

## Comparing Strategies for Building Korean Information Infrastructure Using System Dynamics Model

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### 1. Introduction

This study compares the effects of several strategies for building Korean Information Infrastructure(KII). Korean Government plans to invest about 45 trillion won for the next fifteen years to build Korean Information Infrastructure(Table 1). Using system dynamics model of Korean Information Infrastructure, this paper compare market vs. government initiative strategies for building KII and explain the development pattern of KII under different strategies. Model building was proceeded in accordance with group model building procedure(Richardson & Andersen,1995).

Table 1. Government plan for constructing KII

	Ground Stage (1995 - 1997)	Diffusion Stage (1998 - 2002)	Completion Stage (2003 - 2010)
New Korea Net - Government	<ul style="list-style-type: none"> <li>* between 5 major cities: 622Mbps - 2.5 Gbps</li> <li>* between major and 6 hub cities: 622 Mbps</li> <li>* between hub and small and medium sized cities: 155-622 Mbps</li> </ul>	<ul style="list-style-type: none"> <li>* between 5 major cities: 2.5 Gbps</li> <li>* between hub cities and 5 major cities: up to 2.5 Gbps</li> </ul>	<ul style="list-style-type: none"> <li>* integrated broadband multimedia services (several ten of Gbps - several Tbps)</li> </ul>
	<ul style="list-style-type: none"> <li>* one-stop civil services</li> <li>* electronic library</li> </ul>	<ul style="list-style-type: none"> <li>* comprehensive GIS</li> <li>* Advanced IVHS</li> </ul>	<ul style="list-style-type: none"> <li>* provision of most of the public information by enhanced multimedia service</li> </ul>
New Korea Net - Public	<ul style="list-style-type: none"> <li>* interconnect local telephone offices with 155 - 622 Mbps synchronous networks</li> <li>* increase optical fiber cable for large-scale traffic users, eg., large buildings</li> </ul>	<ul style="list-style-type: none"> <li>* interconnect local and city telephone offices with 2.5 and 10 Gbps synchronous networks</li> <li>* provide optical fiber cables for high-density population areas, e.g., small and medium sized corporations and apartment</li> </ul>	<ul style="list-style-type: none"> <li>* 100 Gbps networks both between local telephone offices and between cities</li> <li>* complete installation of optical fiber cables to individual subscriber's home</li> <li>* establishment of the networks to integrate communication and CATV networks</li> </ul>
	<ul style="list-style-type: none"> <li>* video conferences</li> <li>* stille-image picture phone services</li> </ul>	<ul style="list-style-type: none"> <li>* moving-image telephone services</li> <li>* VOD services</li> <li>* telemedicine</li> <li>* distance learning</li> </ul>	<ul style="list-style-type: none"> <li>* video services of HDTV class</li> <li>* multimedia PCS</li> </ul>
Budget for Constructing gov't KII*	2,901 (967 per year)	3,882 (776 per year)	5,011 (625 per year)

\*: unit:100 million won. Summarized from MIC,1994.

## 2. Structure of the KII Model

The KII model consists of three major sectors, four key variables, and three major feedback loops. Three major sectors are BISDN, CATV, and MOBILE sector (Figure 1). Each sector has three subsectors of service supply capacity, network supply capacity, and user. The key variables of KII model are supply of network, demand on network, application and services, and funds for network buildup. There are three major feedback loops (Figure 2). The first one is a positive feedback loop representing the competition and compliment relationship between BISDN sector and CATV sector. The second feedback loop is a negative feedback loop which controls the growth of CATV market. The third feedback loop is a negative feedback loop controlling the growth of BISDN market.

