



President's Council on
National ICT Strategies

ESTABLISHING A SMART GOVERNMENT BY USING BIG DATA

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I Advent of the Big Data Era

1. Background

- With the advent of mobile Internet and social media, the world is slipping into the era of big data where exponentially increasing data is an economic asset of a society.
- Current science and IT paradigm based mainly on hardware (HW) and software (SW) are shifting to the paradigm that puts more emphasis on analysis and forecast for all political and socio-economic issues.
- Web 1.0 which mainly focuses on delivering information evolved into Web 2.0 which produces collective intelligence through people's participation and communication. Now the era of Web 3.0 that creates convergence knowledge through data analysis has dawn.
- There is a growing demand for increased efficiency and transparency in managing state affairs and customized public service through convergence intelligence.
- In order to rapidly respond to potential threats such as diseases and financial crisis, the government should obtain high analytic competence to recognize socio economic changes occurring at home and abroad.
- By providing the public with more access to data as well as utilizing the data proactively, the government can run the state affairs more effectively thanks to the decrease of labor cost, increased transparency of tax revenue and enhanced public welfare.
- Most major countries like Britain, the United States, Canada and Australia are giving their people more access to data.

2. What is Big Data?

◆ Big data in social areas
Big data refers to the information technology that enables to extract valuable data by using and analyzing a huge volume of data. And based on the newly generated information, big data helps users proactively response to changes, let alone for2casting.

- ※ "Big data" refers to datasets whose size is beyond the ability of typical database software tools to capture, store, manage, and analyze.
- ※ (Methodological definition) At the burgeoning stage, big data refers to an enormous amount of data itself larger than a certain number of terabytes (thousands of gigabytes) but the big data has become a term embracing not only related tools,

platform, but also analytic skills

<Changes of analysis methods according to big data use>

Division		AS-IS	TO-BE (based on convergence knowledge)
Application changes	data openness	web based interface	three tiers of source data/analysis/visualization
	approach	post crisis approach examining a case after an accident	pre-emptive approach based on real-time update
	application form	vertical use by individual government agencies	horizontal use by all government agencies
	user	person in charge of management	person in charge of analysis and planning
Analytic changes	analysis subject	standardized DB data	irregular data including standardized data, SNS, query and so on
	scale	gigabytes ~ terabytes	petabytes ~ zetabytes
	analysis scale	single silo	multi silo
	application time	batch process	in-time process
	data	analysis after storage	on-the-fly analysis

3. Potential value of big data

A. National value

- National competitiveness in the future depends on how well to make the most out of big data.
 - US President’s Council of Advisors on Science and Technology insisted in a report that every federal agency needs to have a “big data” strategy. (December 2010)
 - Digital “big bang” triggered by wide spread of smartphones and social networks has increased the necessities of data knowledge and its use in the government

sector.

- As the value of big data in the public, private, medical and research sectors has been proved to be enormous, more and more sectors begin to introduce and use big data.
- Unlike the current vertical and individual data use, big data can bring about huge innovation to the public and government sectors through horizontal data use among government organizations and enable real time detection and preemptive actions.
 - Big data can create comprehensive and inclusive information by making the relevant data more readily accessible amongst otherwise separated government departments.
 - Instead of passively receiving data from government agency’s web portal, data users can proactively utilize and analyze data which is updated on the real time basis.
- Big data not only can reduce government budget but also can support the government to rapidly respond to the domestic and international changes. In addition, big data can also contribute to increasing quality of life and government credibility.
 - The government can save a large amount of money by using public big data analysis and management technologies.
 - Public and social data analysis will enable the government to detect the changes at home and abroad and come up with measures in a timely manner.
 - Making big data more easily accessible to the public can increase transparency and efficiency. As a result, government credibility will be enhanced.

B. Economic value

- Using big data in the public sector has a more than 10.7 trillion won of potential value a year to the Korean economy.
- In the era of “Mobile Revolution” and “Smart Society”, big data has been a core resource. New companies and industries collecting big data and doing big data analysis are emerging.
 - Major international companies like Google is focusing on a new business model using big data analysis, such as analysis on web site visiting records, search statistics and social media records.

Implications

- Under the circumstance that advanced countries are striving to improve efficiency in government management at the advent of the Era of Analysis and Forecast, a country that does not prepare itself with big data will lose its competitive edge and face risks in the international area not before long.
- Public data use guidelines including safeguards regarding information anonymizing and data non-storage should be in place to address public concerns about big data.

