

A Study on the 1st National GIS Project Policy in Korea

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Abstract

본 연구의 목적은 한국에서 시도된 국가지리정보체계(NGIS)구축의 1단계사업에 대한 정책적인 측면에서 해외의 NGIS와 비교하여 2, 3단계 사업의 성공화를 도출하는데 있다. 본 연구의 첫 장에서는 Masser(1999)에 의한 세계NGIS 추진 10개국의 정책과 핵심분야를 한국의 NGIS와 비교분석하여 장단점을 제시하였다. 2장에서는 한국의 NGIS정책에 대하여 구체적으로 분석하여 3장에서 한국 NGIS의 핵심5대 분야와 연계한 결과및 평가의 구체성과 4장에서 한국의 미래 NGIS의 방향을 동시에 제시하였다.

세계적으로 90년대 후반에 시작된 국가지리정보체계의 구축사업 중에서 11개국에 대한 선행정책연구 분석에서 볼 때 한국이 포함된 7개 국가에서 정부주도형의 하향식(Top-down) 형식으로 수행하였으며, 3개 국가는 기존 수행체계를 발전시킨 상향식(Bottom-up) 형식이었고 나머지 한 국가는 절충형의 후발주자에 속하여, 한국의 NGIS 1단계사업은 국가주도형의 정책이 주종을 이루는 하향식 정책의 국책사업으로 밝혀졌다.

한국의 1단계 NGIS사업의 정책과 분야는 1995년부터 정부주도 정책에 따라서 2억 \$(중앙정부: 64%, 지방정부: 36%)의 예산으로 2000년까지 11개 중앙부처가 참여하고 5개 분과위원회(총괄분과, 지리정보분과, 토지정보분과, 기술개발분과, 표준화분과)에서 10개 사업(지형도전산화사업, 주제도 전산화사업, 지적도전산화사업, 지하시설물도전산화사업, 지하시설물관리체계개발시범사업, 공공GIS활용체계개발사업, GIS기술개발, GIS전문인력육성, GIS표준화사업, 국가GIS지원연구사업)을 수행한 대규모 국책연구개발사업이었다. 따라서 한국의 미래NGIS 정책방향은 국가공간정보기반조성을 통한 디지털국토구축으로 국가 Agenda인 'u코리아'를 실현시키고 선진형 대민서비스를 제공하는 것으로 정해될 것이다.

I. Introduction

Since GIS was implanted to the spatial fields related governmental, industrial, and research sectors, GIS technology not only promoted ability of the spatial data manipulation, but also made necessity of geographic information supplies and uses for the governmental policies, industrial fronts, and R & D institutions that required their own role reevaluation (The 1st NGIS Project White Paper, 2002).

GIS policy could be used on almost entire fields of the world, such as the national land management, environmental management, disaster management, enterprise activities, and general lives. GIS policy was called as an infrastructure of the knowledge information on the cultural society (Fisher, 1996). For insuring the national power on the periods of the unlimited competition, it was very important to establish the national information infrastructure.

The National Geographic Information Systems (NGIS) in Korea was established for the construction of the digital land (The 1st NGIS Project White Paper, 2002). There were two NGIS stages as the NGIS I and NGIS II. The NGIS I was constructed from 1995 to 2000 and NGIS II was constructed from 2001-2005. This paper was concentrated on the NGIS I on the results with policies. The NGIS I results

would consist of not only GIS policies that presented backgrounds with problems of the technical dependable situations, but also detailed construction items that exhibited budgets with assessments of the overall parts. The hypothesis of this paper was that the The National Geographic Information Systems (NGIS) in Korea would be a typical successful model for the small sized countries of the world.

The purpose of the NGIS project I was to development on living benefits of people through an efficiency of policy and rationalism of planning. In order to achieve this purpose, the NGIS project I had been established using the national geographic information based planning. The NGIS project I consisted of the master management part, the geographic information part, the technique development part, the standardization part, and the land Information part (The 1st NGIS Plan, 1997). These five GIS project parts were operated by four governmental ministries and related institutions, such as The Ministry of Transportation and Construction, The Ministry of Science and Technology, The Ministry of Information and Communication, and The Ministry of Administrative and Home Affairs.

