

KOREA

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1. Summary of Government R&D Budget FY 2010

1.1 Compilation Process of Government R&D Budget FY 2010

After the kick off of the new government, the Government research and development (R&D) budget has been organized as a dualistic structure between National Science and Technology Council (NSTC) and Ministry of Strategy and Finance(MSF) as shown in Figure 1. If we have a look at this compilation process briefly, it has began with a step of submitting '09-'13 Mid-Term Program Plans to the MSF on Jan. 31, 2010. The MSF notified each government ministries on next year's ceiling of Government R&D Budget according to this Mid-Term Program Plans by the end of April. Consequently, each ministry submitted a written request of the next year's budget to the MSF within the settled limit. In addition, the direction of next year's Government R&D Program Budget Allocation established at the NSTC was crucial information at the stage of budget compilation in Government R&D Budget. Government R&D appropriation bill in fiscal year(FY) 2010 was submitted to the National Assembly after the Cabinet Meeting on Sep. 28, 2010 and finally passed after the deliberation on Dec. 12, 31.¹⁾

1.2 Status of Government R&D Budget Compilation FY 2010

The Government R&D Budget FY 2010 was allotted KRW 13.7014 trillion which was increased by 11.0% than FY 2009. This rate of increase comes third after foreign policy and unification department (14.7%) and culture, sports and tourism department (12.2%)

among the Government Budget FY 2010. This policy which expands on the Government R&D Budget is in accelerating motion after the beginning of current government. The Government R&D Budget was increased by 10.8% which is almost double the annual average increase rate (6.5%) of overall financial scales in the Participatory Government (Roh Government). The current government also ran on an agenda to "Expand the R&D investment to 5% GDP level by the year 2012 from 3% GDP level" in the presidential election campaigns. To follow up with the campaign pledges, the current government provided the realization of world's biggest Government R&D Budget by expanding the investment size by 1.5 fold during the term ('08-'12) as the key project. Especially, it is planned to expand more than 10.7% annually from 2008 to 2012, KRW 68.4 trillion in total, which is KRW 28 trillion more than the Participatory Government. This shows that the policy of expanding the R&D investment has been reflected on the 2010 Government R&D Budget.

2. Government R&D Budget Compilation Status by Each Area

2.1 Compilation Status by Each Accounting

By looking at the compilation status of Government R&D Budget by each account in FY 2010, the Government R&D Budget is KRW 11.9576 trillion, increased by 12.5% (KRW 1.3276 trillion) than FY 2009. The general accounting, among them, was composed as KRW 9.7711 trillion which is 13.8% increase (KRW 1.1854 trillion) than FY 2009. The national R&D Program ministered by the government R&D fund was composed as KRW 2.1865 trillion which is 7.0% increase (KRW 142.2 billion) than FY 2009 (Table 1). Especially, some part of general accounting has been transferred to Cultural Properties Protection Fund among the National R&D Program ministered by the Cultural Heritage Administration of Korea. As a result, the Cultural Properties Protection Fund has been newly included into the finance of

1) Especially, the government appropriation bill in FY 2010 failed to observe the regulation listed on the Constitution which stipulates 30 days prior to the beginning of next year's budget due to the political issues on 4 Major Rivers Project and also, there has been worries on compilation of provisional budget