II Big data use in other countries

1. Strengthening national security

- (Disaster prevention) Advanced countries are using big data and conducting analysis based on horizontal information as to take pre-emptive actions against international threats, pandemic or risks.
 - Big data handles enormous amount of data from various areas such as climate change, water pollution and radiation leakage.
 - Big data is used to prevent financial fraud and money laundering as well as develop solutions for consumer behavior analysis.
 - Analysis on weather data like typhoon, precipitation and earthquakes is being conducted to calculate possibilities of tsunami and floods.
- (Terrorist threat detection) Big data is being used to detect potential threats against national security.
 - Government and private sectors can make the most out of situation recognition and shared information analysis and enjoy enormous benefits from the analysis.
 - Nowadays many countries around the world are paying more attention to, and increasing investment on homeland security.
 - Collected information from social network, newspapers, magazines and articles can be used to detect terrorist movements and potential terrorist threats in advance.
 - Countries around the world are working hard with network analysis in order to resolve the Fifth Generation War, which is characterized by complicated and various security threats.

2. Innovating national infrastructure

- (National economy) Big data helps stabilization of consumer prices and enhances readiness against global financial crises.
 - Use of big data analysis for better pricing mechanism in the monopoly or oligopoly industry, such as oil refining and telecommunication, contributes to stabilization of consumer prices.
 - To rapidly respond to global financial crisis, it is necessary to improve market surveillance and collect and analyze global financial information.
 - Big data is supporting global and domestic financial market analysis and policy making procedures against risk factors.
 - Big data can present not only financial and economic trends of each country around the world but also risk factors, and recommend effective countermeasures.
- (Medical, science and technology) New researches based on big data analysis helps strengthen national competitiveness.
 - Data analysis on genetics, diseases and medical treatment advances medical technology.
 - Genetic data analysis has helped prevention of diseases.
 - Thanks to the Internet searching and social data analysis, it was possible to monitor and analyze the spread of diseases.
 - Big data enables analysis of datasets whose size is beyond the ability of typical database software tools to manage.
- (Transportation and port) Traffic and port system can use big data analysis and forecast to optimize transport and port network.
 - New data collected by cameras, acoustimeters or pollution measuring instruments on the roads are being analyzed for traffic volume measurement and new traffic policies.
 - Various data convergence and processing have led to increased accuracy of vessel tracking and operation as well as improvement of vessel traffic management efficiency.

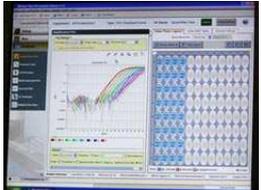
3. Improving government efficiency

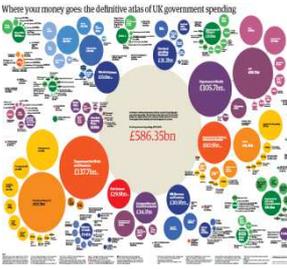
- Use of big data supports governments to run state affairs efficiently, thereby

increasing national competitiveness.

- As the amount of data necessary for public administration is increasing exponentially, many governments are introducing big data system to offer public service efficiently.
- The British government is establishing an infrastructure for multiple access channels, which will link local governments' data system with the central government system.

<Current status of big data use in major countries>

Nation	Application	Usage	Note
USA	Homeland Security	<ul style="list-style-type: none"> ○ After 9.11 terrorist attacks, US Department of Homeland Security introduced federal-level big data system, which performs data collection across all government departments as well as data analysis for anti-terrorism and prevention of crime. - US Secretary of Department of Homeland Security Michal Chertoff mentioned the Bush administration's big data scheme. - Under the scheme, US will better prevent money laundering and terrorism financing by monitoring financial transactions of individuals and organizations at financial systems at home and abroad. 	 <p><Media release about big data scheme for homeland security ></p>
	National security	<ul style="list-style-type: none"> ○ FBI's national DNA profile databases (CODIS) - In 2007, convicted offenders' DNA profiles yielded 45,400 hit rates thanks to DNA databases which offers DNA forensic and cloud DNA profiles. - CODIS enables law enforcements to get access to state government databases to analyze criminal's DNA profiles within an hour, and it also provides law enforcements real-time big data analysis solutions. 	 <p><Analysis system of Arkansas's></p>

