS concept, a new business opportunity is discussed. Also, further recommendations are made to enhance the rapid implementation of the “Ubiquitous Network Society” throughout the world. The most productive approach is co-regulation where business seeks to adapt and grow while the Government provides a supporting environment through an effective National IT Strategy.

2. National Strategies and Worldwide Activities Update

2.1. u-Japan

In Japan, the initial framework for the current “u-Japan” strategy was created as “e-Japan”, started on January of 2001. At first the aim was to create the world’s most advanced IT nation. During the first stage targeted for 2005, the plan was to support the rapid development of a reasonable broadband infrastructure.

In July of 2003, infrastructure building was well ahead of the initial projection and the IT strategy changed course. In July of 2003, the “e-Japan II” strategy was announced, and an increase in usage by everyone was to be the new focus. This shift in Japan’s National IT Strategy was one of the first of its kind, where strategy is innovative and dynamic, adapting to changing economic environments. At the end of 2004, with many of the goals of “e-Japan II” achieved, the Ministry of Public Management, Home Affairs, Posts and Telecommunications (MPHPT) announced a new 10-year National IT Strategy was to be launched called “u-Japan”.

For “u-Japan”, the theme was “Whenever, Wherever, Whatever and Whoever are connected to the Network” and, “Using ICT to Establish a Richness of Ubiquitous Network Society”.

In January of 2006, the next 5-year National IT Strategy was created. This time, the plan was to enhance the ICT usage not only through network infrastructure building, but by creating new applications, content as well as usable devices and instruments. This is to be the primary R&D effort between now and 2010. Examples maybe seen in “non-contact RFID IC tag technology-based electronic cash”, and “Blog and SNS – Social Networking Service-based information provision”; both well established ubiquitous instruments in Japan.

Japan’s IT Strategies are based on the belief that the establishment of advanced ICT mechanisms will enhance the daily life of each citizen and unlock individual creativity. However, in addition to the positive impact of new technology, there are also possible negative societal impacts which should also be considered.

2.2. United States of America

As far as the U.S.A. in general, there is no visible official IT Strategy for the Ubiquitous Network Society. However, as the Internet was born in the U.S.A., new trends and applications continue to create a dynamic market. One recent initiative from the private sector is the concept of “WEB 2.0”. Another influential trend may be the increasing use of digital technology in the implementation of anti-terrorism and National Security strategy.

The Internet was originally created to provide communication between the U.S. Government’s defense project and associated academic institutions. Because of that, many of the new Internet technologies emerged from the universities. In the U.S., the word “Ubiquitous” is not often heard, but the original use of the word comes from trying to solve the complex computer network connections. One U.S. Academic Researcher noted the following: “Recent years have witnessed a dramatic trend towards ubiquitous computing, whereby very large numbers of casually accessible, mobile or embedded computing devices are connected to an increasingly ubiquitous networking infrastructure.”

In principle, the US National IT Strategy may be described as one which seeks to follow a twin path of technological development for National Security combined with fostering

an environment in which business innovation can thrive. In this way the U.S.A. continues to act as an incubator for new ICT companies with cross-border ambitions.

2.3. Korea

Korea has placed a high priority on the establishment of the Ubiquitous Network Society and is one of the most advanced nations in terms of implementation of this concept. In order to promote “Ubiquitous” readiness, Korea’s first National IT strategy was called “IT839”. The initial base for IT839 was called “e-Korea vision 2006”. The term “839” comes from “8 Services”, “3 Infrastructures”, and “9 Growth Engines”.

In 2006, IT839 was transformed into a new IT National Strategy called “u-IT839”. This strategy is based on “8” main services. These are:

1. WiBro Service with 2.3Ghz mobile Internet
2. DMB – Digital Multimedia Broadcasting on Satellite and Terrestrial Broadcast Network
3. Home Network – Network within any given home
4. Telematics
5. RFID related Application and Services
6. W-CDMA
7. Terrestrial Digital TV
8. Internet Telephony (VoIP).

