

Narrowing the Digital Infrastructure Divide among Cities and Rural Areas

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Abstract— Korea possesses a high-speed network infrastructure that excels those of other advanced countries, as a result of a series of network advancement projects; however, although small farming and fishing villages in remote places can access the Internet, the data rate remains low. As a result, various convergence services cannot be used in these areas, unlike in metropolitan cities and small and medium sized cities, and the digital divide between cities and rural areas will emerge as a social issue. In this paper, we discuss the BcN establishment project to provide high-speed network combination services such as IPTV and VoIP to rural areas in mountainous areas, and estimate the expected impacts.

Keywords— BcN, policy, digital infrastructure divide

I. INTRODUCTION

Korea now possesses a high-speed network infrastructure that excels those of other advanced countries, having performed a series of network advancement projects – such as the broadening of the nationwide telephone network in the 1980s, the execution of the high-speed information and communication network project in the 1990's, and the construction of the broadband convergence network (BcN) infrastructure from the mid 2000's [1][2][3]. Many professionals in Korea and overseas countries point out that Korea will take the position of the strongest IT country owing to the government's policy of promoting the high-speed infrastructure over the last few decades, as well as the strenuous efforts on the part of the private sector.

However, although small farming and fishing villages in remote places can access the Internet, the data rate remains at 1~3M (xDSL type). As a result, various convergence services cannot be used in these areas, unlike in metropolitan cities and small and medium sized cities. In these areas, voluntary investment by communication service providers cannot be expected, because they generally pursue short-term profits. According to the survey of Korea Telecom, the current nation-wide BcN coverage are up to about 80%, and will be increased to 90% by 2010 [4]. However, small farming and fishing villages, which lack profitability from the perspective of service providers, are not included in their

expansion plans. This situation inevitably necessitates governmental support.

In particular, the digital divide between cities and rural areas will emerge as a social issue - including limited accessibility to IPTV in rural areas - as IPTV becomes fully available this year. To resolve this issue, the government has set up the BcN establishment project to provide high-speed network combination services such as IPTV and VoIP to fishing and farming villages in mountainous areas, and makes efforts for funding this project.

In Section 2, we discuss the BcN establishment project of Korea government for rural areas. The expected impacts from the pilot project will be discussed in Section 3. The conclusion will follow the detailed establishment plan and the impact analysis.

II. BCN DEPLOYMENT PLAN

The core of the BcN establishment project for rural areas is to establish the FTTH subscriber network at a speed in excess of 50Mbps, so that broadband multimedia services like IPTV, video phone, u-Healthcare, and u-Learning can be provided to approximately 450,000 households located in rural areas. Some towns in those areas consist of fewer than 50 households, and private service providers are reluctant to make an investment due to poor profitability [5].

It is expected that around 230 billion won will be required to achieve the establishment project during the coming five years. The government will provide 50% of the budget using the matching fund method with local autonomous bodies, and the remaining 50% will be covered by private communication service providers. Table 1 shows the number of target households of the BcN deployment of Korea. The greatest number of areas falling into the targeted areas (under 50 households) were found to be in Jeonbuk, followed by Jeonnam, Gyeongnam, Gyeongbuk, Chungbuk, and then Chungnam, which together account for 91% (12,085 villages) of the total target areas (13,308 villages).

To establish the network, the FTTH method will be used because it can guarantee connection at a speed of over 50Mbps at long distance. Also, the PON will be used, by considering the distributed residential pattern of farming and fishing villages. Figure 1 show the network architecture for the rural