This paper dealt mainly with results of the literature materials that combined to previous research papers and to the National Geographic Information Systems in Korea. Through these papers

comparisons and critical suggestions would be taken in order to drive assessment of the results. The national GIS construction in

the existed organization systems as the bottom-up policy (Table 1).

Table 1. National GIS policies of the international spatial information infrastructures.

Nations	Name of the National GIS Projects	Years	National Policy
Australia	Australian Spatial Data Infrastructure	1986	Bottom-up Policy
Canada	Canadian Geospatial Data Infrastructure	1996	Bottom-up Policy
Indonesia	National Geographic Info. Sys.	1993	Top-down Policy
Japan	National Spatial Data Infrastructure	1995	Top-down Policy
Korea	National Geographic Info. Sys.	1995	Top-down Policy
Malaysia	National Infrastructure for Land Info. Sys.	1994	Top-down Policy
Netherlands	National Geographical Info. Infrastructure	1992	Bottom-up Policy
Portugal	National System for Geographic Info.	1990	Top-down Policy
Qatar	National Geographic Info. Sys.	1990	Top-down Policy
England	National Geospatial Data Framework	1996	Negotiated Policy
USA	National Spatial Data Infrastructure	1990	Top-down Policy

(Data modified from Masser, 1999)

the world was pasted for around ten years. Since that period 11 countries already started for the national geographic information systems construction (Table 1). This paper would be comparable to that results. In terms of the previous researches 11 countries already started for the national geographic information systems construction (Masser, 1999). This paper would be comparable to the report of the 1st generation national spatial information infrastructure. This paper indicated that 11 countries would be divided to two categories. The first one was the national GIS constructed by the governmental forced systems as the top-down policy. The other one was the national GIS constructed by

In terms of the GIS policy the first type was the national GIS constructed by the governmental forced systems as the top-down policy: Portugal, USA, Korea, Japan, Qatar, and Malaysia. The other type was the national GIS constructed by the existed organization systems as the bottom-up policy: Australia, Canada, Indonesia, and Netherlands. England case of the national policy differed from others due to inactive governmental process by the Ordnance Survey, and by the existed organizations.

Korean government emphasized on the NGIS project success by the strong governmental force to the required infrastructure development for the potential digital geographic information technology

development (Masser, 1999). On the other hand, the NGIS policy related and supported names of the existed GIS

institutions each countries were as follows (Table 2).

Table 2. Names of the NGIS projects with institutions of the each countries

Nations	Name of the national GIS projects	Name of the GIS institutions
Australia	Australian Spatial Data Infrastructure	Australian Land Information Council Australian Prime The ministry Heads of State Governments Australia New Zealand Land Information Council Australian Surveying and Land Information Group
Canada	Canadian Geospatial Data Infrastructure	Canadian Council on Geomatics The Federal Inter-Agency Committee on Geomatics
Indonesia	National Geographic Information Systems	National Coordinating Agency from Surveying and Mapping
Japan	National Spatial Data Infrastructure	The ministry of International Trade and Industry The Cabinet Councilors Office of the Cabinet Secretariat The National Mapping Agency The National Land Agency NSDI Promotion Association
Korea	National Geographic Information Systems	The Ministry of Construction and Transportation
Malaysia	National Infrastructure for Land Information Systems	-
Netherlands	National Geographical Information Infrastructure	Dutch Council for Real Estate Information National Council form Geographic Information
Portugal	National System for Geographic Information	National System for Geographic Information The Ministry of Planning and Territorial Administration National Center for Geographic Information
Qatar	National Geographic Information Systems	National Steering Committee
England	National Geospatial Data Framework	Ordnance Survey, Federal Inter Agency Committee on Geomatics
USA	National Spatial Data Infrastructure	Federal Geographic Data Committee Office of Management and Budget National Geospatial Data Clearing House National Digital Geospatial Data Framework National Performance Review, Executive Branch US National Academy for Public Administration

(Data modified from Masser, 1999)

II. Policy of the National GIS I Construction in Korea

1. Backgrounds and necessities

As Huxhold and Levinsohn (1995) stated as “If a policy framework is not established, it will be more difficult for management to set direction and evaluate progress”, a GIS policy required predominant geo-spatial issues from the governmental IT plans.