In conjunction with these 8 main services, for the infrastructure, there are “3” infrastructure expansions:

1. Broadband Convergence Network
2. U-Sensor Network
3. IP v6 based Internet.

Lastly, there are “9” specific new markets:

1. Next Generation Mobile Network
2. Digital TV
3. Home Network
4. IT System on Chip (SoC)
5. Next Generation PCs
6. Embedded Software
7. Digital Content
8. Telematics devices
9. Intelligent Robots.

Like Japan, Korea has been dynamic in changing its IT strategies to accommodate new trends. The Korean Government predicts if the u-IT839 is successful, then by the year 2010, growth in ubiquitous related businesses will be 14.2% within 5 years time, equivalent to 576 trillion Korean Won in directly related industries, and 266 trillion Korean Won in adjacent industries.

2.4. u-Taiwan

During the past years Taiwan's government has devoted significant efforts to developing competitive ICT infrastructure and industry. As a result, the World Competitiveness Report 2005-2006 of World Economic Forum (WEF) rated Taiwan in fifth position among the 117 countries worldwide. For the past 20 years, Taiwan's IT industry has evolved from an OEM to ODM model, and has migrated to providing the global supply chain management services. Currently, Taiwan's IT industry has obtained the 4th largest market share in hardware manufacturing and OEM business. However, within the IT value chain, the profit margin of manufacturing and packaging has been reduced significantly. Taiwan's IT industry is therefore facing a critical challenge of paradigm shift from a manufacturing-oriented focus to a high value-added services and products focus.

With the convergence trend of consumer electronics as well as information, wireless communication and service technologies, the Ubiquitous Network Society environment has become more apparent. The Executive Yuan (Cabinet) of Taiwan Government incorporated "the development of Taiwan's UNS society" into its major IT policy and designated it as the next stage of the e-Taiwan project. After the planned mission and tasks of the current e-Taiwan project are accomplished by the end of 2007, Taiwan's government will start from users' point of view to develop innovative key UNS services, to strengthen the competitiveness of Taiwan's IT infrastructure and industry.

The key action items of the e-Taiwan project are establishing broadband environment for over 6 million households, as well as developing the services of e-Government, e-business, e-life, e-transport, as well as bridging the digital divide. The goal of the M-Taiwan project is to resolve issues associated with the last mile, and to develop Taiwan's wireless communication industry. For the u-Taiwan project, the key concept is to develop Taiwan as a secure and convenient society, where users will be able to share knowledge and information to achieve their full potential in promoting sustainable development and improving the quality of life. It will also support the design and realization of a people-centered information society, where the secure and reliable flow of information will be ensured.

The Taiwan government planned the following strategic goals and directions for the u-Taiwan project:

1. Plan and develop a Ubiquitous Network Society infrastructure, to make Taiwan one of the 5 leading countries in the network readiness index (NRI) of the WEF. The strategic directions consist of focusing on the human needs as well as technology trends, encouraging social experts and citizens to be involved in the UNS development.
2. Provide 80% of national households with 30 Mbps broadband infrastructure, to enable a diversified class of services such as entertainment, video, conference, monitoring, and context aware services. The strategic directions consist of developing a competitive next generation high-speed broadband network

- infrastructure, as well as to leverage industrial resources to develop a u-City for experimenting and demonstrating prototype UNS services.
3. Promote the idea of “Ubiquitous Network Society basic law”, and related policies, to strengthen the UNS environment. The strategic directions consist of establishing policy law, enhancing information security, developing citizens’ trust, providing fair digital opportunity, and training experts for the next generation networks.
 4. Develop key UNS services that fulfill users’ requirement as well as to make Taiwan as a leading UNS service demonstration country. The strategic directions consist of developing various life enhancing UNS applications such as applications in food, medicine, accommodation, transportation, as well as education. For instance, Taiwan plans to develop a series of intelligent living space applications. The key idea is to incorporate the IT and the architecture related domain knows how to assist the IT industries providing integrated intelligent living space products or services. In addition, the developed intelligent living space applications and services should improve the life quality and convenience for user users.

2.5. China

China is one of the fastest growing economies in the world. Like many other sectors of its economy, rapid expansion has resulted in China leap-frogging technological generations and emerging as an increasingly important IT market.

