Historical Information Systems Administered by the Korean Public Sector
- Present and New Challenges-

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This article is purported for reviewing the present historical material databases funded by the Korean government and suggesting solutions for improving database services and providing researchers of Korean studies with more useful and convenient digital resources.

In Korea, Historical Information Systems were funded by the Ministry of Information and Communication, and were carried out by twelve public institutions. These databases currently contain 6.53 million digital materials, which are all provided for free to information users all around the world as well as those in Korea.

The database construction project for Korean historical materials covers overall Korean history to allow much easier and more convenient access to research materials than in the past. However, the current historical information system has many problems to be improved. Among them, the most urgent matter to be addressed is the enhancement of interoperability between databases.

The practical method to increase interoperability is to have institutions make metadata that explicitly describe the content and format of their databases and share them with other institutions. A technological standard for a Metadata Registry was suggested to enhance interoperability between independent systems.

Since the Metadata Registry is purported for information resources that belong to a certain knowledge field, it must be made and run by those with deep knowledge and expertise in the regarded field. In order to have the Historical Information Systems play the leading role in promoting the free communication of high quality information on traditional Korean culture in cyber space, facilitating mutual understanding of history and information technology is very important.

Keywords: Knowledge and Information Resource Management Project, Integrated Historical Information System, information retrieval, digital content manipulation technology, interoperability, metadata registry

Introduction

Scholars abroad who study and research Korean history and culture are surprised at the tremendous increase of digitalized materials on Korean history during the recent five to six years.

In Korea, databases of historical materials called Historical Information Systems were funded by the Korean government and created by twelve public institutions and university libraries. These databases currently contain 6.53 million digital materials, which are all provided to information users all around the world as well as those in Korea at no charge.

The digital information service improved the research environment for Korean historians and also made access to necessary information much easier for researchers of Korean studies in other countries. However, it is true that these databases have some problems since they were made under strategic planning and financial support by the government instead of being formed out of the need of scholars and researchers in related fields. The present study is purported for reviewing the present historical material databases funded by the Korean government and suggesting solutions for improving the database services and providing researchers of Korean studies with more useful and convenient digital resources of knowledge and information.

Database Construction Project initiated by the Korea Government

1. Social Background

Large-scale historical information databases being produced with the financial support of government is very rare in other countries. What is the reason why historical information databases are produced in large quantities in Korea?

One of the main reasons is that the Korean government promoted the information and communication industries as strategic fields and the country has implemented the best environment in the world to use the internet. Very high speed communication networks are available to 73 households out of 100, and

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1. Korea's advanced information and communication infrastructure is partly due to the fact it has a large population concentrated in a small area. The investment towards implementing a network

Annual budget for the Knowledge and Information Resource Management Project
(Unit: billion, Currency: Korean Won)

Year	1999	2000	2001	2002	2003	2004	2005	Sum
Annual budget	50	34	32.8	27.5	47	47	52.5	290.8

the rate is the highest in the world (Kim Hyeon 2003).[1] The rate of internet Korean users is 61%, which is the third highest usage rate after Iceland and Sweden (National Computerization Agency 2005: 25-27).

However, the production of information content does not increase on its own no matter how advanced the information and communication infrastructure. There is another special reason for the rapid increase of information content in Korea.

At the end of 1997, Korea underwent the financial crisis called the "IMF period" by Koreans. During this period the Korean government promoted various government-run projects to provide work to the jobless. One of the labor intensive businesses run by the government was the "IT New Deal Project," a business for developing information content.

The Ministry of Information and Communication, the architect of the project, had public institutions implement plans for developing a huge amount of information content, and temporarily employed college graduates without jobs to input the data. This project lasted for three years starting from 1998 and cost 640.8 billion Korean Won. As a result, 186 large-scale information databases were developed (Bak Jae-mun 2002).

The Ministry of Information and Communication reorganized the business and launched the Knowledge and Information Resources Management Project in 1999. The Ministry has been investing around 50 billion Korean Won every year for information content development. The annual budget for the Knowledge and Information Resource Management Project is as follows. The representative large-scale databases of Korean historical materials are outcomes of these government funded projects.

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can be highly profitable since a large number of network subscribers can be reached by constructing a single high speed backbone network. This profitability speeded up the implementation of networks in Korea.

2. The Knowledge and Information Resource Management Project

The Knowledge and Information Resource Management Project promoted by the Ministry of Information and Communication is aimed at enhancing Korea's global competitiveness and contributing to the advance of the Korean economy by establishing a knowledge and information database that can be easily accessed and utilized by ordinary Korean people and businesses anytime, anywhere (National Computerization Agency 2004a: 19).

For this project, the knowledge and information resources to be digitalized were categorized into four major fields: science and technology, education and learning, culture and art, and history. The public and educational institutions involved in each field received financial support from the government for developing databases. From 1999 to 2004, 718 institutions participated in the project as follows and produced a total of 220 million items of digital materials:

Number of institutions participating in the Knowledge and Information Resource Management Project

Area	Science & Technology	Education & Learning	Culture & Art	History	Sum
Number of Institutions	79	445	158	12	718

Quantity of database records produced by the Knowledge and Information Resource Management Project

Area	Science & Technology	Education & Learning	Culture & Art	History	Total
Number of Data Records	97,870,000	113,990,000	2,040,000	6,530,000	220,430,000

The materials contained in the database are all available through the internet. As of the end of 2004, an average 8.23 million users used the database per month (Ministry of Information and Communication 2005).

