

# **POTENTIALITY OF WIBRO AS A NATIONAL GROWTH ENGINE IN INFORMATION TECHNOLOGY**

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## **ABSTRACT**

Telecommunication services have evolved and adhere closely to the attributes of broadband and multimedia, and in particular have developed with the convergence of fixed and wireless industries, as well as integration between industries. The result and effect from such growth and development of telecommunication services will not only be sustained in the information technology industry alone, but is expected to maximize the efficiency in value chains across industries. In addition, with economical spillover effects from pre and post-investments, this new service is emerging as the new national IT growth engine, which will become the founding business towards reaching \$20,000 in national GDP. This paper will explore WiBro's future potential in technology, market, industry, and prospects in entering International markets, as well as economical spillover effects as a national growth engine, then present directions to enforce competitiveness of WiBro.

**KEYWORDS:** WiBro, national growth engine, portable Internet

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## **INTRODUCTION**

As the domestic telecommunication service market enters into the mature stage in the fixed and wireless business, development of killer application service that can newly lead growth emerges as a new question in the industry. The current fixed telecommunication service is increasingly replaced and encroached by the mobile communication, and lack of new business that can continue the growth trend of the broadband Internet. As a result, the resource and competence should be focused on development of the promising new business at the enterprise level.

In line with this trend, various telecommunication technologies are introduced as the services are evolved based on technological innovation from the middle of 1990's, and fixed-mobile convergence, digital convergence and ubiquitous networks are proliferated. In this vortex of rapid paradigm change in technology and market, Korea cannot take relief in mythological success history of CDMA, semi-conductor, TFT-LCD and broadband Internet in the past. It is the high time to accurately foresee the future trend and implement the plan at the national level.

Recently, WiBro service draws attention as a new telecommunication service in the domestic market. It provides a certain scope of space and mobility to the fixed broadband Internet and the wireless LAN, and improves speed and service charge of the mobile Internet. With these benefits, it is expected to be a driving force of new growth in the telecommunication industry that can create a new service market. As described above, WiBro service is foreseen to bring out rapid change in terms of productivity and life style not less than the fixed Internet, because the overall social processes for government, public agencies, enterprises and household will be networked through video, mobility and location positioning, and the WiBro service will create a new value that overcomes the limitation of time, distance and space.

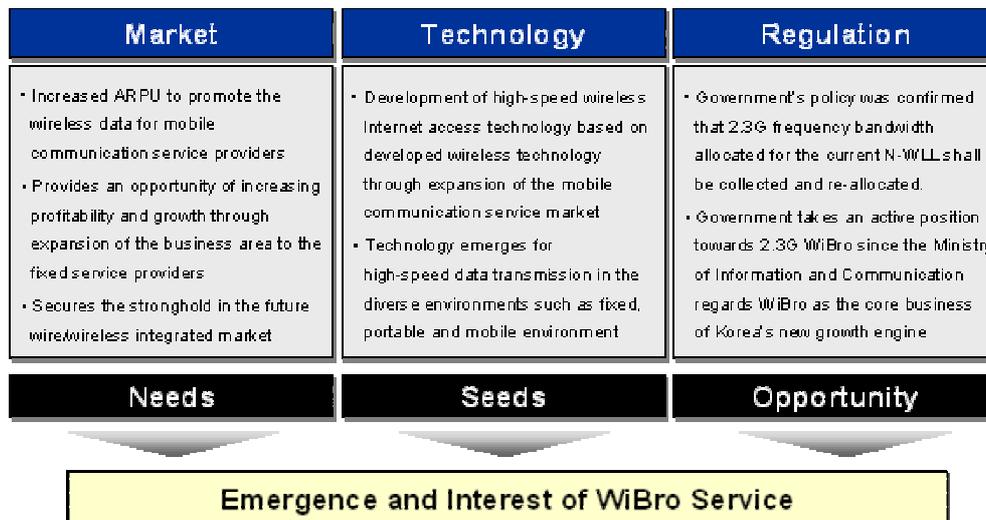
The WiBro service is not only the promising new business for the telecommunication service providers but also a core component of the national growth engine for IT growth propelled by the government. It is expected to contribute to earlier achievement of US\$20,000 in national GDP. Therefore, it is the time to discuss about the WiBro service from the perspectives of 10 new driving forces of the national growth engine.