Area	Target (A+B)		Fixed line (A)		Satellite (B)	
	# of administrative villages	# of households	# of administrative villages	# of households	# of administrative villages	# of households
Gangwon-do	507	17,481	507	17,481	-	-
Gyeonggi-do	585	21,153	585	21,153	-	-
Gyeongsangnam-do	1,715	58,869	1,715	58,869	-	-
Gyeongsangbuk-do	1,625	57,810	1,624	57,808	1	2
Daegu	37	1,371	37	1,371	-	-
Busan	36	1,163	36	1,163	-	-
Ulsan	29	1,037	29	1,037	-	-
Incheon	27	971	10	372	17	599
Jeollanam-do	2,974	101,083	2,834	96,859	140	4,224
Jeollabuk-do	3,349	103,546	3,349	103,546	-	-
Chungcheongnam-do	1,191	44,172	1,189	44,079	2	93
Chungcheongbuk-do	1,231	41,911	1,231	41,911	-	-
Jeju-do	2	74	2	74	-	-
Total	13,308	450,641	13,148	445,723	160	4,918

Table 1. Classification of BcN Target Households

BcN deployment. When deploying the network, the optical cable will be installed on the border of the administrative unit village, so the BcN service can be launched whenever the households in those rural areas want. The fixed line BcN cannot be installed in remote islands and coastal areas. For those areas, the wireless methods, such as two-way satellite, microwaves, and wireless mesh, are being considered for the alternatives.

III.EXPECTED IMPACTS

Looking into the policies of advanced countries, the U.S. government announced the “Broadband New Deal” at the inauguration of President Obama, under which a 100Mbps network will be installed in every household by 2012. Australia is promoting the National Broadband Network under plans to cover 90% of the country with the BcN services and use satellite Internet for the remaining remote farming and fishing villages during the next eight years. Japan announced its “Next-Generation Broadband Plan 2010” in 2006, in which the government provides one third of the FTTH installation costs to rural areas.

Korea prepared the necessary conditions for the rapid diffusion of the high-speed Internet and the development of the related ICT industries by promoting nationwide optical cabling at an early stage under the high-speed network project, which commenced in 1995. Both the utilization and

the convenience of the broadband subscriber network are expected to increase exponentially, as numerous future services appear over the coming decades, besides IPTV. It is expected that such developments will induce change and innovation of the people in the future.

The BcN construction project for farming and fishing villages as promoted by Korea is a matching fund-type cooperative project participated in by related local autonomous bodies and infrastructure communication service providers. Unlike other countries, which tend to promote large-scale government-driven broadband construction projects as part of the strategy to overcome the economic crisis, Korea has taken one step into the future by implementing a differentiated, government-private cooperation, high-speed infrastructure strategy.

Most of the implementation costs (90%) of the BcN construction project for rural areas are consumed by the installation of optical cables. As regards their technical characteristics, optical cables can last for over 30 years. Therefore, they will serve as indispensable materials rather than as optional items in people’s current and future daily life.

Once the BcN service has been deployed to farming and fishing villages, a universal broadcasting and communication convergence service will be available to everyone regardless of the geographical location, be she/he in a city or in a rural village at a moderate rate at any time. Also, household