Historical Material Databases in the Korean Public Sector

1. Public Institutions Producing Historical Material Databases

History was included among the four fields of the Knowledge and Information Resource Management Project, thanks to the great interest shown by institutions involved in historical research and publication, including the National Institute of Korean History and the Academy of Korean Studies.

At that time, *the Annals of the Joseon Dynasty*, the representative historical records from the dynasty, was compiled onto CD-ROM through the efforts of a

History-related Institutions Participated in the Knowledge and Information Resource Management Projects: 1999-2005

Institutions	IT New Deal Project		Knowledge & Information Resource Management Project						
	1998	1999	1999	2000	2001	2002	2003	2004	2005
National Institute of Korean History		●	●	●	●	●	●	●	●
The Academy of Korean Studies	●	●	●	●	●	●	●	●	●
Gyujanggak Archives, Seoul National University			●	●	●	●	●	●	●
Korean Classics Research Institute			●	●	●	●	●	●	●
Korean Studies Advancement Center			●	●	●	●		●	●
Independence Hall of Korea		●		●	●			●	●
Korean Women's Development Institute						●		●	●
Ministry of Patriots and Veterans Affairs								●	●
Jongyeonggak, Sungkyunkwan University								●	●
Muncheongak at Gyeongsang National University								●	●
Korea Democracy Foundation								●	●
The War Memorial of Korea								●	
Institute of Korean Studies at Myongji University									●
The National Library of Korea									●

private company.[2] The history of the Joseon dynasty amounting up to 400 volumes of 300-paged books was put onto a single CD-ROM. It was used widely among many researchers and became a good example showing the world how useful and convenient digital information content could be. This example spurred Korean public institutions involved in history studies to create similar digital historical materials and to aggressively participate in such projects.

When the project initially commenced in 1999, five institutions participated including the National Institute of Korean History, the Academy of Korean Studies, the Gyujanggak Archives of Seoul National University, the Korean Classics Research Institute, and the Korean Studies Advancement Center. Afterwards, several other institutions joined in. This was followed by others: Independence Hall of Korea in 2000, the Korean Women's Development Institute in 2001, and three others including the Ministry of Patriots and Veterans Affairs since 2004. Now, there are a total of twelve participants building digital material databases in the field of history. With Myongji University and the National Library of Korea adding to the list in 2005, databases will be provided by fourteen institutions from the year 2006.

Up to 2004, 6.53 million items of historical materials have been digitalized, accounting for over a quarter of the overall digital materials produced from the project. The expenses invested in developing historical databases also account for over a quarter of the whole budget for the project every year (Ministry of Information and Communication 2005).[3]

2. Contents of the Historical Material Databases

All of the participants of the historical material database construction project are Korean institutions that possess and produce history-related materials. Each participating institution specializes in its own unique field of research and business and is developing a database for handling materials of each particular field.

The contents of each database built and provided by each of the twelve public institutions are as follows.[4]

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2. *The Annals of the Joseon Dynasty* was digitalized and published on CD-ROM by Seoul Systems Company in 1995.
3. In 2005, 15 billion Korean Won from a total 52.5 billion Korean Won were invested in building historical databases.
4. Information concerning the contents of the historical information databases was collected from

Specialized Database Compilation Areas of Public Institutions

Institutions	Specialized Area of Database Compilation
National Institute of Korean History	Various old documents, books ,and relevant overseas materials
The Academy of Korean Studies	Cultural and historical materials held in Jangseogak Library
Gyujanggak Archives, Seoul National University	Historical rare books and documents held in Gyujanggak Archives
Korean Classics Research Institute	Collection of Korean literary classics translated into the Korean language, and their originals
Korean Studies Advancement Center	Collection of literary works of Confucian scholars in the Yeongnam area
Independence Hall of Korea	Materials concerning Imperial Japan's exploitation of Korea, and the Korean independence movement
Korean Women's Development Institute	Materials concerning the history of women's life
Ministry of Patriots and Veterans Affairs	Materials concerning the independence movement and national meritorious persons
Jongyeonggak, Sungkyunkwan University	Materials concerning Korean Confucianism and the Confucian classics
Muncheongak at Gyeongsang National University	Collection of literary works made by Confucian scholars in South Gyeongsang province
Korea Democracy Foundation	Historical materials concerning the democratization movement
The War Memorial of Korea	Materials concerning the Korean War and the Vietnam War
Institute of Korean Studies at Myongji University	Korea-related old books published in Western countries
The National Library of Korea	Union catalogue of old Korean books

◆ National Institute of Korean History

National Institute of Korean History was established in 1946 for the collection of materials concerning Korean history for relevant research and compilation activities. The Institute has collected a variety of old documents, books, and relevant overseas materials and has provided them to academic circles. The

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websites run by each of the twelve institutions and brochures introducing the database compilation project. The addresses of each institution's website are appended.