## **OVERVIEW OF WIBRO SERVICE**

As the number of subscribers using fixed broadband Internet reaches to almost 14 million people, more subscribers are increasingly demand for the broadband wireless Internet that can provide the similar data rate to that of the fixed broadband Internet. Currently, the Internet service based on the mobile environment has the benefit of being mobile but it falls short of user's expectation due to expensive cost and low data rate. With increasing demand of the users and development of the information and telecommunication technology, the new converged service is emerging that combines the benefits of the fixed broadband Internet service with that of the mobile Internet.

### **2.1 Background and concept of the WiBro service**

Emergence of WiBro service can be seen from three perspectives in general – market, technology and regulation. Reviewing the domestic telecommunication market based on Fig. 1, service provider's profitability was deteriorated due to saturation of fixed broadband Internet and mobile telecommunication service market, and change in the user's demand initiated development of WiBro service. Additionally, the revolutionary development of the information and telecommunication technology was enough to satisfy user's requirements as described above, which enables convergence of two technologies from the technology and service perspectives. The last motive was related with the government regulation. 2.3Ghz band was reserved for WLL originally, but the government then changed its policy to utilize it and include it as a part of the driving force for national growth engine. The Ministry of Information and Communication (MIC) has firstly allocated 2.3Ghz band to KT and Hanaro Telecom for Wireless Local Loop (WLL). But, the frequency utilization was insufficient and so decided to change its usage to the portable Internet (now WiBro) on October 2002. On July 2003, the technology standardization project group (PG) was established, mainly driven by TTA. Finally, the WiBro service was selected as one of the driving forces for the national growth engine. The technical draft was prepared on April 2004 that HPi was selected as the standard portable Internet technology. The term "portable Internet" was officially renamed to WiBro that combines the "wireless" and "broadband" in May.



(Fig.1) Background of WiBro Service<sup>1</sup>

Thus, the WiBro service can be defined as “ubiquitous broadband Internet on the move while stationary or at the nomadic speed, using portable device.” The word “while stationary or nomadic” means that the service should enable seamless Internet access inside homes or offices and outdoors like the park and the street, whereas the word “broadband” means that the data rate (1 ~ 2 Mbps per subscriber)<sup>2</sup> similar to the fixed broadband Internet should be basically provided. Additionally, the WiBro service can provide the un-interrupted service on the move by supporting handover between cells like the current mobile telecommunication service. Viewing from the device, it supports the same access environment with the fixed broadband Internet environment from laptop to mobile computing terminal.

## 2.2 Positioning and features of the WiBro service

### 2.2.1 Service positioning

As seen from Table 1, the WiBro service can be differentiated from the wireless LAN in that broadband Internet is available while moving at normal to high speed. Normally, the wireless LAN supports Internet access with high data rate (11 ~ 54Mbps). However, the service coverage is limited to about 100m within the range of the hot spot (area where Internet access is available), and does not support mobility inside the hot spot. Additionally, connection should be re-established if the user moves from one hot spot to

<sup>1</sup> Lim, M.H, Cho, S.S, Telecommunication Review 2004.2

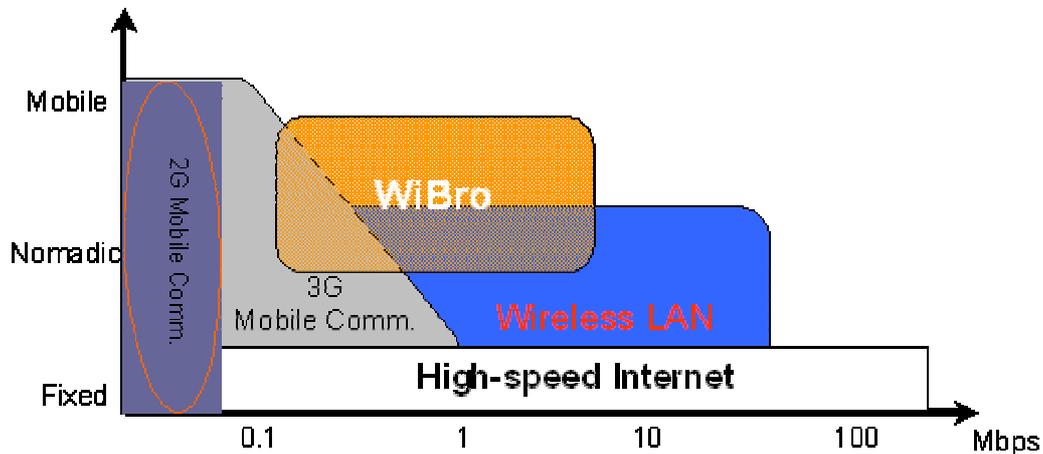
<sup>2</sup> Hwang, H., Cho, O., “2.3GHz Portable Internet”, Telecommunication Market, 2003