This leap-frogging phenomenon is also true in some areas of China’s National IT policy. Earlier in 2006 China enacted one of the world’s most strict SPAM laws (effective on March 30th). Although, Chinese per capita Internet usage ranks it below the world’s top 30, the total number of users is far above that of Japan for example. As the benefits of economic growth are spread inland, the potential for e-commerce will grow exponentially.

Aware of this potential explosive growth, the Chinese Government is working on many different aspects of the law to govern and protect the Internet usage. In early summer of 2006, China held a Government-sponsored symposium discussing the creation of privacy law in China. The most notable aspect of this symposium was that domestic and foreign industry representatives were invited and encouraged to voice their opinions. The willingness to support continuing dialogue and the establishment of a “Privacy Law” may herald a significant attempt to begin a process to establish a comprehensive National IT Strategy.

Another major development in 2006 was the news that the Chinese Government would not allow any manufacturing or sale of PC equipment without a pre-installed operating system. This was seen as an important development in attempts to reduce the number of illegal copies of PC software.

2.6. Europe

In Europe, the overarching IT Strategy for the European Union is known as “i2010”.

The focus of “i2010” is based on the convergence of industries to support the EU’s emergence into the Ubiquitous Network Society. These are:

1. Telecommunications industry
2. Internet service providers
3. Media and content providers
4. Internet user communities.

The convergence of these four industries is expected to create further technological innovation, employment and emergence of new markets. i2010 is also known as “A European Information Society for Growth and Employment” with a key aim being to create more employment and e-business opportunities.

Recently, there was an “i2010” conference among EU members entitled “Towards a Ubiquitous European Information Society”. This marked one of the first times the term “Ubiquitous” had been used in this way in a European context.

3. Emerging e-Business in Ubiquitous Network Society

Many of the impacts of the UNS on society are not yet known. However, much of the initial focus has been finding a balance between a nation’s desire to protect its citizens by electronic monitoring and the rights of individuals to a degree of privacy. This debate is still in its initial stages but it is likely to become one of the defining issues surrounding the implementation of the Ubiquitous Network Society.

One of the technologies which has generated significant discussion to date is RFID (Radio Frequency Identification), sometimes known as Smart Cards or Contactless Cards. The GBDe has noted some current cases involving RFID applications and also new devices and the possible impact on business.

3.1. RFID IC Tag Use For Child Safety

Protection for children is unfortunately becoming a growing concern in many parts of the world. Concerns include accidents travelling to and from school, and even include the possibility of kidnapping. There are a number of instances where schools have begun using RFID Tags for the purpose of locating and tracking pupils.

In Japan, there is a cell phone called “Kids’ Cell” which is used to locate a child’s position using the phone itself and GPS when the signal is receivable. Parents may use an Internet application available from the cell phone carrier to browse the web for the location information. This phone is specifically designed, that the unit cannot be powered off, unless a supervisory password is entered.

In 2006, the mechanism to locate child activity was further expanded with visual sensor networks (VSNs) and ubiquitous devices. In this example, a child is equipped with an active and passive type RFID IC Tag. A sensor at the school's entrance gate, for example, will electronically monitor entrance and exit and transmit this information to parents. Alarms may be triggered if any child is overdue.

By October 2006, there were some 219 examples child safety mechanisms using UNS technology in Japan. Some have been initiated and driven by the P.T.A. – Parents and Teachers Association, and some by the town and city level local government. Also, some universities and colleges with engineering or technology laboratories are providing the service as a part of their research and development expenditure.

3.2. Mobile Ubiquitous Devices – Cell Phones

Japanese cell phones have already becoming ubiquitous devices. These phones have changed their shape several times since being introduced as a simple mobile phone.

In February 1999, NTT Docomo introduced the “i-Mode” Cell Phone service, where web browser and internet e-mail were incorporated into the cell phone. Two months later another Japanese carrier – now called KDDI - introduced a similar service called “EZ-Web”, which did the same.

i-Mode and the mobile phone services it inspired created a distinct monetary collection and exchange service. It was seen that content access could be charged to the phone carrier and added to the cell phone subscriber charges. This in turn transformed the mobile telecommunications provider into a micro-payment collection service.