Databases produced by the institute are as follows:[5]

Daily Record of the Royal Secretariat	A full-text database on the basis of Seungjeongwon ilgi, the Daily Record of the Royal Secretariat. The *Seungjeongwon ilgi* is a record of daily affairs at Seungjeongwon, a state institution that handled and kept royal orders.
The Collection of Korean Historical Materials	The essential knowledge resources concerning the national history of Korea. So far a total of 42 books have made their way into the database.
Official documents of the Border Defense Council	A collection of official documents kept by the Border Defense Council--Bibyeonsa, the highest administrative institution after the Japanese invasion of Korea in 1592. This is a database of the present-day language text of the records.
Official letters between the central government and provincial offices	A full-text database of official letters made by the central government and provincial offices concerning foreign affairs, trade, finance, law enforcement, and royal court affairs during the 1577-1910 period.
History of King Gojong's reign	A chronological collection of historical materials from 1863 (King Gojong's ascension to the throne) to 1910 (Japan's annexation of Korea) (in six volumes, 1967-1972).
History of 36 Years of Imperial Japan's Colonial Rule	A chronology compiled by the National Institute of Korean History covering the 36 years of colonial rule under Imperial Japan's colonial rule.
Materials concerning history of Korean independence movements	22 volumes of material concerning Korean resistance movements against Imperial Japanese colonial rule.
The collection of materials concerning the history of Korean Independence Movements	A collection of materials compiled with a focus on Korean independence movements against Imperial Japanese colonial rule based on materials kept by the National Institute of Korean History. The materials are comprised of newspaper articles and records of court proceedings concerning Koreans engaged in independence movements.
The collection of documents concerning Korean resistance to Imperial Japan's colonial rule	A collection of materials concerning Korean independence movements carried out in Manchuria, Shanghai, Japan, Russia, and the U.S. as well as major events that occurred in Korea. It is comprised of several groups of documents, including the Document Files of Gyeongseong District Court and Documents of the Cases of Insubordinate Koreans.

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5. For more information, visit the website of the National Institute of Korean History, Database of Korean History, http://www.history.go.kr/

Documents of the Residency-General of Imperial Japan	A collection of the documents of the Residency-General of Imperial Japan sorted out among the records kept by the Japanese Legation in Korea in the 1905-1910 period, based on an 11 volume book of the same title published in the 1988-2000 period.
Materials concerning distinguished Koreans in modern times	A database of personal information of Korea's leading figures in modern times.
Newspaper articles in modern times	A database of photocopied images of original texts of leading newspapers in modern times, along with explanations.
Materials from magazines in modern times	A database of original texts of the nineteen leading magazines published in modern times, plus a table of contents of sixty-four other magazines.
Material-History of the Republic of Korea	A database of historical materials concerning events that occurred between August 15, 1945 and June 24, 1950. The materials are comprised of newspaper articles and public/private documents circulated and used both in and out of the country concerning important matters in political, economic, social, cultural, and international sectors.
The collection of Lee Seung-man's letters	A collection of Lee Seung-man's letters (10 volumes) written in the 1944-1965 period, plus materials concerning the Federation of Korean Associations, Hawaii in the 1915-1936 period.
Documents from the Military Government Headquarters	A database of materials concerning the military government (Military Government Headquarters, Headquarters Detachment and Headquarters Company) in Korea run by U.S. troops following the end of Imperial Japanese colonial rule in 1945.

◆ The Academy of Korean Studies

The Academy of Korean Studies was established in 1978 for the promotion of Korean studies through in-depth research and education of Korean culture. The Academy is engaged in the academic research of Korean culture, compilation of classical literature works, and the training of researchers of Korean studies. The Databases produced by the academy are as follows:[6]

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6. For more information, visit the website of The Academy of Korean Studies, Database of Historical Materials Held in Jangseogak Library. http://yoksa.aks.ac.kr/

Cultural and histori-cal materials of the Royal Household	A database of records concerning ceremonies held within the royal court during the Joseon dynasty. Especially, more than 10,000 records concerning Illustrations of Royal Court ritual standards (儀軌) are contained in this database.
Unofficial history and records of daily events	A database of historical materials compiled by private citizens in the form of transcripts. They compose interesting historical information that official records do not provide. They reflect the atmosphere of that time more accurately and supplement deficiencies of official his-torical records.
Old documents kept by reputable families	A database of old documents collected from about fifteen reputable families nationwide through a research project. They are comprised of property inheritance documents, contract documents, legal proceed-ings documents, letters of appointment of officials, i.e. those that show everyday activities carried out in provincial society.
The collection of Korean oral literature	A collection of materials directly voice-recorded from sources nation-wide for the purpose of research on regional differences in folk songs and folklore. It will also enable descendants to listen to the voices of their ancestors.
The collection of Korean dialectal materials	A collection of dialectal materials which provides an important basis for research on the origins of the modern Korean language and regional differences in dialects.
The collection of Korean folk songs	A collection of folk songs recorded directly from their sources across the country. Provided in the forms of voice files, along with lyrics, musical scores, and explanations, they can meet a variety of require-ments, in addition to being utilized for research purposes.
Pictorial materials concerning Korean culture	A collection of pictorial materials held by the Academy of Korean Studies. The materials are sorted out according to their respective nature, such as organizations, literature, plays, games, relics, historic sites, anniversaries, events, natural objects, articles, artworks, figures, etc.
Basic dictionary of Korean history	An electronic dictionary with explanations on terms related to Korean history, sorted out according to conceptual terms, figures, place names, literature, artwork, social system, organization, relics, historic events, historic sites, and leading philosophy.
The collection of seal impressions	A collection of impressions of seals used by King Heonjong of the Joseon dynasty, along with explanatory materials. They are the royal seals used in the 19th century and can be compared with those used by literary writers and painters of that time.
The collection of per-son and place names	A summed-up collection of names of persons and places appearing in various materials and associated legends.
Chronological mate-rials	A database of historical facts appearing in various materials. The contents are chronologically arranged and can be used for multi-dimensional checking of various historical facts that occurred con-temporarily.