another. On the other hand, the mobile telecommunication service provides wider service coverage and an un-interrupted connection while mobile. However, the data transfer speed is low with high service charge, as it is based on the packet usage amount. As a result, the WiBro draws attention since it can overcome both strength and weakness of the fixed and wireless Internet access.

[Table 1] Comparison of WiBro Service with Other Telecommunication Services

		WiBro	1x EV-DO	WCDMA	Broadband Internet	WLAN
Capability	Data Rate	512Kbps ~ 3Mbps	384Kbps	384Kbps	1~54Mbps	2Mbps
	Mobility	Low to mid/Mobile	High/Mobile	High	Fixed	
Service		Data and Multimedia Service	Voice, Data, Multimedia	Voice, Data, Multimedia	Data and Multimedia Service	Data and Multimedia Service
Price		Low to Mid	High	High	Low	Low

Source: Kim, S.C, Telecommunication Market, 2003.12



(Fig.2) Concept of WiBro Service

Source: ETRI, 2004

### 2.2.2 Technical characteristics

According to discussions made by 2.3Ghz mobile Internet project group (PG302) on April 2004, the specification of the wireless connection system for the WiBro service was decided as follows. First, the TDD (Time Division Duplexing) method, 10Mbps

channel bandwidth and OFDMA multiple access methods were selected. Additionally, the minimum requirements included 128Kbps ~ 1Mbps (minimum to maximum) upstream data rate and 512Kbps ~ 3Mbps downstream data rate per each subscriber. The frequency reuse factor was agreed to “1”, and the upstream/downstream maximum spectrum efficiency were defined as 6 and 2bps/Hz/cell respectively. The packet transmission interruption time at the time of hand-off was defined as 150ms, and the maximum movement speed was set to 60Km/h. Lastly, the service coverage at the downtown area was classified into picocell (100m), microcell (400m) and macrocell (1Km)

## **WIBRO SERVICE AS A NEW DRIVING FORCE FOR GROWTH**

The Korean economy achieved continuous growth based on the heavy industry in 1970's ~ 1980's and information and communication industry in 1990's. In 1995, the national GDP was over US\$10,000 but it remains unchanged for 10 years. It is urgent to find a breakthrough due to tough competition in the industry as new developing countries like China and India are emerging.

To cope with the environmental change, the current “Participation Government” of President Roh, presented a vision of achieving “US\$20,000 national GDP”, and selected 10 major national industries that can drive growth. It is assumed that the leap forward of the Korean economy depends on successful implementation of this project. In other words, it will be the criteria to foresee whether the Korean economy can go advance.

### **3.1 Overview of new growth engines**

Each ministry and department of the government was reviewing the next-generation technologies and commodities from March 2003 in full consideration of market size, technology development, marketability and spillover effect. In July 2003, the government finally selected 10 major industries that will lead future growth of national growth such as next-generation communication service, biotechnology, and aerospace industry and display products.

Looking into these industries by the government, the MIC has selected 9 industries including next-generation communication service, semi-conductor and digital TV in the IT industry, considering marketability, domestic technological competence, possibility of technology development, and socio-economic spillover effects. The Ministry of

Commerce, Energy and Industry (MCEI) also similarly selected 10 major growth industries for future development; such as digital electronics, bio-industry, environment and energy and aerospace industry, and then extracted 40 sectors in the industry, based on the 10 major growth industries. The Ministry of Science and Technology selected their promising future industries according to, technology that affects current core industries and the ones that would provide opportunities of growth in the future, and selected 50 areas based on marketability and possibility of success.<sup>3</sup>

Many industries were selected for growth engines by each government ministries. However, the bottom line was that these industries were selected based on the principle of “select and focus” so that Korea can become competitive and lead the future world market. Rather than the segmented industries distributed among 8 promising industries, half of the selected industries are concentrated on digital electronics, communications and next-generation medical service areas that Korea has strong competitiveness.