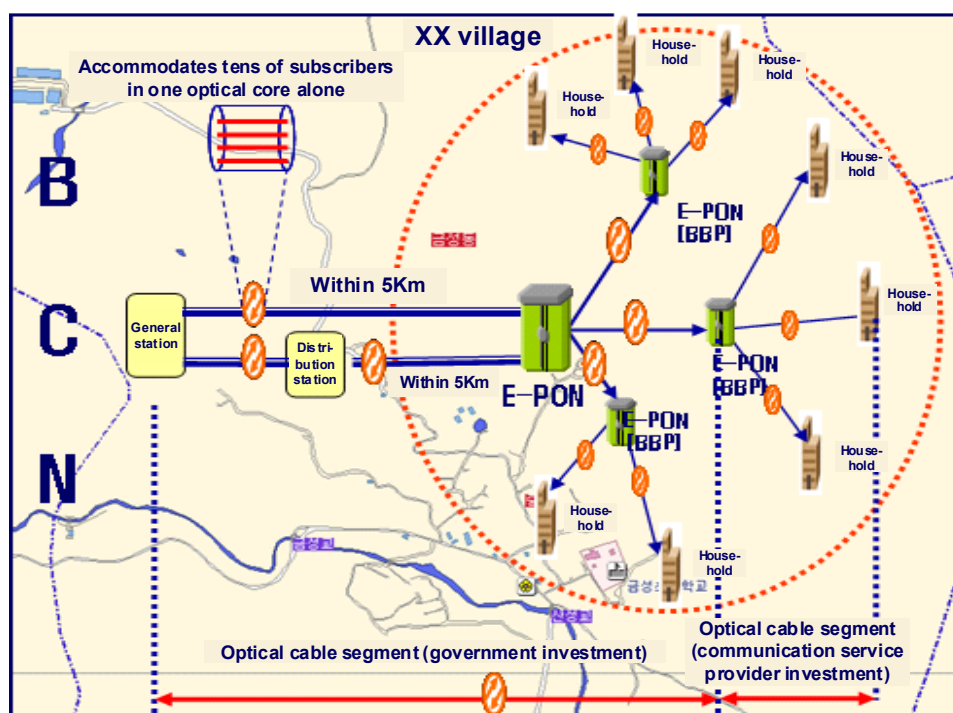


Figure 2. Network Architecture of BcN Construction

Type	FTTH (optical cable)	VDSL (phone line)	ADSL (phone line)
Speed	Up to 1G	10M~100M	1M~10M
Transmission distance	Up to 20Km	Up to 2.5Km (approx.)	Up to 5.5Km (approx.)
Strengths	High quality, high speed Maximum transmission distance Cheap maintenance cost	Inexpensive installation cost, as existing coaxial lines can be used. Same down/uplink speed	Inexpensive installation cost, as existing coaxial lines can be used.
Weaknesses	Initial installation cost is relatively high.	Speed drops sharply in inverse proportion to distance. Limited to 300M when a speed of over 50Mbps is provided.	Speed drops sharply in inverse proportion to distance. The uplink speed is relatively low.

Table 2. BcN Target Bandwidth

communication expenses are expected to be cut by half, as the combination service (TV, PC, land-line phone, and mobile handset) will also become available in farming and fishing villages.

The anticipated economic effects include a total production inducement of 393 billion KRW that will be made visible by establishing the broadband subscriber network by 2014, an added-value inducement of 209.1 billion KRW, and the creation of 2,400 jobs.

In addition, it is likely to contribute to the discovery of the BcN utilization service model. The model can be customized

to the peculiar environment of rural areas. It will also contribute the following topics: the balanced development of cities and rural areas through the expansion of remote exchange between these two geographical areas; the provision of information access opportunities to the most alienated members of society; the promotion of the rural areas' economy; and the greater social integration. Furthermore, it is expected to make a significant contribution to laying the foundations for Korea's take-off as an advanced global IT country, by helping promote the related industries and creating jobs by encouraging investment in the IT infrastructure, such as FTTH.

IV. CONCLUSION

Korea possesses a high-speed network infrastructure that excels those of other advanced countries, as a result of a series of network advancement projects; however, although small farming and fishing villages in remote places can access the Internet, the data rate remains low. As a result, various convergence services cannot be used in these areas, unlike in metropolitan cities and small and medium sized cities, and the digital divide between cities and rural areas will emerge as a social issue. In this paper, we discuss the BcN establishment project to provide high-speed network combination services such as IPTV and VoIP to rural areas in mountainous areas, and estimate the expected impacts.

The BcN deployment in the rural areas will contribute to the discovery of a BcN utilization service model, the balanced development of cities and rural areas through the expansion of remote exchange between them, the provision

of information access opportunities to the most alienated members of society, the promotion of the rural areas' economy, and the greater social integration. Furthermore, it is expected to make a significant contribution to laying the foundations for Korea's take-off as an advanced global IT country, by helping promote the related industries and creating jobs by encouraging investment in the IT infrastructure, such as FTTH.

REFERENCES

- [1] Basic blueprint for building the Broadband convergence Network, MIC, 2004.
- [2] Second phase plan for establishing BcN, MIC, 2006.
- [3] Third phase plan for establishing BcN, MIC, 2008.
- [4] Broadband convergence Network Annual Report 2007, NIA, MIC, 2007.
- [5] UBcN Deployment Policy, MIC, 2009.