◆ Gyujanggak Archives at Seoul National University

The Gyujanggak Archives had formerly functioned as the Royal Library during the Joseon dynasty and now falls under the management of Seoul National University. At present, it has a large number of old books, documents, and book-plates, including certain rare books designated as National Treasures (7,078 books in seven types) and Treasures (25 books in seven types). Databases produced by Gyujanggak are as follows:[7]

Catalogue of materials kept by Gyujanggak	An electronic catalogue of various materials kept in the Gyujanggak Archives.
Introductions to old books kept by Gyujanggak	A database providing introductions to old books kept in the Gyujanggak Archives. It covers collections from Korea and China, classifying them into linguistic/literary materials, diplomatic documents, and official documents. Some introductions are provided in English.
Antique maps kept in the Gyujanggak Archives	Comprehensive information on natural geography and the state of society of the Joseon dynasty. Many of the old maps were made using the technique of landscape painting. Thus, they are appraised to have high artistic value.
Government records in the modern era	A database of various materials kept by each provincial and county office, which show how the nation adapted to modernization policies and coped with the aggression of Western powers.
Records of Daily Reflection	A record comprised of 2,329 volumes covering daily affairs concerning the king's direction and his development of state affairs in the 1752-1910 period. It is a representative material compiled by Gyujanggak Royal Library of the Joseon dynasty.
Records of daily affairs kept by Gyujanggak	A record of daily affairs kept by Gyujanggak Royal Library in the 1779-1883 period. Comprised of 1,249 volumes, it contains much content not found in other chronological materials covering the same period.
Daily Record of the Royal Secretariat	A photocopy image database of *Seungjeongwon ilgi*, the Daily Record of the Royal Secretariat. Seungjeongwon ilgi is designated as National Treasure No. 303.
Book plates	A database containing the images of major book plates held in the Gyujanggak Archives. 17,816 plates of 102 old rare books were put into the database.

7. For more information, visit the website of Gyujanggak's Database of Historical Materials in Gyujanggak's archives. http://e-kyujanggak.snu.ac.kr/

◆ Korean Classics Research Institute

The Korean Classics Research Institute was established in 1965 with the aim to pass on and promote Korean traditional culture. The Institute has been engaged in the collection, compilation, and translation of classical literary works into modern language. The databases compiled by the institute are as follows:[8]

The collection of Korean literary classics translated into the modern Korean language	A collection of Korean literary classics translated into the modern Korean language. 408 books in of 79 types were published until by 2003 in this collection, and the texts of 237 books in of 46 types have been put into the database.
Daily Record of Royal Secretariat translated into the modern Korean language	A record of wide-ranging state affairs of the latter period of the Joseon dynasty. A total of 203 volumes were translated into the modern Korean language and published, and a total of 179 volumes covering the first year through the 35th year under the reign of King Gojong were put into the database.
Records of Daily Reflection translated into the modern Korean language	A record of daily affairs concerning the king's movement and development of state affairs in the 1752 - 1910. The texts in 33 volumes out of the translated materials have been put into a database.
The collection of Korean Classic Work Originals	A database made of the original Chinese character texts which were used to publish the Korean literary Classics, but not included in the Korean Literary Collections database. It contains 58 books in 12 categories.
Korean Literary Collections	A comprehensive collection of the Korean literary works of distinguished writers who lived in the pre-1910 period. The collection is being published to provide basic materials for translation of classical works and for the study of classical works. By 2004, 192 books in 482 types were put into the database.

◆ Korean Studies Advancement Center

The Korean Studies Advancement Center was established in 2001. The Center is engaged in collection, research, and exhibition of traditional materials owned by private citizens and is training scholars specializing in such activities with the

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8. For more information, visit the website of the Korean Classics Research Institute, Collection of Korean Literary Classics. http://www.minchu.or.kr/

aim for the creative inheritance of Korean traditions. Databases produced by the center are as follows:[9]

The collection of literary works of scholars in Yeongnam	A bibliographic database of literary works of Confucian scholars in Yeongnam, mostly followers of Lee Hwang (李滉, 1501-1570). The database contains 3,503 volumes of 1,328 types.
Old documents kept at Dosan Seowon	A database of 13,238 pages of documents of 2,500 types kept at Dosan Seowon, a private school run by Lee Hwang in the Joseon dynasty. It contains a variety of old documents, which show the school's constitutional and economic aspects.