Reviewing the industries selected as new growth engines, many commodities are included that are directly related with the IT industry such as electronic appliances, telecommunication, software and sensor technology. Also, many industries are included that the IT industry should indirectly support, such as intelligent precision machinery and its parts, medical and health care, aerospace and transportation. Therefore, it is quite evident that successful development of the IT related technologies is most important for the successful implementation of new growth driving industries. The spillover effect of the IT technologies on other domestic industries has been proved over the last 5 years. The IT technology is likely to continue to affect various sides of the Korean social economy, society and culture.

### **3.2 Direction of the telecommunication service in the newly developing industry**

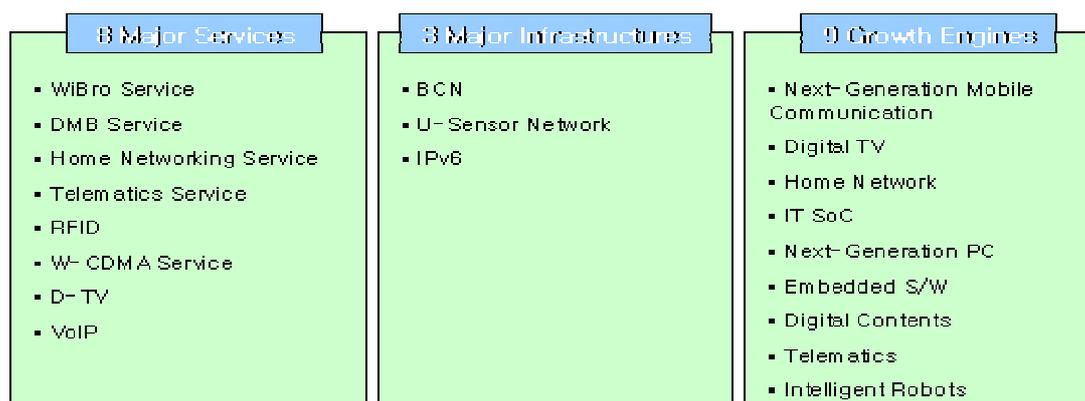
The MIC established policy on “IT as New Growth Engine Promotion Committee” in order to systematically support government’s initiatives to implement supporting for new growth driving industries. It also established the detailed promotion plan for nine new growth driving engines, and selected the project manager for each industry.

Recently, the MIC has announced the “IT 3-8-9 Strategy” to present its willingness to achieve US\$20,000 national GDP. For this purpose, the MIC is determined to elevate the second selection momentum as the motive of national development. This

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<sup>3</sup> Kim, S., “Government policies towards US\$20,000 in national GDP”, LGERI CEO Report, 2003.7

announcement seems to stem from the eagerness to have the information and telecommunication industry to successfully manufacture the world first products such as semiconductor, mobile phone, TFT-LCD and digital TV based on the broadband network and IT technology. Also this announcement provides an opportunity of take a lead in the future world IT industry under more tough and complex world environment like rapid emergence of China and India in the world market.



(Fig.3) IT 8-3-9 Strategy

Source: MIC, "IT 8-3-9 Strategy"(modified), 2004

### 3.3 Spillover effects of WiBro service as the new growth engine

The quantitative and non-quantitative values of the WiBro service, which is expected to play a role of new growth engine for the domestic telecommunication industry, has been already proved. According to the recent research<sup>4</sup> that divides the quantitative spillover effect into the primary and secondary stages, it has the primary effect that induces total production of 4,490 billion won, and creates 2,800 billion won in value-added, and induces 1,570 billion won export and 1,220 billion import, and creates employment opportunity for approximately 67,000 people. Its secondary spillover effects includes 17,300 billion won manufacturing induction including services, systems and terminals, and 8,200 billion won value-added effect, and 6,400 billion won export induction as well as 260,000 employment opportunities. Therefore, it is expected that the WiBro service affects the national economy significantly by inducting about 22,000 billion won manufacturing, and generating about 10,000 billion won in value-added, and about 76,000 won in export. On the other hand, about 330,000 new jobs would be created including the industries related with the WiBro service.