	<p>Medical care</p>	<ul style="list-style-type: none"> ○ The Obama administration's Health.20 – Pillbox project <ul style="list-style-type: none"> – Medicine search is possible on the website, National Library of Medicine. – Big data collected through Pillbox can be useful statistics of HIV and major diseases, for example, geographical distribution or annual increase of disease. 	 <p>< Display of PillBox ></p>
<p>UK</p>	<p>Access to public information</p>	<ul style="list-style-type: none"> ○ The British government is providing one-stop data service for public data use and sharing through data.gov.uk. <ul style="list-style-type: none"> – By doing so, the British government aims to improve not only transparency of the administration but also people's rights and socio-economic values of data, and take the initiatives in the next generation of Web of Data. – The government is promoting public participation and soliciting public opinions. It is also providing communities for app development and data sharing. 	
<p>Singapore</p>	<p>National risk management</p>	<ul style="list-style-type: none"> ○ Since 2004, Singapore has launched risk management plan based on big data in order to prevent terrorist attacks and infectious diseases. <ul style="list-style-type: none"> – It is proactively managing national threats like diseases and financial crisis by collecting and analyzing data through RAHS (Risk Assessment & Horizon Scanning System). – Collected data and analysis through simulation and scenario methods are being used to detect potential threats and come up with effective counter measures. 	 <p><RAHS 2.0 system: new influenza outbreak in the world></p>
<p>Australia</p>	<p>Access to public information</p>	<ul style="list-style-type: none"> ○ Australian Government Information Management Office (AGIMO) allows the public to use government data through Government 2.0. <ul style="list-style-type: none"> – The Australian government can save time and resources by using automated tools that enables users to search, analyze and reuse enormous amount of data. – Government 2.0 Strategies and Service Team 	 <p>< data.gov.au ></p>

		under AGIMO runs a web site, “data.gov.au” that provides repository and search tools for government data.	
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III Policy process innovation through big data

1. Changes in government’s decision making process

- (As-is)** Due to limited access to information at each government department, fragmented information and its passive usage has been an impediment to rational decision making.
 - Due to lack of cross-access to information among the government departments, there has always been a possibility that the government decision can be made based on personal experiences or conviction, and the decision can be out of touch with the public.
- (To-be)** Smart government should be established, where information of each sector can converge and decisions are made based on real-time data analysis.
 - The government should lay the foundation for data analysis by converging data among government departments and utilizing private data like social media.
 - A new system should be established, which enables timely, realistic and preemptive decision making and policy implementation through real-time big data analysis.

2. Potential value of big data use

A. Preventing disasters

- Summary**
 - Disaster prevention and management system based on forecast analysis will enable real-time analysis and rapid response.
- Current status**
 - It is difficult to make quick decisions when a disaster strikes due to current respond system, which can be characterized by standardized and experience-based management and response mechanism; and facility-centered disaster

preparedness; as well as manual monitoring.

□ **How to use big data**

- Big data prevents potential risk factors from developing into full-scale disasters through monitoring the potential risks on the real-time basis.
 - Based on past damage records, big data helps to forecast rainfalls and areas which will be potentially vulnerable to floods.
 - Automatic and real time analysis helps government departments understand situations exactly.
 - Thanks to real time analysis on social network and social news, the government can provide adequate warnings to disaster struck areas and come up with prompt responses.
 - Once multi analysis on causes of damages is available and convergence takes place and virtuous cycle in the disaster management mechanism is in places, intelligent risk management will be possible.

B. Preventing foot and mouth disease

□ **Summary**

- Fragmented animal disease control data and breeding farm data in government agencies will be converged and integrated for analysis. Then, the analysis will be used to control and take preventive measures for animal disease control such as foot and mouth disease.

□ **Current status**

- Currently, there is no networked system among government agencies to manage animal diseases information and data. And reports on breeding farm investigation are not collected in a timely and effective manner. Therefore, it is difficult to rapidly make decisions or come up with appropriate measures.
 - Each government agency is running its own data system to manage breeding farm data bases, thereby facing problems of data sharing and cooperative use.
 - From preventive steps to forecasting steps, current diagnosis and control procedures are proved to be inefficient due to inaccurate breeding farm database and epidemiological investigations which are highly dependent on inquiries.