◆ Korean Women's Development Institute

The Korean Women's Development Institute was established in 1983. In addition to providing assistance for women's social participation and enhancement for their welfare, the Institute endeavors to carry out research on matters concerning women, set up policies for women, and develop women's abilities. The databases produced by the institute are as follows:[10]

Materials concerning women-related policies	A database of materials concerning the development of women-related policies taken by the Korean government, classified into sectors, such as policies in general, law/institution, employment/labor, family/health/welfare, education, everyday life/culture, and social activities, etc.
Materials concerning the history of women's life as community members	A database of materials concerning the development in women's life as community members, including their family life, welfare and education, their cultural/arts activities, and influential women.
Materials concerning women organizations' activities	A database of materials concerning save-the-nation activities carried out by women at the time of the nation's door-opening, activities of intelligentsia women in the 1920s, the women's labor movement of the 1970s, development of the women's movement in the 1980s, and the diversification of the women's movement in the1990s based on periodicals, publications, and documents of leading women organizations.
Materials concerning cultural affairs and education for women	Materials concerning changes in the social status of women, their everyday life and cultural activities, the development of women's schools in modern times, and materials used for women's education.

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9. For more information, visit the website of Korean Studies Advancement Center, Collection of Literary Works of Confucian Scholars. http://www.koreastudy.or.kr/
10. For more information, visit the website of Korean Women's Development Institute, Database of Women's History. http://www.womenshistory.re.kr:7070/

◆ Independence Hall of Korea

The Independence Hall of Korea was established in 1987 with the aim to contribute to the Korean people's national spirit and patriotism through an exhibition of materials related to the nation's history of overcoming difficulty. The databases produced by the institute are as follows:[11]

Displayed materials of the Independence Hall of Korea	Out of 73,000 items related to independence movements kept by the Hall, 2,000 items were selected and put into a database to provide detailed information on those displayed items.
The roster of those performing meritorious deeds in the independence movement	A database containing information on 8,866 Leading Patriots, such as their names, places of origin, kinds of medals bestowed, names of group they belonged to, etc.
Historic sites of the independence movement	A database containing information on the sites of the independence movement, i.e. 548 places in Korea and 530 places in China, Japan, Russia and the U.S. The content of the database is composed of texts, maps, still images, and motion video clips to show via multimedia the efforts made by Koreans to regain their nation's sovereignty.
Newspaper articles during Imperial Japan's colonial rule	This database contains the original texts of articles of newspapers published during Imperial Japan's colonial rule along with images and indices of the articles.
Declarations and written appeals	A database providing original texts of a total of 228 kinds of declarations, written appeals, manifestos, and leaflets, including the Declaration of Independence on March 1, 1919, along with their images.
Oral materials concerning Imperial Japan's exploitation of Koreans	Materials comprising of oral statements and video images of Koreans forcefully mobilized by Imperial Japan as laborers, servicemen, or comfort women.

◆ Ministry of Patriots and Veterans Affairs

The Ministry of Patriots and Veterans Affairs was established in 1961. The Ministry focuses on providing national meritorious persons with the benefits which they deserve, and broadening and deepening public awareness of how

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11. For more information, visit the website of Independence Hall of Korea, Database of Independence Movement Materials. http://www.independence.or.kr/

national meritorious persons have earned the people's infinite respect. The databases produced by the ministry are as follows:[12]

History of independence movements	A database concerning independence movement-related materials such as the History of the Volunteer Army's Resistance, History of the Independence Movement in 1919, the History of Provisional Government of Korea, the History of Battles Engaged in by Korean Troops against the Imperial Japanese Army, the History of Struggles Engaged in by Civil Patriots, the History of Cultural Struggles, the History of Students' Independence Movements, and v the History of Struggles by General Public.
The collection of materials concerning independence movements	A collection of materials concerning Korean volunteer troops fighting the Imperial Japanese Army and independence movements by Koreans in Japan.
Historical materials concerning independence movements carried out overseas	Various historical materials concerning independence movements carried out overseas: Materials concerning diplomatic relations between the Provisional Government of Korea and the Union of Nations, documents concerning approval of the Provisional Government, and documents issued by the Foreign Ministry of Germany, etc.
Materials concerning Korean Volunteer Troops' Activities	17,000 pages of materials concerning Korean volunteer troops' activities for national independence in 1907 and 1908.
Recording of testimonies by meritorious contributors to the independence movement	Testimonies made by persons who made a meritorious contribution to the independence movement.

◆ Muncheongak at Gyeongsang National University

Muncheongak was established in 1986 as a section of Gyeongsang National University library and specializes in books written in Chinese characters. It is a representative library concerning books in Chinese characters in South Gyeongsang Province. The databases produced by the library are as follows:[13]

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12. For more information, visit the website of Ministry of Patriots and Veterans Affairs, Database of National Meritorious Persons. http://e-gonghun.mpva.go.kr/
13. For more information, visit the website of Muncheongak, Database of Nammyeong Study. http://nmh.gsnu.ac.kr/

Old literature database on Jo Sik)	A database on Jo Sik (曺植, 1501-1572), a reputable scholar in Gyeongsang Province in the mid-Joseon dynasty.
Old literature on friends and disciples of Jo Sik	A database containing materials concerning personal details of friends and disciples of Jo Sik, their literary works, and relevant facts.
The collection of literary works made by Confucian scholars in Gyeongsang-u-do	A database containing personal details of Confucian scholars who lived in Gyeongsang-u-do during the Joseon dynasty, their literary works, and relevant facts.
Record of affairs concerning Gyeongsang-u-do	A database containing chronicles compiled by lower administrative units, *gun* (郡) or *eup* (邑), in Gyeongsang-u-do.