There were four items of backgrounds and necessity for the national GIS I construction.

① It is to prepare for the information society, to accumulate for the national competition and legislative productivity, and to upbringing for the competible industries through GIS developments

② It is to use the national policy, legislative and public fields such as the national land spatial management, disaster management, and public services, throughout the usages base and condition of the national level GIS

③ It is to prevent from lives and property loose through the insolvent management of the underground facilities

④ It is to effective driving of the national land spatial management through the integrative management of the spatial information.

2. Problems

There were three problems for the national GIS I construction.

① GIS usage base and condition week for the requirement of the national policy due to initial stages of the digital mapping for the topographic maps and thematic maps

② Probability question of the GIS engine of Korean made due to the delay of the GIS relative technique development because most GIS relative techniques were dependent upon foreign productions

③ Under prepared to the GIS relative law and systems for the GIS early construction and spatial information distribution.

3. Promote direction and policy

There were seven promote directions and policies for the national GIS I construction.

① Base spatial DB structure construction and standardization

② GIS relative technique development and manpower education

③ Governmental GIS usage system development support

④ Spatial information distribution maximization

⑤ Expert driving organization foundation and expenditure support activation

⑥ Mutual fund production of public fields and private fields for the GIS base foundation

⑦ Other relative systems and law adjustment.

4. Detail execution items

There were ten detail execution items for the national GIS I construction.

① 1/25,000 Thematic map digitize projects ('98-'00): landuse map, parcel map, administrative map, and etc.

② Underground facility digitize projects ('97-'01): water, sewage, electricity, communication, gas, heat, and oil pipe facilities

③ GIS relative technique development such as base and application core software ('95-'03)

④ GIS relative manpower education ('96-'00)

⑤ GIS standardization project on the base map and application field information ('95-'97)

⑥ Pilot project on cadastral map digitalization and cadastral survey ('95-'97)

⑦ Pilot project on the underground facility management development of Gwacheon City ('96-'97)

⑧ GIS usage system development on environment, urban, disaster prevention, and etc. ('98-'01)

⑨ National GIS project support research on technique, information accumulation and management ('95-'99)

: Information network link

⑩ High express Information communication network link between the central GIS center and relative government and organizations.

5. Role allotment

There were ten role allotments for the national GIS I construction.

① government: base Spatial information DB standardization, technique development, manpower education, relative systeme production, GIS project main role, and topographic map digitization cost 50% national treasury provides

② Project on map and application field information ('95-'97) GIS

③ The ministry of Construction and Transportation: GIS project master control and usage policy development

④ The ministry of Science and Technology: Technology development and manpower education

⑤ The ministry of Information and Communication: standardization for the data exchange

⑥ The ministry of Governmental Administrative and Home Affaires: land Information systeme development

⑦ National Geographic Information Institution: digital mapping of all paper maps

⑧ Municipalities: water and sewerage facility map production: 1/1,000 topographic map digitization cost 50% national treasury burden (demander burden principal)

⑨ Government invest institutions: own facilities map production: 1/5,000 topographic map digitization cost 50% national treasury burden (demander burden

principal)

⑩ Private sectors: commercialization lead on the mapping techniques, S/W development and etc.

6. NGIS expenditure

For the 1st NGIS project planned total expenditure was 346 million dollars, however, the actual total expenditure was reduced as 199 million dollars (Table 3).

Table 3. The NGIS I expenditure

Project names	US \$
Topographic map digitization	53.0
Thematic map digitization	18.4
Cadastral map digitization	11.8
Underground map digitization	64.7
Pilot project of underground management system development	1.0
Public GIS usage system development	26.2
GIS techniq development	14.6
GIS education	5.4
Standardization	1.0
GIS researches	2.8
Total (Unit: Million USD)	198.9

Sources: The 1st NGIS Plan (1997, The Ministry of Construction and Transportation), The 1st NGIS Project White Paper (2002, The Ministry of Construction and Transportation)

III. The Five Major Parts of the 1st NGIS in Korea

The NGIS I project was to establishment of the five parts of the national spatial information systems, such as various nationwide digital maps, GIS technique development, GIS education, GIS standardization, and GIS researches. At the Primary stage of the NGIS in Korea, the NGIS catagorized as “The NGIS consisted of the following three systems :

(1) The National Spatial Information DataBase (NSID)

(2) The Application System consists of Automated Mapping System, Facility Management System, and Spatial Decision-making Support System(SDSS).