<Management systems of stock farming agencies>

Agency	System in use	Major information
Ministry for Food, Agriculture, Forestry and Fisheries	AGRIX	Breeding farm information
Ministry of Public Administration and Security	Livestock Administration System, Resident Registration System	Breeding farm/ resident registration information
Livestock Health Control Association	Beef Tracking History Management System	Breeding farm information, beef tracking history
Korea Institute for Animal Products Quality Evaluation	Breeding Farm Disease Control Management System	Breeding farm information, result analysis on forecasts
Animal Plant Fisheries Quarantine and Inspection Agency	Korea Animal Hygiene Integration System(KAHIS) & Livestock Product Safety Management System	Breeding farm and slaughterhouse information
Korea Animal Improvement Association	Swine Breed Registry Management System	Breeding farm/ resident registration information

□ **How to use big data**

- Information about animal diseases overseas, immigration and breeding farm surveys as well as information about breeding farm, workers in the livestock industry and livestock migration – which is individually managed by each agency – will be converged and integrated to support disease prevention and preemptive decision making procedures.
 - **[Prevention]** Real time data collection of disease outbreak overseas, records of outbound travelers, livestock vehicles' rout records, social media information and their analysis will help to prevent diseases and conduct timely and effective sterilization and vaccination.
 - **[Forecasting]** To forecast possible disease spreading channels once the early signs of infectious disease in livestock are detected, and to come up with prompt and effective disease control measures, it is necessary to set up animal disease forecasting manuals customized to each area.
 - **[Diagnosis]** All systems and data dealing with national geographic information system, soil and water management will be networked and integrated for fast and effective diagnosis.
 - **[Control]** Once an accident occurs, the optimal level of response resources including manpower, equipment, material supplies for mass slaughter, mass culling and vaccination will be provided to the infected areas. And guidelines

will be delivered immediately through SNS according to instruction manuals.

C. Realizing customized welfare

□ Summary

- The government will be able to offer customized welfare services along with various ranges of welfare information.

□ Current status

- Since its establishment of Social Welfare Integrated Network (SWIN), the Network has collected and managed 219 types of information on welfare service candidates - for example, income, property and personal information, provided by 27 government agencies including Ministry of Public Administration and Security (MOPAS) and National Tax Service (NTS). Based on the information, SWIN determines whether a candidate is eligible for a social welfare program or he/she is likely to enjoy double benefits of welfare services.
 - As of August 2011, SWIN saved 384.7 billion won in welfare money.
 - However, since the current SWIN system focuses only on the data management for the status quo, it could not spot loopholes of the current welfare system and provide customized welfare to the people in need.

□ How to use big data

- Welfare information will be collected not only from the demand side through the channels of social workers, Internet portals and welfare counseling centers, but also from the supply side, for example social welfare centers, religious groups and social welfare fund raising organizations. Based on the information, customized welfare services will be provided according to both life-cycle of a recipient and the type of welfare programs.
 - Utilizing information collected from the demand side and analysis of the data will help find potential welfare recipients and identify the public's demand.
 - Identifying welfare resources and matching them with the demand will help deliver customized welfare services. Analysis on the service results will be used to forecast future welfare supply and demand.

D. Stabilizing consumer prices

□ **Summary**

- The government will come up with measures to stabilize consumer prices by monitoring production, consumption and distribution on a real-time basis.

□ **Current status**

- Since relevant government departments are conducting manual sample surveys on production, consumption and distribution, it is difficult to share information among the departments. In addition, as the period between the surveys is long, immediate response to changes is difficult.
 - Several government agencies are in charge of key consumer items and make efforts to stabilize those prices. The agencies regularly conduct off-line surveys through personal visit, phone call or paper surveys, and announce the result.
 - Meanwhile, information released by Korea Customs Service (KCS), Import and export quantity of transported goods; NTS, production and marketing volume; and Fair Trade Commission (FTC), transaction volume are solely based on reports of applicants. Therefore, there is always a possibility of data error or false reports.

<Survey methods of government agencies>

Agency	Survey item	Cycle	Subject	Method
National Statistical Office (NSO)	consumer price	monthly	goods and services(489 items) stores in 37 major cities	on-the-spot investigation (1~3/month)
the Bank of Korea (BOK)	producer price	monthly	goods and services(884items)	phone call/email/fax/ visiting survey when requested by related companies and guilds
KCS	distribution information	as needed	tariff added imports and exports volume and prices	unit taxation based on voluntary reporting (quarterly or
NTS		quarterly	quantity of vat added goods and services	
FTC	distribution information	as needed	unfair trade, subcontract, false labeling, cartel(domestic/overseas)	investigation as needed or when complaints are filed

□ **How to use big data**

- Thanks to big data technology that deals with all information of products

including prices and distribution volume from producers to consumers, total inspection and analysis will be possible from the beginning of distribution stage of all products.