The next major cell phone development related to the UNS was the rapid evolution into a key personal entertainment device featuring:

1. Incorporation of the digital camera capability
2. Promotion as a music and video playing device with networked download capability.

The natural evolution was to embed a credit card onto the same device. Soon, the cell phone became:

1. Voice communications device
2. Internet browser
3. e-mail terminal
4. Digital camera
5. Video and audio content display terminal
6. e-Cash and Credit Card.

This qualifies the cell phone as a fully ubiquitous-capable device with “Wherever”, “Whenever”, and “Whoever” capacity.

New developments include the addition of biometrics devices such as finger print recognition. The IC chip's spare memory region is being used for purposes such as e-Key

to open electronic locks for building access. Functions such as the incorporation of e-Pass and e-Ticket for transportation are also practiced widely throughout the world.

One of the most recent additions is a digital TV Broadcast receiver. This function has nothing to do with either the cell phone network or the Internet, but the digital receiver was added to show the digital TV content. With these additional ubiquitous functionalities, one person's everyday life maybe compacted into this ubiquitous cell phone.

3.3 Music and Emerging Businesses

Electronic delivery of legitimate music content was hampered during the Internet's first phase of commercial development by cost and download speed issues.

However, Apple Computer's iPod and linked iTunes service was based on a reasonable fee, and music-listening device was able to establish a successful business model.

One new marketing development involving the iPod involves the ability to read data collected by sensors embedded in running shoes for those with active lifestyles. The availability of this feature requires a combination of ubiquitous network technologies:

1. Sensor device
2. Intermediate data collection device
3. Data gathering and transport interface to the Internet
4. e-Business server at sporting goods company.

With the spread of the ubiquitous network, a combination of network-enabled devices and applications are able to gather information directly from specific sets of consumers. By incorporating these ubiquitous network technologies, marketing research firms can undertake increasingly sophisticated consumer purchasing and product studies.

3.4 Social Networking Service – SNS and Blog

During the past two years the terms SNS - Social Networking Service, WEB Log – Blog, and Web 2.0 have become popular to describe new user-based Internet activities.

With the use of SNS and Blog, an individual can easily create their own sub space on the Internet and share content with others. The basic difference between SNS and Blog could be said, as Blog is an individual journal with only one person responsible for content. However, an SNS is a community of users all contributing to the development of content. Business may benefit from establishing links to some specialized or particularly influential SNS.

An illustration of this concept is "Google Map", where the Search Engine site is providing APIs (Application Program Interface) so that anyone on the Internet may access and manipulate the original Map Data for other subsequent usage, which could be public, semi-public, or private.

Web 2.0, refers to second-generation of Internet-based services — such as social networking sites — that let people collaborate and share information online in previously unavailable ways. It differs from early web development in that it moves away from static websites, the use of search engines, and surfing from one website to the next, towards a more dynamic and interactive World Wide Web.

Potentially with Web 2.0-type concepts, along with the growth of SNS and Blogs, new e-business opportunities may arise.

3.5. RFID Impact – Bank Loan Example

In Japan, the economy is believed to be in an upward shift. With positive economic signs, financial institutions are seeking to expand commercial loans.

In the past, traditional collateral in the form of property has been a limiting factor for financial institutions seeking to extend commercial loans to small and medium enterprises. However, one bank in Japan has overcome this problem with the help of ubiquitous technology.

The specific case involved a pig farming business which was seeking to obtain a loan from a local bank but was unable to meet normal collateral criteria. Instead, the farm sought to provide the pigs as collateral but for this purpose it was important for the bank to establish exact numbers and the health of the stock. The solution was to provide each of some 10,000 pigs with a unique IC Tag on their ear. IC Tags are scanned every month to identify every pig. In this way the business was able to both secure a 200,000 Japanese Yen loan and also improve production with the application of accurate and up-to-date livestock data.