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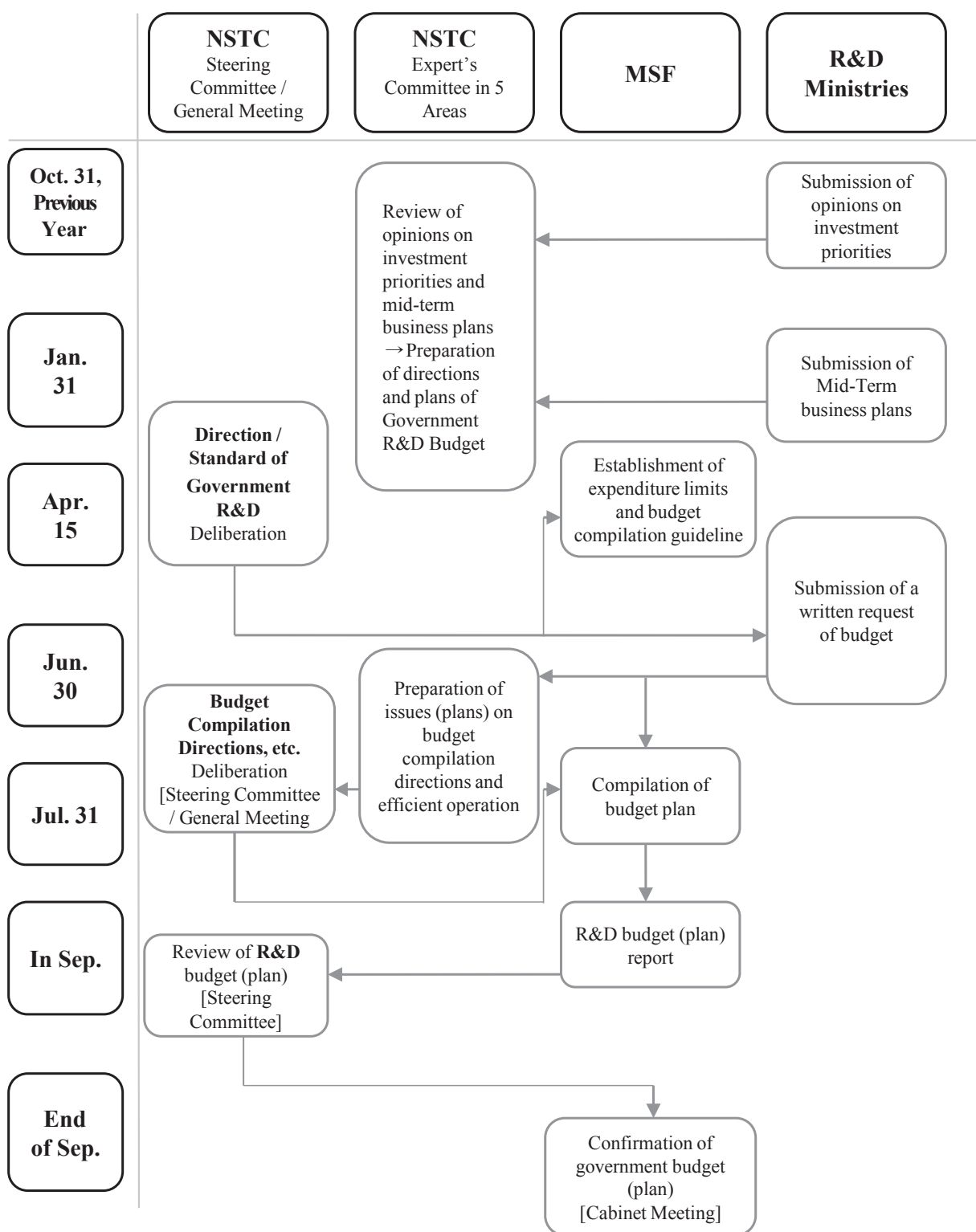


Figure 1 Main Process of Government R&D Budget Compilation

Table 1 The compilation status of Government R&D Budget FY 2010 by each accounting

(Unit: KRW 100 million, %)

Type	2006	2007	2008	2009 (a)	2010 (b)	Fluctuation (b-a)	Portion (%)
Government R&D Budget (A+B+C)	89,096	97,629	110,784	123,437	137,014	13,577	11.0
Government R&D (A+B)	72,283	81,396	93,461	106,300	119,576	13,276	12.5
- General Accounting (A)	61,094	65,907	75,725	85,857	97,711	11,854	13.8
- Special Accounting (B)	11,189	15,489	17,736	20,443	21,865	1,422	7.0
Government R&D Fund (C)	16,813	16,233	17,323	17,163	17,437	274	1.6

Table 2 The investment portion of Government R&D Budget in basic research

(Unit: KRW 100 million, %)

Type	2009 (A)	2010 (B)	Fluctuation (B-A)	Portion(%)
Investment Portion in Basic Research Area (%)	29.3	31.3	2.0	-
Support Individual Researchers	5,000	6,500	1,500	30.0
- The General Researcher Support Program	2,548	3,550	1,002	39.3
- The Middle-Management Support Researchers Program	2,100	2,450	350	14.7
- The Leader Researchers Support Program	352	500	148	42.0

Government R&D Budget FY 2010²⁾.

2-2 Compilation Status by Each Policy

In the basic research area, the size has been increased to 31.1% which is 1.8% increase from FY 2009 in Government R&D Budget FY 2010 (Table 2)³⁾. Mainly, it is originated from the increase in creative basic research projects of individuals in the university (KRW 5 trillion in '09 → KRW 6.5 trillion in '10, 30% increase). This type of investment on the basic research is showing constant increase after the Participatory Government in order to reinforce future oriented creative R&D strategies beyond the limit of follow-up R&D strategy. Especially, in this government, it is now promoting a national project with an intention to expand the financial investment on basic research and generic & radical research area

to the 50% of the government budget by '12 which includes the original areas further from the basic research area. In July 2009, 3 estimation measures for 'Estimation of Generic & Radical Research Concept and Portion' at NTSC had been provided. There should be measures to estimate investment portions of generic & radical researches in association with budget compilation of future government R&D (Um, Ik-Cheon, 2009)