- Real time update about producer and consumer price changes by regions and items will help adjust production and import and the data will be used for price stabilization and macroeconomic policies.
- Distribution management by regions and items will contribute to stabilization of consumer prices by optimizing distribution structure and redistributing.
- As it will become possible to detect unfair trade and illegal transactions in real time, tax revenue as well as transparency in taxation will increase.
- Providing the public with more access to big data and promoting data analysis by the private sector will lead to accumulation of knowledge, thereby enabling the government to utilize the knowledge for product planning and production as well as import planning.

<How the government agencies to use convergence knowledge
for stabilization of consumer prices>

Agency	Application
Ministry of Knowledge and Economy (MKI)	<ul style="list-style-type: none"> · Comes up with macroeconomic measures to stabilize consumer prices and conducts analysis on alternatives and supplements · Monitors consumer prices trends and reorganizes areas of production or distribution structures across the nation accordingly. · Reflects real prices in polices and increases transparency of price policies
Ministry of Strategy and Finance	<ul style="list-style-type: none"> · Reflects inflation in welfare subsidies. · Subdivides public products according to regions and use it as a consumer price index.
Korea Food & Drug Administration	<ul style="list-style-type: none"> · Manages agricultural and maritime products' place-of-origin. · Checks the expiration date and cracks down on substandard food.
Ministry for Food, Agriculture, Forestry and Fisheries	<ul style="list-style-type: none"> · Predicts consumer prices and adjusts production or import of certain products. · Prevents produce crisis and runs prior warning system.
Fair Trade Commission (FTC)	<ul style="list-style-type: none"> · Monitors unfair trade practices and detects price-fixing movements. · Figures out the amount of adulterated gasoline circulating on the black market.
Korea Customs Service/ National Tax Service	<ul style="list-style-type: none"> · Increases the integrity of taxation and tax revenue. (ex. VAT)
National Statistical Office (NSO)	<ul style="list-style-type: none"> · Provides information on fluctuation in consumer prices by regions and items on the real time basis. (ex. Website that offers real-time price information on gasoline)
Private sector	<ul style="list-style-type: none"> · Conducts distribution cost analysis by items and inventory management.

E. Advancing science technology and medical treatment

□ Summary

- Sharing DNA data and medical data and promoting use of the data will open a new era of Customized Medicine.