Figure 1. Overall Model Structure

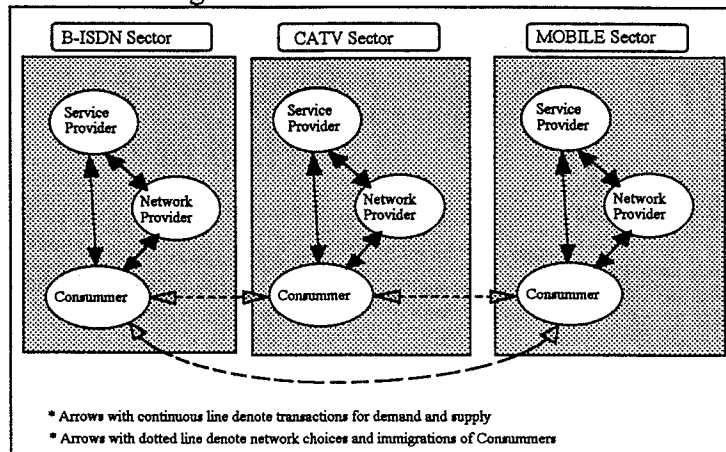
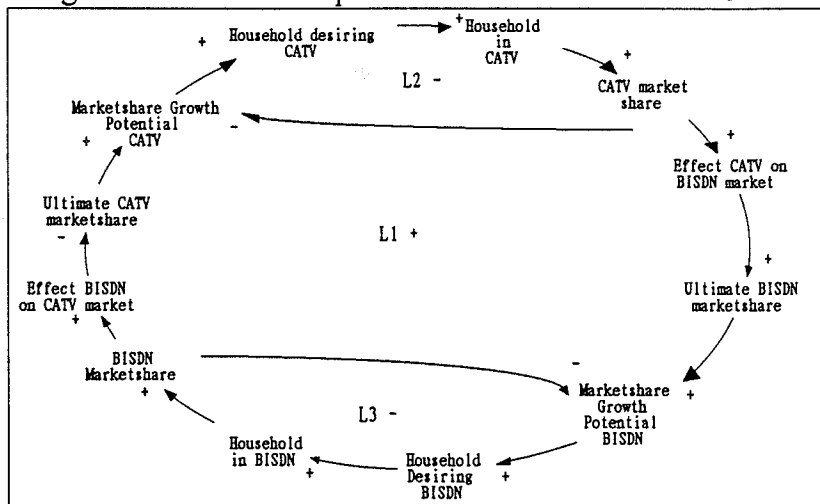


Figure 2. Feedback Loop between CATV and BISDN Sector



### 3. Simulation Results and Policy Implications

Simulation of the KII model was proceeded on the basis of four different types of policy intervention scenarios (Table 2). Among these scenarios, the first one - when BISDN and CATV market is separated and KII buildup is left to private initiative - was used as a base run of this model and simulation results under other scenarios were compared.

Table 2. Policy Scenarios

		Government Initiatives	
		No government network	Initiative of Government network
Market Integration	B-ISDN, CATV market separation	1. separation - private initiative	2. separation - government initiative
	B-ISDN, CATV market integration	3. integration - private initiative	4. integration - government initiative

First, when the KII buildup were left to market mechanism alone and the BISDN and CATV market is separated (scenario 1), the BISDN users increased slowly for the first ten years and begin to increase rapidly thereafter. But the number of CATV users rarely increased until the beginning of the 2010s and began to decay before it reaches its full size of potential market. The number of MOBILE users increased most rapidly (Figure 3). Second, when the KII buildup were initiated by the government and the market is separated (scenario 2), the number of BISDN users increased more rapidly than under the first scenario. The number of BISDN users exceeds one million around the beginning of the 2010s, meaning that the information age will come 5-6 years earlier with government intervention than without it (Figure 4). Third, when CATV, BISDN, MOBILE market is integrated and the KII buildup is left to market initiative (scenario 3), both the number of BISDN and CATV users increase rapidly (Figure 5). Fourth, when market is integrated and the KII buildup is initiated by the government (scenario 4), the construction time of BISDN network will be reduced by 7-8 years. Also, the CATV market will grow to its full potentials up to 15 million people. (Figure 6)

Figure 7 compares the effect of different types of policy intervention on BISDN market. It shows that the 'market integration with government initiative' strategy will bring the largest market increase within the shortest period of time. Also, it shows that the 'market separation - government initiative' strategy is more beneficial to BISDN market than 'market integration - private initiative' strategy. Figure 9 compares effect of government policies on CATV market. It shows that the market integration policy is most effective for CATV market expansion.