Furthermore, the area of New Growth Engine was expanded largely with 22.0% increase to a size of KRW 1.9 trillion as an intention to reinforce the strategic aspects of Government R&D Budget and create potential for the future growth. In Jan. 2009, 17 New Growth Engines were selected from 3 areas. The basis of this policy corresponds to the Next Generation Growth Engine Programs promoted by the Participatory Government. Especially, the current government is focusing on developing green technology by establishing "Comprehensive Plans for Green Technology R&D (Jan. 13, 2009)" after announcing "Low-Carbon Green Growth Vision" in Aug. 2008 in order to support low-carbon green growth. The budget in the green technology area was allocated KRW 2.2 trillion which is 19.1% increase from FY 2009. It is planned to make firm support

2) The government budget in FY 2010 consists of general accounting, 18 special accountings and 63 funds. Among them, the Government R&D is funded from the general accounting, 7 special accountings and 8 funds.

3) However, the presentation of final confirmation in the basic research area is a matter of concern belonging to the Basic Science Research Promotion Council based on the Clause 3, Section 1 of the Article 15 on the Science Technology Basic Law during the end of this March to the middle of April.

in energy technology development and renewable energy technology development to improve efficiency on machines that consumes much energy such as boilers, lighting devices, air conditioning and heating devices. Moreover, in the converged and integrated cultural contents technology development, KRW 43.5 billion was allocated which is 45.0% increase and the area of supporting technology innovation medium size companies was increased to 560.7 billion which was 14.5% increase from FY 2009. The budget on expanding R&D outcomes and establishing commercialization basis was allotted KRW 136.7 billion which is 25.9% increase from FY 2009⁴⁾. On the other hand, the Government R&D Budget was

largely expanded in the area of improving people's safety and quality of life as well as in large scale technology. In an effort to take measures against the pandemic disease, A(H1N1) (Novel Swine-Origin Influenza), KRW 15 billion was allotted in immunity vaccine development which is 27.5% increase from FY 2009. Also, the areas of development of supplementary mechanicals for elderly and development of core original technology in public welfare and safety were recognized as a new government R&D Program being allotted of KRW 9 billion and 5 billion respectively. Especially, it is noticeable that KRW 20 billion was newly allocated in developing Korean space launchers in order to reinforce basis for independent space technologies after the partial success in launching NARO (Um, Ik-Cheon, 2009).

4) The number is a sum of Medium Business Commercialization Technology Development Program from Small & Medium Business Administration, Establishing Nano Convergence Technology Commercialization Platform Program from Ministry of Knowledge Economy, Establishing Intelligence Vehicle Commercialization Basis Program, and Technology Transfer Commercialization Promotion Program.