<sup>4</sup> Lim, M.H, Cho, S.S, Telecommunication Review 2004.2

Besides the quantitative spillover effects, the invisible effect of the WiBro service for the overall domestic telecommunication service will be also significant. As described in the Table 2, the WiBro service will overcome the limitations of the current telecommunication services and lay a foundation for the converged telecommunication technology that will be continuously developed in the future. This service will bring the reserve capability for investment for the telecommunication service providers so that the stagnating domestic economy can be promoted, because it will provide an opportunity of new market development that enables to enhance profitability of the service provider suffering from dropped revenue due to saturation of the fixed and mobile telecommunication market. The WiBro service will be very important in that it enables to have strong national competitiveness by leading the world market in the future while taking a lead in the paradigm of the world IT environment.

[Table 2] 8 Major Industries in Focus

	Significance
Telecommunication Service	<ul style="list-style-type: none"> <li>✓ Overcoming imitations of current services in mobility, speed, service charge</li> <li>✓ Promote fixed/wireless convergence and convergence with other industries</li> <li>✓ Connecting service before ubiquitous networking</li> </ul>
Telecommunication Provider	<ul style="list-style-type: none"> <li>✓ New revenue source and growth engine for telcos</li> <li>✓ Expansion of service range and level provided by telcos</li> <li>✓ Re-organization of competition structures and level between telcos</li> </ul>
Domestic Economy	<ul style="list-style-type: none"> <li>✓ Contributing in development as the domestic IT industry's new growth engine</li> <li>✓ Enhancing efficiency for domestic benefits and pre/post economical spillover effect</li> </ul>

## CONCLUSION

Today, the telecommunication service is evolving while taking the property of the broadband and the multimedia. It is even further being developed through fixed and wireless convergence and combining between industries. The progressive growth effect of the telecommunication service is likely to maximize efficiency of the relevant value

chains by overcoming the boundaries between industries, instead of being limited inside the IT industry. Additionally, it draws attention as the “killer application” for the new IT growth engine, which will lay a foundation to achieve US\$20,000 in national GDP through forward and backward spillover effects of the related investment. The MIC evaluates the WiBro service as the core service from the perspectives of marketability, technology and domestic technological competence since it has the greatest spillover effects among next-generation telecommunication services, and enables to keep the competitive advantage by securing the core technology. Besides these large-scale spillover effects, it is foreseen that meaning and significance of the WiBro service as the new growth engine will be enormous as follows, which will affect telecommunication services, service providers, national economy and users.

First, the WiBro service will create new service demand by taking the initiative in fixed and wireless convergence through integration of the network with the contents, realization of the next-generation wireless access technology, and building up of convergence-based access network. Integrating with other industries like electronic home appliances, transportation, finance and broadcasting will be accelerated through linkage with home networking, telematics and DMB (Digital Multimedia Broadcasting). It will realize the ubiquitous networking by providing the bridging service that connects the current fixed and wireless service with the multimedia telecommunication service.

Second, the WiBro service will improve the revenue of the fixed and wireless telecommunication service providers, mainly from the multimedia and Internet access service. Besides, productivity of the contents providers will be enhanced that enables to use the current contents in various fixed and wireless terminals, so that outstanding multimedia contents can be massively produced, which eventually result in revenue increase of the service providers.

Third, the WiBro service will enhance efficiency of the industry by restructuring competition between telecommunication service providers and increasing competitiveness capability. Up till now, competition has been remained in the fixed or wireless service area. However, the service providers will compete over the competitive advantage in the fixed and wireless converged environment, based on the accumulated core capabilities of the service providers, as the WiBro service emerges.

Fourth, the WiBro service will promote user convenience and quality of life in the 21<sup>st</sup>

information society by taking a lead in service quality improvement, decrease in service charge and life style change.

Lastly, the WiBro service will contribute to accumulation of the global competitiveness of the domestic IT-related industries as well as affecting entire relevant value chain such as telecommunication equipment manufacturer, terminal manufacturer and contents provider. The WiBro service is not yet widely commercialized internationally. Therefore, Korea will be able to pre-occupy the export market with technical standardization efforts, accumulation of the related experiences, parts localization and marketing experiences would provide competitive advantage and technical competence over other competitors.

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