3.6. Other RFID Initiatives

Market forecasts indicate RFID will likely enter common usage within the next 10 years. Therefore, the challenge now is how to make RFID indispensable for a wide range of automated data collection and identification applications, especially when the ROI from RFID implementation is not yet apparent.

In line with the UNS Strategy for next generation development, the Taiwan Government has committed to the advent of RFID applications. The aim is to make Taiwan the powerhouse of RFID industry worldwide, and to revolutionize the convenience and security in the living environment.

The significant advantage of RFID systems is the non-contact nature of the technology. RFID tags can be read in challenging circumstances at remarkable speeds, in most cases responding in less than 100 milliseconds. Developments in RFID technology also continue to yield larger memory capacities, wider reading ranges, and faster processing. The read/write capability of an active RFID system is another advantage in interactive applications such as work-in-process or maintenance tracking.

In the last few years, there have been a number of initiatives involving RFID applications in Taiwan, such as RFID for Emergency Medicare, SARS Alert via RFID/Location-Based Medicare Service, RFID-enabled Outpatient Clinic System. The advances in RFID applications are set to close the technology gap, to improve safety, and to support better decision-making in the coming Ubiquitous Network Society. A major SOA project in Taiwan, iCare, is also expected to deliver an innovative model later this year, seeking to become a blueprint for service to senior citizens and those with disabilities.

In order to drive adoption and bring RFID down to the individual item level in Taiwan, at least two comprehensive projects of RFID applications in the public domain (i.e. food, agriculture, pharmaceutical and healthcare industry) will be scheduled for implementation by 2013. The plan is to use 3 billion tags for agriculture/produce (NT\$12 billion) by 2013; 1.5 billion tags for food (NT\$6 billion); and 0.5 billion tags (NT\$2 billion) for healthcare industry. By 2013, public domain initiatives in Taiwan are expected to drive RFID demand to NT\$20 billion.

Pilot studies in the private sector are expected to create another NT\$5 billion market value in RFID applications. Extensive research centered around RFID technologies will also help industries gain competitive edge and are expected to create another NT\$45 billion market value. By 2013, Taiwan is aiming for 10% of the global RFID market share, with at least two among the top five global RFID products/services developed in Taiwan. The total of RFID market value in Taiwan is expected to reach NT\$70 billion.

One of the core initiatives launched in 2006 is a 3-year action plan to develop an RFID Enabling Application Platform (REAP) by 2008. The project is making progress to address issues in RFID development, including data collection/filter, standards, event management, device management, real-time process management, security and infrastructure. The platform is expected to help drive cost reductions and increased RFID adoption across vertical markets.

4. Conclusion

The term Ubiquitous Network Society is becoming widely accepted world wide as a means to describe the next phase of the commercial development of the Internet and growth of e-Business. As the infrastructure required for the UNS is installed, particularly in Asia, new business opportunities are being actively identified. The GBDe will continue to monitor and promote three major themes in future:

1. National IT Strategy

First of all, a national IT strategy must be shared and understood which defines the UNS for a particular economy and develops a coherent framework for its implementation and goals to be achieved. National IT strategies which explicitly refer to the UNS at present include “u-Japan”, Korea’s “u-IT839” and “u-Taiwan”.

2. Exponential Growth in User Interaction

Secondly, the establishment of the UNS promises to exponentially increase the amount of communication and information flow over networks. In this way consumers will be able to identify and purchase products in a range of new ways aided by almost real-time information. This provides a tremendous opportunity for business as well as placing greater demands on manufactures and retailers to improve customer service.

3. New Frontiers

Third, as has been seen in Asia, the deployment of UNS technologies is only the beginning of the emergence of a new e-commerce paradigm. The convergence of digital technologies and the incorporation of new data collection capabilities within networks will create new opportunities which are only now starting to emerge.

The GBDe has been seeking to generate increased discussion worldwide about the concept and potential impact of the Ubiquitous Network Society for three years. During that time the concept has started to become a talking point in Europe and the US as well as in Asia (where it originated).

The GBDe believes it is important to continue to discuss the societal issues and business opportunities arising from the establishment of the UNS. This discussion will be instrumental in determining the future international environment for e-business.

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