□ Current status

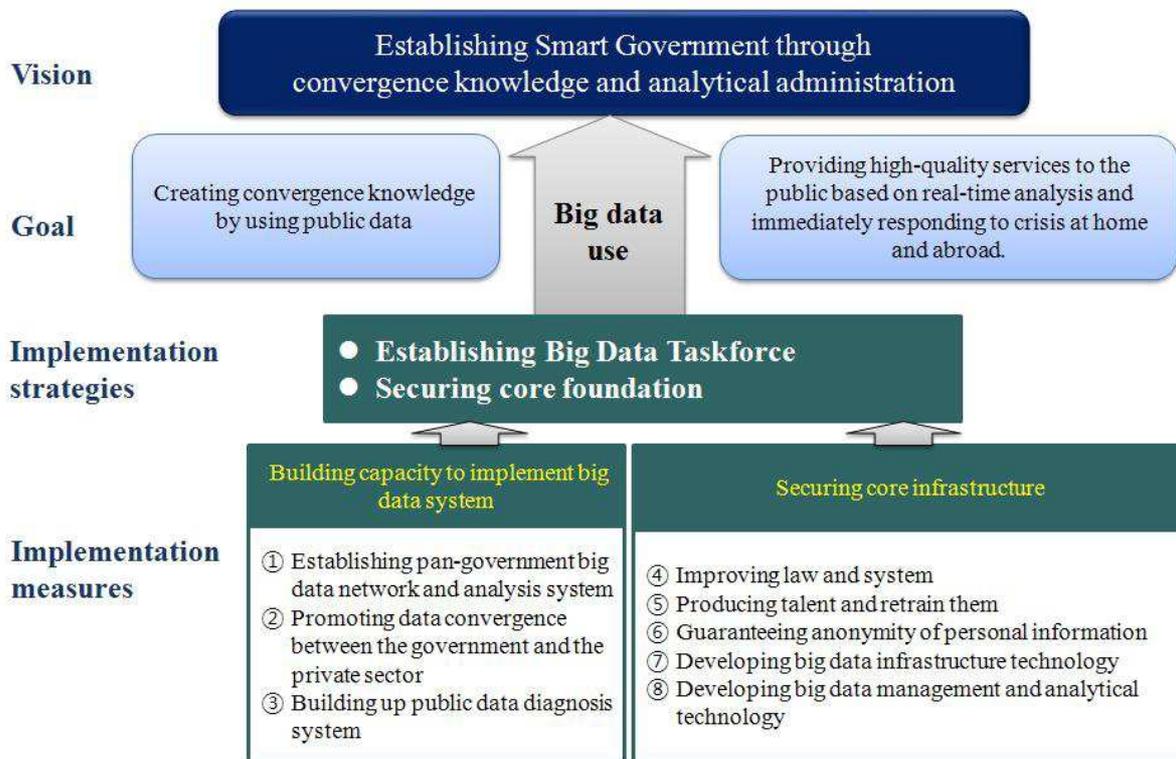
- Korean Bioinformation Center (KOBIC) has managed DNA information at the national level, but it now reaches the limitation as it has a difficult time to manage the information efficiently as the data increase exponentially.
 - Advanced countries have already realized the importance of DNA data. They are managing the data at the national level and established integrated management systems.
 - According to the report release by KOBID in 2010, Korea utilizes and stores a mere 1% of its DNA data compared with advanced countries.
 - While Ministry of Health and Welfare has collected bio information of 360,000 by launching the Korea Bionetwork Network Business since 2008, the ministry is not as good at collecting and utilizing the data as advanced country.

□ How to use big data

- A systematic national DNA data management system should be established to link the DNA data and medical data.
 - It will be possible to provide customized diagnosis and medical treatment to a patient by converging DNA data and various medical information of the patient.
- Examples of data collection and application
 - ① Coming up with measures to promote information sharing for studies (i.e. DNA, genetic/protein information) funded by the government.
 - ② Voluntary information donation by researchers and hospitals.
 - ③ Developing application system for Korean's DNA and medical information by establishing data sharing system among research institutions and medical organizations.

IV Implementation plan for big data use

1. Vision and goal



□ Implementation strategies

- The government needs to establish Big Data Taskforce to play a leading role in utilizing big data and building related infrastructure.
 - The taskforce will be in charge of (1) building a network to link all data managed by each government agency; (2) establishing a cooperative channel; (3) protecting personal information; (4) engaging in data quality control; (5) conducting intelligent analysis and (6) directing analysis team in each government agency.
- It is necessary to reorganize national and social infrastructure to further foster national competitive edge in big data technology and develop source technology through industry-academia cooperation in order to consolidate core big data foundation.

2. Implementation measures

A. Building capacity to implement big data system

1. Establish pan-government big data network and analysis system

- Establish a system that allows continuous information exchange and collection by expanding existing administration information centers.
 - Build knowledge administration system to converge and analyze tasks and knowledge at the pan-government level by linking administrative performance systems.
- Come up with a nationwide data collection and analysis system – which enables the government to prepare itself based on forecast and innovate the ways running state affairs.
 - Sep up exact policies by analyzing various social phenomena and implement them accordingly.
 - Collect important data at home and abroad such as major forecast, outlook and social changes related with economy, society, science and technology and build data analysis system.

2. Promote data convergence between the government and the private sector

- Develop technology and system to link and utilize public data and private data such as social media and portal media.
- Build and manage data silos to link, store and use a wide range of data from the industries and universities at the national level.
 - Collect and process major irregular data like all government agency’s social media information, various reports, policies and e-documents.
- Create values in the private sector and support business activities by allow more access to public data in phases.
 - Set up detailed guidelines for data opening with three steps of source data, analysis data and open data and open the data according to the steps.
 - Propose diverse business opportunities to use public data to small and medium sized companies and the self-employed.
- Make “Data License” regulations as private companies get more access to public data and secure that use of public data should improve public interest.