(3) The Information Supply Systems(ISS)” (Kim and Shn, 1995).

1. The master management part

This part would operate to support planning, manipulation, evaluation, expenditure, law, pilot project, research, and usage system development fields of the national GIS projects (Table 4).

Table 4. Overview of the master management part

#	Items	Description
A. Planning, control, assessment		
1	Main plan establish and manipulation	- 1st national GIS projects planning ('95-'00) - New base planning found for the 21C knowledge base hyper-information society
2	Seminar and workshop support	- Conference open for the GIS2000 - Conference open for the international base - Workshop for the land management information systems
3	Manipulation subparts and fields	- NGIS planning, expenditure management and manipulation for the each field and each year - Meeting open for each field committees, research ,committees and project operation committees - Out of fields, such as road management integration systems of NGIS control meeting open
4	Mid-term evaluation and R/D	-Mid-term evaluation open for the NGIS project development ideas -GIS policy and teaching support research by KRIHS and KICT
B. Law and enforcement ordinance legislation		
1	Systematic and practical law/institution system	- To make a law and system equipment for the effective NGIS project operation
C. Public GIS usage system development support		
1	Project name	-Land management information systems, soil resource info. sys., forest geographic information systems, underwater information management systems, geologic information management systems
2	Duration	'98-'01
3	Main agency	The Ministry of Construction and Transportation, sub-institutions
D. Underground facilities digital mapping support		
1	Project name	79 cities
2	Duration	'97-'01
3	Main agency	The Ministry of Transportation and Construction, related municipalities, and related institutions
E. Underground facilities digital mapping project (water and sewage)		
1	Project name	19 Underground Facilities Digital Mapping Project
2	Duration	'98-'01
3	Main agency	NGIS team of the Ministry of Transportation and Construction

The 1st NGIS Plan (1997)

2. The geographic information part

The National Geographic Institution controled and presented each base data digitize, regulation and standardization (Oh, 1998) (Table 5).

Table 5. Overview of the geographic information part

#	Items	Description
A. Topographic map digitize project		
1	Project name	1/1,000 (79 cities), 1/5,000 (nationwide), 1/25,000 (nationwide)
2	Duration	'95-'00
3	Main agency	The National Geographic Institution
B. Thematic map digitize project		
1	Project name	Urban plan map, road network map, land use plan map, cadastral map, land use map, administration boundary map
2	Duration	'98-'00
3	Main agency	The National Geographic Institution

The 1st NGIS Plan (1977)

3. The technique development part

The Ministry of Science and Technology would operate to obtain the independent techniques and to support the education for the experts by the core GIS base technique development support (Table 6).

Table 6. Overview of the technique development part

#	Items	Description
A. GIS technique development project		
1	Project name	GIS Engine, DB tools, Mapping techniques, System integration
2	Duration	'95-'99
3	Main agency	The Ministry of Science and Technology
5	Results	
B. GIS education for experts		
1	Project name	Education
2	Duration	'96-'00
3	Main agency	The Ministry of Science and Technology
5	Results	700 experts educated per year

The 1st NGIS Plan (1977)

4. The standardization part

The main purpose: The Ministry of Information and Communication presents a research and development of the GIS standardization for the base data construction and circulation (Table 7).

Table 7. Overview of the standardization part

#	Items	Description
A. GIS standardization projects		
1	Project name	GIS Standardization Establishment for the GIS Data Construction, Circulation, and Usage
2	Duration	'95-'00
3	Main agency	The Ministry of Information and Communication

The 1st NGIS Plan (1977)

5. The land information part

The Ministry of Administrative and Home affairs presents the digitize cadastral map and land information systems construction for the high GIS usage requirement (Table 8).