◆ Jongyeonggak at Sungkunkwan University

Jongyeonggak is a specialist library designed for the collection and compilation of academic materials concerning East Asian culture. The library has an array of antique literature, hardbound books, microfilm materials, and overseas publications. The database produced by the library is as follows:[14]

Materials concerning the study of Confucianism in Korea	A database of 145 volumes of texts of the collection of Confucian study materials in Korea and introductions published by the Daedong Institute for Korean Studies at Sungkyunkwan University.

◆ Korea Democracy Foundation

The Korea Democracy Foundation was established in 2002. The Foundation aims to contribute to the development of national democracy by commemorating the democratization movements. The database produced by the institute is as follows:[15]

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14. For more information, visit the website of Jongyeonggak, Database of Korean Confucianism and Confucian Classics. http://koco.skku.edu/
15. For more information, visit the website of Korea Democracy Foundation, Database of Democratization Movement Materials. http://saryo.kdemocracy.or.kr/kh/

Historical materials concerning the democratization movement	A database of historical materials concerning the democratization movement classified into periodicals, official documents, manifestos, collections of materials, newspaper articles, and letters, etc. The database contains materials concerning the April 19 Student Revolution in 1960, the struggle against President Park Chung-hee's dictatorship, the Gwangju Uprising in May 1980, and democratization movements carried out in the 1990s and early 2000s.

◆ The War Memorial of Korea

The War Memorial of Korea was opened in 1994 with the aim to remind people of the need to prevent war and to accomplish the goal of the peaceful unification of Korea. This institute is collecting and preserving various materials concerning war, both old and modern. The database produced by the institute is as follows:[16]

Materials concerning the Korean War and the Vietnam War	A database containing a total of 3,130 items of material concerning the two wars. It includes information on leading patriots, battles, battle sites, monuments, weapons, military relics, military terms, and photographs related to the wars and military history.

On-line Service system of the Historical Material Databases

1. Configuration of the Historical Information System

The databases built during the Knowledge and Information Resource Management Project are managed and operated separately by each of the producing institutions, but users can access the information through four different routes.

First is through the internet homepage of the institutions processing the databases. Second is through the integrated service system of the history field.[17] Third

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16. For more information, visit the website of The War Memorial of Korea, Database of War and Military Affairs. http://www.warmemo.co.kr/
17. National Institute of Korean History, Integrated Historical Information System, http://kh2.koreanhistory.or.kr/
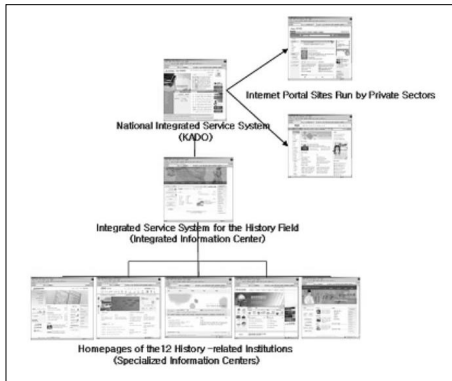
Hierarchy of the Information Service
Systems of the History Field

is through the national integrated service system run by the Korea Agency for Digital Opportunity and Promotion, the institution in charge of managing the project.[18] Fourth is through internet portal sites run by private sector.[19]

The diagram below shows the database service system of the history field.

As observed in the above diagram, each institution provides historical materials themselves and the same materials are also available through a comprehensive information service site that provides materials from participating institutions. Such a network system between the historical material databases for comprehensive services is called the "Integrated Historical Information System." This name refers to the fact that although the databases are run separately by each institution, users are capable of using comprehensive contents from all related databases.

The integrated service is realized by the function that allows the integrated retrieval of metadata provided by each institution. The sites providing this function are called "gateways" and the "Integrated Information Center" is in charge of managing these gateways. At present, the National Institute of Korean History plays the role of the Integrated Information Center for the history field. Meanwhile, the institutions operating each of their specialized databases are called "Specialized Information Centers."

2. Metadata Harvesting and Retrieval Service

In order to provide the integrated information retrieval function for separate database content, the Integrated Historical Information System collects some metada-

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18. For more information, visit the website of Korea Agency for Digital Opportunity and Promotion, Korea Knowledge Portal. http://www.knowledge.go.kr/
19. For more information, visit the website of KTH, National Knowledge Portal at http://kis.paran.com/ and Yahoo Korea, National Knowledge Portal at http://kr.kis.yahoo.com/.