2.3 Compilation Status of Each Department

In the Government R&D Budget FY 2010,

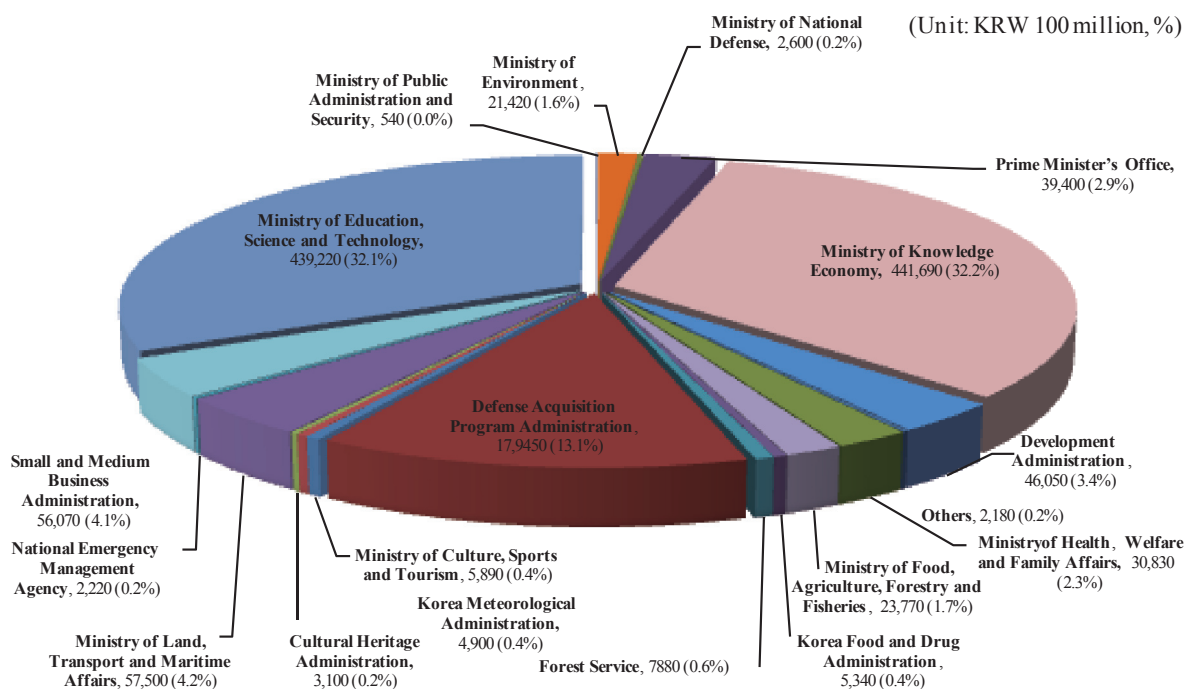


Figure 2 The compilation status of Government R&D Budget FY 2010 by each department

Other Departments: MSF, Ministry of Labor, Ministry of Foreign Affairs and Trade, Fair Trade Commission Korea, Ministry of Government Legislation, Ministry of Unification, Ministry of Gender Equity, Korea Coast Guard, Multifunctional Administrative City Construction Agency, Korea Communications Commission, National Police Agency and 12 other departments

Government R&D Budget FY 2010: KRW 137,014 trillion

Ministry of Knowledge Economy constituted the most portion of 32.3 (Figure 2). The main reason for this increase stems from large scale expansion in the investment relevant to new growth engines and green technology. The Ministry of Education, Science and Technology, 31.9% (KRW 4.3558 trillion), Defense Acquisition Program Administration, 13.2% (KRW 1.7692 trillion), Ministry of Land, Transport and Marine Affairs, 4.2% (KRW 576.0 billion), Small & Medium Business Administration 4.1% (KRW 5.607 billion) follow next. Although the Ministry of Education, Science and Technology took up the highest investment portions before the starting of the new government, the Ministry of Knowledge Economy takes up the most investment portions in government R&D in accordance with the concept of government convergence (a smaller number of larger sized departments) – department convergence between the Ministry of Industry and Resources and the Ministry of Information Communication; and transfers of Research Council for Industrial Science & Technology ministered government research institutes(GRIs)

2.4 Compilation Status of New Government R&D Program in FY 2010

52 Programs (KRW 2.584 billion) from 11 ministries and administrations were recognized as the new government R&D programs in FY 2010 (Table 3). In sizes of the program, the Ministry of Education, Science and Technology was the biggest occupying 41.3% (18 programs, KRW 1.179 billion), the Ministry of Knowledge Economy was next of 38.8% (16 programs, KRW 1.094 billion), and the Ministry of Food, Agriculture, Forestry and Fisheries came next with 6.6% (KRW 18.8 billion). These 3 ministries took up 86.2% of overall new government R&D programs.

In recent 5 years, the number of newly authorized government R&D program was 36.6 on average. This is the result of the significant expansion of Government R&D Budget. Along with this strategy basis of expanding R&D investment in the government, it is showing some form of budget strategy to ensure more budget by submitting applications for general financial programs as new government R&D programs. To prevent this, it is necessary to establish clear governance between NSTC, MSF, and R&D budget application relevant departments.

3. Major Characteristics and Implications of Government R&D Budget FY 2010

As we have discussed the compilation status of Government R&D Budget FY 2010, it can be summarized into 2 characteristics: constant expansion on the R&D investment; and reinforcement of strategic investment. This Government R&D Budget FY 2010 can be discussed from 3 typological perspectives: government leadership type; government-private sector cooperation type; and system type. The government leadership type is an area where the Government R&D Budget plays a crucial role in the areas which the private corporations find hard to participate due to the inclination to market failure or not formed market. In the government leadership type, the basic research area is most representative where it is difficult for the private corporations to operate. The government-private sector cooperation type is an area that promotes private R&D investment in a partnership to supplement R&D areas which is insufficient in the private sectors to create future growth engines and especially, to help private sectors during financial crisis. The technological advancement of major infrastructure businesses and R&D departments in technology innovation small and

Table 3 The compilation status of new government R&D programs in FY 2010

Type	(Unit: KRW 100 million, %)						
	2006	2007	2008	2009 (a)	2010 (b)	Fluctuation (b-a)	Portion (%)
Government R&D Budget (A)	89,096	97,629	110,784	123,437	137,014	13,577	11.0
New programs (B)	3,289	952	1,533	4,051	2,854	Δ1,197	Δ29.5
(B/A, %)	(3.7)	(1.0)	(1.4)	(3.3)	(2.1)	-	-
Number of New programs	(34)	(22)	(38)	(37)	(52)	(15)	-

medium, and venture companies are included in this type. The system type is a area that prepares systematic basis to promote cooperation between central and local sectors, and among industry, university, and research, to align technology innovation impediment such as taxation and banking, and to prevent systematic failures. Most typical example is the cooperative research among industry, university and research.