3. Build up public data diagnosis system

- Establish Master Data Management (MDM) system which embraces all government departments for efficient data management.
 - Build a system that has a wide range of data classifications by elements and sectors so that enables keyword search and analysis.
- Set up quality control standards and systems to regulate mutual use of data among all government agencies.
 - Make quality performance evaluation model to evaluate how well the virtuous cycle of public data use and quality control mechanism work.
 - Strengthen public data quality control governance for the advancement of shared services and come up with measures to raise public awareness and participation.
- Put forward government campaign to improve the quality of existing data.
 - Revise detrimental factors of national data use such as inconsistency, low quality and service delay.

B. Securing core foundation

4. Improve law and system

- Establish a national big data use implementation plan and revives relevant laws.
 - Establish “Implementation Plan for Convergence Knowledge Infrastructure,” which includes core strategies, vision, measures, national implementation structure and mid and long term plans for big data use.
 - Lay a legal foundation to launch an expert group to promote big data use.
 - Revise laws and regulations to promote data sharing and mutual analysis among government agencies.
- Come up with measures to promote use of big data analysis in the public sector and set up performance management system.
 - Prepare big data analysis application plans for government departments to make policies, carry out tasks and assess job performance, and reorganize work process to be based on big data.

- Set up continuous monitoring and reporting system for each department based on big data in order to check improvement in public administration.

5. Produce talent and retrain them

- Produce big data analysts to meet a new demand in the big data era.
 - Nurture talent -- for example managers, analytical experts and technology experts and create new job opportunities related with big data.
 - Educate analytic talent and hold analyst license exams.
 - ※ According to the report by McKinsey Global Institution, demand for deep analytical talent in the U.S. could be 50 to 60 percent greater than its projected supply, 440,000 to 490,000 by 2018.
- Provide various kinds of re-education programs to strengthen big data competence.
 - Strengthen big data competence both of the public and private sector by introducing big data use success cases, supporting companies to use big data in their job and educating analytical methods.

6. Guarantee anonymity of personal information

- Thoroughly prepare privacy protection measures in order to guarantee safe and reliable opening and use of public data.
 - Prepare a safeguard to minimize privacy infringement to resolve people's anxiety about public data use.
 - Specify levels of authority to access to sensitive personal information and clearly state personal information management system.
- Work out tight security measures for reliable data sharing and exchange.
 - Ban unnecessary data use strictly and impose punishment for illegal collection or abuse of big data as well as introduce all-time security monitoring system.
- Draw up guidelines for the government to use, share and exchange public data.
 - Set up encryption principles including restriction on storing personal identification information in order to prevent privacy infringement.
 - Prepare privacy protection principles regarding social data use, including, for

example, bans on storing source data, location information or personal identification information.

7. Develop big data infrastructure technology

- Develop core technologies (RDBMS SQL, NoSQL) to prevent the domestic big data market from being dominated by overseas solutions.
- Secure big data security technology to guarantee anonymity.
- Develop framework technologies for convergence and analysis to link data distributed in each government agency and the public and private sector.
 - Provide analytical technology for specialized services in public service.

8. Develop big data management and analytical technology

- Develop core technology domestically to strengthen big data technology competitiveness.
 - Domestically develop core technologies for big data collection and interpretation, information extraction, information analysis, data storage and management, data search and query and visualization.
 - Introduce the latest advanced analytical technologies for effective analysis on irregular data.
- Set up a management and analysis platform for stream data at social media services to respond to the fast-growing social media environment.
 - Develop a real-time framework for mass distributed system in order to immediately collect, analyze, interpret and extract data from social media.
 - Develop technologies for big data lifecycle management, data redundancy removal as well as data link.
- Establish big data management system that manages data domains and develop user friendly information visualization technology.
 - Develop knowledge convergence and management technology that creates specialized knowledge at domains by converging public data analysis and social media analysis.
 - Develop user friendly information visualization technology for efficient use of analysis results.

C. Future plans

<Implementation schedule>

Implementation plan	2012	2013	2014	2015	2016	note
1. Building capacity to implement big data system						
① Establish pan-government big data network and analysis system						
② Promote data convergence between the government and the private sector						
③ Build up public data diagnosis system						
2. Securing core infrastructure						
④ Improve law and system						
⑤ Produce talent and retrain them						
⑥ Guarantee anonymity of personal information						
⑦ Develop big data infrastructure technology						
⑧ Develop big data management and analytical technology						