ta from each record of the database of each institution.[20] Till 2004, the metadata were collected by having participating institutions send newly produced database materials once yearly to the Integrated Information Center. But this method made use of the databases very inconvenient because the changes and corrections of materials produced by each institution could not be reflected immediately in the gateway system data. Due to this reason, the database of each institution and the gateway system have been synchronized since 2005 to have any alterations in the separate database content to be sent and applied automatically to the gateway system. Such real time metadata harvesting was realized based on OAL-PMH 2.0.[21]
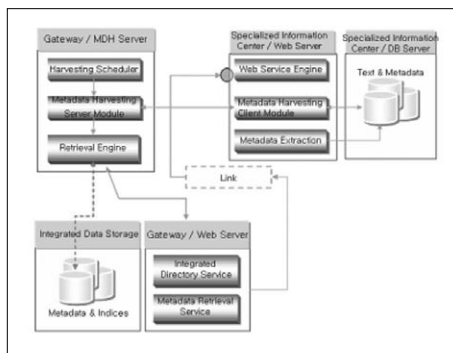
Process of Metadata Harvesting between the Gateway System and Individual Sitesa
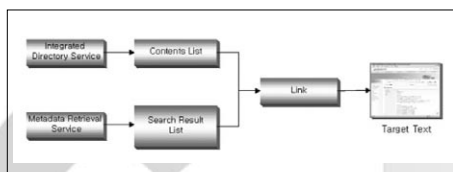
Metadata Service and Text Link Process of the Gateway System

The harvested metadata are stored in the metadata database within the gateway system, and directory and retrieval services are provided for the overall database content provided by the twelve institutions. Since the system merely deals with metadata harvested from distributed databases, the user must log on to the database of the particular institution in order to view the data's text. In the case of the Integrated Historical Information System, when a user selects an item from among the search results, the integrated service system automatically links the original digital resource, which is physically stored in a certain institution's database, to show the text of the material.

The Integrated Historical Information System "symbolizes" the fact that while the databases of the twelve institutions exist separately, they are at the

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20. The term "metadata" in this context refers to certain key field data of the the database records.

21. OAI-PMH is an abbreviation of "the Open Archives Initiative Protocol for Metadata Harvesting." The protocol provides an application-independent interoperability framework based on metadata harvesting (The Open Archives Initiative, The Open Archives Initiative Protocol for Metadata Harvesting, http://www.openarchives.org/OAI/openarchivesprotocol.html).

same time connected to each other. The term "symbolize" is applied here to indicate that although much effort is being made in order to connect the databases, not much practical achievement has been realized yet. The majority of users using the historical information system search the separate databases through the homepage of each institution instead of through the gateway system. The main reason why the Integrated Historical Information System cannot function appropriately as a comprehensive information service is because no technological standards for the database structure and service methods have been established for the separate twelve databases.

Outcome of the Integrated Historical Information System

1. Introduction to the New Research Method

The database construction project for Korean historical materials selected materials covering the overall Korean history from ancient to contemporary, digitalized and compiled to allow much easier and more convenient access to research materials than in the past.

Another notable achievement of the project is that it proved that electronic information technologies, which seemed to have nothing to do with the work of preserving the knowledge of the past, were in fact very useful tools for reproducing and providing knowledge of Korean history. The project contributed greatly in having society recognize the usefulness of digital technology in the field of history.

The common method of historical research is discovering unknown old records hidden away in libraries, reading each old word and phrase patiently and carefully and excerpting and reorganizing the newly discovered facts. However, as the amount of digital materials held in the Integrated Historical Information System has increased tremendously during the past several years, researchers now usually search the system first before looking through materials in the library.

Nevertheless, the present information system is not yet equipped enough to cover the various research subjects and the vast historical materials our ancestors have left behind. But the researcher's attitude towards the system has gradually changed from the negative, "There's nothing I really need" attitude to a positive, "I can find almost everything" attitude. The Integrated Historical Information System has helped researchers not only in the field of history but also various

cultural studies scholars acknowledge the fact that they must stay up to date with the age of digital information and adopt a digital mind in order to study the past more efficiently.

2. Promotion of Digital Content Manipulation Technology

The development of the historical information database also played a significant role in enhancing the IT businesses' competitiveness in digital content production technologies. Notable advanced information technologies resulting from the project include data input technology and information retrieval technology for Chinese character texts.

Because the majority of pre-modern historical records are written in Chinese characters, technologies for the fast and accurate input of data written using Chinese characters must be developed for digitalization of such materials. IT businesses that have participated in the historical information database construction project invested great amounts in developing an efficient Chinese character data input technology. At present, these companies apply a semi-automatic input method based on character image clustering. The Chinese character data input process using this method is composed of scanning the Chinese character text image, producing clusters of similar images by segmenting the image of each character, and mapping each cluster and character code. Generally, errors occur frequently when every single image of a Chinese character is mechanically analyzed and recognized. But when similar character images are clustered and the substitute character is selected manually, accuracy is enhanced. Development of such a practical technology enhanced Korea's capacity in historical information digitalization.[22]

Furthermore, the unicode-based information retrieval system also came into actual use through the project.[23] The KRISTAL 2002™ information retrieval engine developed by the Korea Institute of Science and Technology Information had the unicode Chinese character processing function intensified in order to provide an apt environment for database development and information retrieval services for historical materials. This system was put to practical use for the first

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22. The Chinese character data input method based on character image clustering technology was put to practical use in the database compilation projects performed by the National Institute of Korean History, The Academy of Korean Studies, and the Korean Classics Research Institute.
23. Unicode refers to ISO/IEC 10646 Universal Multiple-Octet Coded Character Set.

time when applied in the historical information system development.