From the typological point of view, the Government R&D Budget FY 2010 is relatively successful with the reinforcement of investment expansion of basic researches. However, in Korea, the portion of basic research among the total R&D cost including government and private sectors is still lower than major powers such as USA and France. Moreover, the percentage of application and development research is higher; thus, the task distribution is insufficient with the private sectors.⁵⁾ Therefore, it is necessary for the government to emphasize basic researches to fulfill its role in providing basis for applied and development researches conducted by the corporation (Um, Ik-Cheon, 2009).

Furthermore, the strengthening of strategic investment in new growth engines and green technology is very positive. However, the private sectors are already associated with advanced informant technology in new growth engines. Hence, it is urgent to establish specific mid-ranged Government R&D Budget strategies for clear role distributions between the government and private sectors. In 2007, the NSTC increased investment in basic science, life science, energy and resources, and environment. And in the information and electronic field, it suggested a total roadmap in macroscopic government R&D programs which gradually reduces the investment portions. This macroscopic investment strategy can only be utilized as the primary principle and standard in the actual Government R&D Budget compilation process but there is a long road ahead before it can

be utilized as a concrete guideline. The information communication area is the representative primary industry in Korea. Therefore, the investment priority must be listed first on its particulars, that is, the precise role distribution on R&D investment between the government and private. In other words, if the information technology area is classified into 6 areas of digital contents, software solutions, semi-conductors, display, home networking and computers (Kim, Yun-Jong et al. 2009), it means that the role distribution between the government and private and its investment strategies in each area should be established in accordance.

Lastly, in the Government R&D Budget FY 2010, the system type investment including diffusion of R&D outcomes and establishment of commercial basis was somewhat increased. However, in comparing government leadership type and government-private sector cooperation type, it is the area which requires more emphasis in the future. Among the innovation actors in Korea, the rate of technology transfer in public research institutes only stays at around 20% level and the royalty revenue just got through KRW 100 billion in 2007 which is smaller than the royalty revenue of Columbia University in USA in 2002 of some KRW 167.0 billion (Korean Intellectual Property Office, 2005: 16). This may have originated from lack of systematic foundation that evaluates and commercializes technological values of research outcomes.

In the future, it is required to reinforce strategic investment on basic research and generic & radical research, new growth engines and green technology along with the constant expansion on investment. The Government R&D Budget is not only the key measures for overcoming the financial crisis but also it can be utilized as an important strategic means to ensure competitiveness after the depression (Um, Ik-Cheon, 2009).⁶⁾ The Government R&D Budget FY

5) The total R&D budget is 16.1% in Korea (2008) which is higher than Japan (13.8%, 2007); however, it is still lower than USA (17.5%, 2007) and France (23.8%, 2006). Also, the percentage the applied and development area among 2008 government R&D programs was 74.5% and 83.9% in private sectors (Ministry of Education, Science and Technology, Korea Institute of S&T Evaluation and Planning, 2009; NSTC, Ministry of Education, Science and Technology, 2009)

6) Each country in the world is coming up with aggressive financial expansion policies in response to global depression including the bankruptcy of Lehman Brothers in Sep. 2008 and planned to invest 1.3~9.3% of 2009 revised supplementary budget onto the R&D department. Korean government also allocated 1.4% (KRW362.2 billion) of the total revised supplementary budget (KRW28.4 trillion) on the R&D department (Internal Data of Ministry of Education, Science and Technology, 2009)

2010 was instituted under the political and financial context to overcome financial crisis. As mentioned earlier, there should be more effort made in relations to the system type among the types of Government R&D Budget. In Korea, significantly low level of cooperative researches among industry, university and research has been pointed out repeatedly as the main factor of degrading investment efficiency of Government R&D Budget (Cho, Yoon-Ae et al, 2005; H.S. Moon & J.D. Lee, 2005 etc). In addition, the areas with possibility of coexistence of similar and overlapped programs in the local R&D field should be reinforced with pre-planning abilities such as preliminary feasibility investigation systems, and promote the improvement of similar and overlapped programs to bring investment efficiency of government R&D to the next level.

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