Table 8. Overview of the land information part

#	Items	Description
A. Cadastral map digitize project		
1	Project	Forest Cadastral Maps: 702,372 sheets
2	Duration	'98-'00
3	Main agency	The Ministry of Administrative and Home Affairs

The 1st NGIS Plan (1977)

There were some problems occurred, however, such as work cooperation problems due to many institutions participation, work delay problems due to a scarcity of control authority holding systems, work consistence and continuity problems due to short term transfer of workers positions and shortage of the expenditure investment due to national economic decay. These suggestive points should affect to the second NGIS planning and implementation (2001-2005).

IV. Policy Direction for the Future NGIS

“For the last three decades, national spatial planning and policies in Korea have played a major role in promoting economic growth and industrial development” (Jin and Kim, 1998). It is necessary to promote the national geographic information systems for the future policy points. Five items were selected for the further national GIS directions (The National Self Evaluation in 2002, 2003).

1. Construction of the national GIS project boundaries and role readjustment in viewpoint of the national spatial information infrastructure
2. Renovation of the mutual cooperative system of the each committee and empowerment of the master control ability
3. Construction of the effective evaluation system for the national geographic information systems
4. Renovation of the tethering budget system and of the execution structure
5. Creation of the practical ideas for the government and private cooperation on the national GIS project.

V. Conclusions

The Korean NGIS project had been transformed from the dispersed and mal-planned dogmatic GIS projects to the systematic planed GIS projects through the 1st NGIS project (1995-2000). Korean

government emphasized on the NGIS project success by the strong governmental force to the required infrastructure development policy for the potential digital geographic information technology development as the top-down process.

Optimistic outputs of the 1st NGIS project in Korea resulted in prevention from overlapped expenditure investment and ensuring interoperability of the systems and spatial database. The invaluable result of the NGIS I project was to establishment of the nation fundamental spatial information systems, such as nationwide digital maps (topographic maps, cadastral maps, thematic maps, underground facility maps), GIS technique development (GIS engine with applications, spatial database tools, spatial data integration, and mapping techniques), GIS education, GIS standardization, and GIS researches.

As the results of 'the National GIS

Policies of the International Spatial Information Infrastructures' data (Table 1), 1st National GIS project policy of the Spatial Information Infrastructures exhibited the results of the strong governmental driving forces were more affected to the systematic results than the existed organizations driving forces as the bottom-up process. The 2nd generation NGIS policy will be guided two different aspects: changeable governmental policies and active global events.

NGIS is realized as the most important national infrastructure for the national competition power and productivity expansion. NGIS should be constructed by the government as a mega-sized project scale because not only GIS is required abundant spatial data and used for the publics, but also GIS will be treated as governmental properties due to its attribute information, geographic elements and national concept.

References Cited

1. Fischer, M. M. , Towards knowledge-based GIS, In: *GIS in ASIA*. Edited by Fung, et al. GIS ASIA PACIFIC, pp. 15-25. 1996.
2. Huxhold, W. E. and A. G. Levinsohn, 1995. *Managing Geographic Information System Projects*. Oxford University Press. p. 31.
3. Jin, Y.H. and Kim, C.H. 1998. National Physical Development Policies. In: *SHAPING THE NATION TOWARD SPATIAL DEMOCRACY*. edited Jeong-Sik Lee and Yong-Woong Kim. Korea Research Institute for Human

- Settlements, 260p.
4. Kim, J.Y. and Shn, D.B. 1995. *Preliminary study on National Geographic Information System*. Korea Research Institute for Human Settlements, 148p.
 5. Masser, I. 1999. A Report on the 1st generation National Spatial Information Infrastructure. *Int. J. Geographical Information Science*, 1999, V. 13(1): 67-84.
 6. Oh, J. 1998. DBMS Independent GIS Software Development Project. *Korea Information Science Society Review*. v.16(3): 16-22.
 7. *The 1st NGIS Plan*, 1997, The Ministry of Construction and Transportation
 8. *The 1st NGIS Project White Paper*, 2002, The Ministry of Construction and Transportation.
 9. *The NGIS Self Evaluation in 2002*, 2003, The Master Contral Sub-Committee of the NGIS Committee. 107p.

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