The Chinese character data processing technology and the experience the Korean public institutions and IT businesses have attained through the project can be transferred to other countries using Chinese characters, and will no doubt contribute greatly to their Chinese character database compilation.

New Challenges in Historical Information Systems

1. Problems of Historical Information Systems

Digitalization of the vast amounts of materials among important resources of knowledge in the field of history that still remain in analogue form must be carried out consistently. However, one must consider very carefully whether the methods applied to date are appropriate enough to be adhered to in future projects.

The current historical information system has many problems that need to be improved considering the data content and service technology. Among them, the most urgent matter to be addressed is the enhancement of interoperability between databases.

Interoperability refers to the possibility of different mechanical devices to be operated in the same way. Internet users around the world are able to send and receive messages through their personal computers because the telecommunication devices installed in personal computers and the relay server devices are interoperable. Application programs developed in Java language can be operated on any type of terminal thanks to interoperability between different operation systems and application programs. Interoperability between information content systems requires that data produced by different information providers be usable under a unified system as if the databases were all built by the same person or institution.

Today, in the case of the majority of Korean information sites, the database of a particular site A can only be used through the information service system provided by site A. When trying to obtain related information not available on site A from site B, the user must make an additional log on to site B. In order to get rid of such inconveniences, the Integrated Historical Information System provides a metadata retrieval function. But this is restricted to searching only several common key words and does not fully solve the problem.

2. Promotion of Interoperability of the Historical Information Systems

When a user comes upon a new place name on using the Literary Collection database made by the Korean Classics Research Institute and is able to open the electronic map of the location from the database of Korean Local Culture built by the Academy of Korean Studies by simply clicking the mouse on the place name, then the two electronic information contents can be said to be interoperable.

Such interoperability can be realized when two institutions consider synchronized usage of their separate databases from the beginning of system development, thereby establishing a unified data format and cooperating in developing the application programs. But it is hard to expect such collaboration between two individual institutions that carry out digitalization at different points of time, each with their own resources. The method suggested as the second best solution, while having each institution implement information systems individually, is to have these institutions make metadata that explicitly describe the content and format of their databases and share them with other institutions so their content can be called and viewed from other systems. As such, a technological standard (ISO/IEC 11179) for "Metadata Registry" was suggested to derive production of standardized metadata and to enhance interoperability between systems based on the standardized metadata.[24]

The metadata registry is very useful when used between information resources that are themselves independent systems but the information they contain falls under a certain field of knowledge and so requires interoperability. As a good example, The EDR (Environmental Data Registry) was made to help the Environmental Protection Agency of the United States and 327 other institutions effectively share environment-related information. This registry provides a total of 11,247 registered data elements from 4,090 information resources with additional information for data interpretation.[25] Regarding this case, it is not at all

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24. ISO/IEC 11179 specifies the kind and quality of metadata necessary to describe data, and it specifies the management and administration of that metadata in a metadata registry (International Organization for Standardization, 2004. ISO/IEC 11179-1:2004, Information Technology-Metadata Registries).

25. The Environmental Data Registry (EDR) is a comprehensive, authoritative reference for information about the definition, source, and uses of environmental data. The EDR supports the creation and implementation of data standards that are designed to promote the efficient sharing of environmental information among EPA (the Environmental Protection Agency of the

impossible for Korea's various information site databases to build a network system for sharing related information through mediation by the so-called "Historical Information Data Registry."

Since the MDR (Metadata Registry) is purported for information resources that belong to a certain knowledge field, it must be made and run by those with deep knowledge and expertise in the target field. In other words, the "Historical Information Data Registry" would be most effective when made not by an information engineer who has full knowledge of ISO standards but rather by historians who are capable of structurally interpreting historical materials and accurately defining essential elements. As such, a project should be considered to be in good hands when specialized research organization members are in charge of constructing historical information systems.

Conclusion: The Need for Interdisciplinary Studies

In this study, observations have been made on the present historical information database developed under the government's financial support, and its achievements and technological tasks it faces in order to enhance usability of the information resources. This is not the first time this task has been mentioned. It has long been a concern since the beginning of the Knowledge and Information Resource Management Project. But to this day, no apt solution has appeared. This is probably because of how the project itself is being carried out. Development of a historical information system deals with very specialized knowledge resources, "historical information." However, no support has been provided for interdisciplinary studies on how to digitalize such specialized knowledge.

In the case of specialized knowledge and information, such as that of history, effective digitalization is possible only when experts in the field put in great effort in understanding the up-to-date information technologies and finding the appropriate digitalization method based on their expertise. Also, such effort must be focused in "research" rather than "business." For this purpose, institution researchers should be provided additional financial support for information tech-

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United States), states, tribes, and other information trading partners. The EDR also catalogs data elements in application systems (U.S. Environmental Protection Agency, Environmental Data Registry, http://www.epa.gov/edr/).

nology research in addition to the budget accurately distributed according to the quantity of produced database content.

In order to have the "Historical Information System" play the leading role in promoting free communication of high quality information on traditional Korean culture in cyber space, facilitating the interdisciplinary connection of specialized knowledge and information technology is as important as supporting content production. The Ministry of Information and Communication and institutions participating in the historical information database development must acknowledge this and put more effort into providing an interdisciplinary study environment.

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