Figure 3. Trend of subscribers: market separation - private initiative

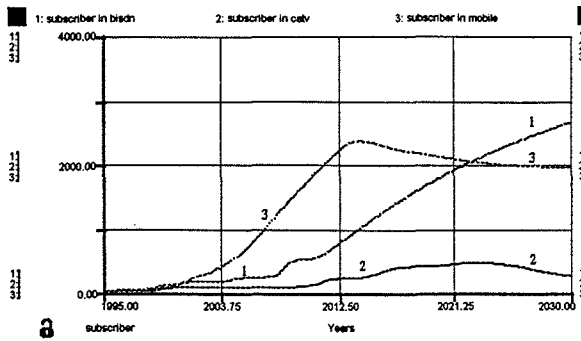


Figure 4. Trend of subscriber: Market separation - Government Initiative

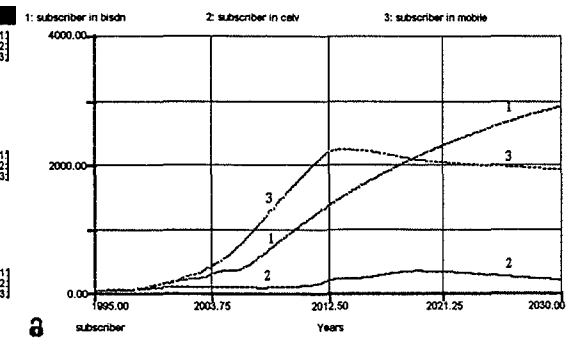


Figure 5. Trend of subscriber: Market integration - Private Initiative

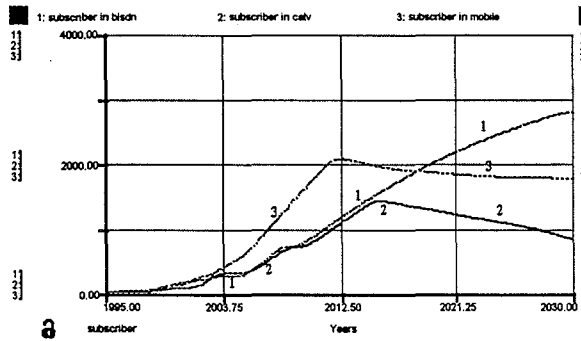


Figure 6. Trend of subscriber: Market integration - Government Initiative

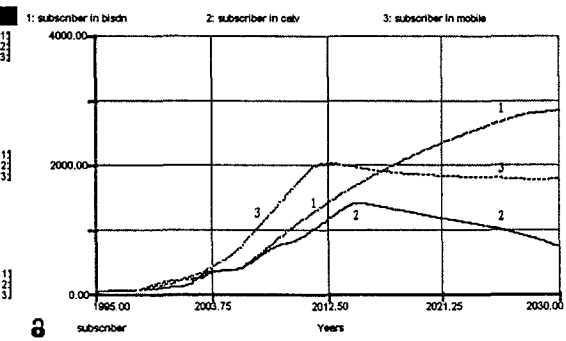


Figure 7. Trend of subscriber: B-ISDN network

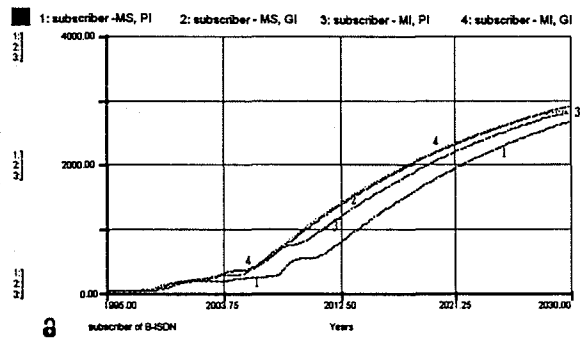
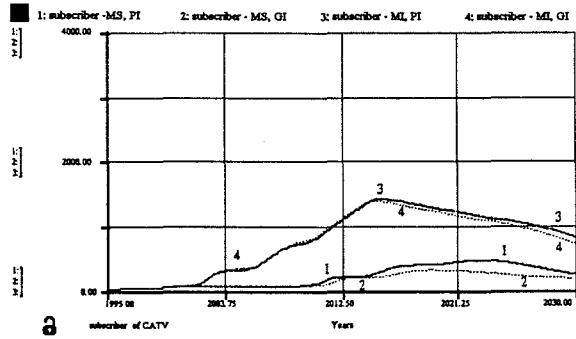


Figure 8. Trend of subscriber: CATV network



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