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2012 Modularization of Korea's Development Experience:

Korean Experience of Financial Management Information System: Construction, Operation, and Results

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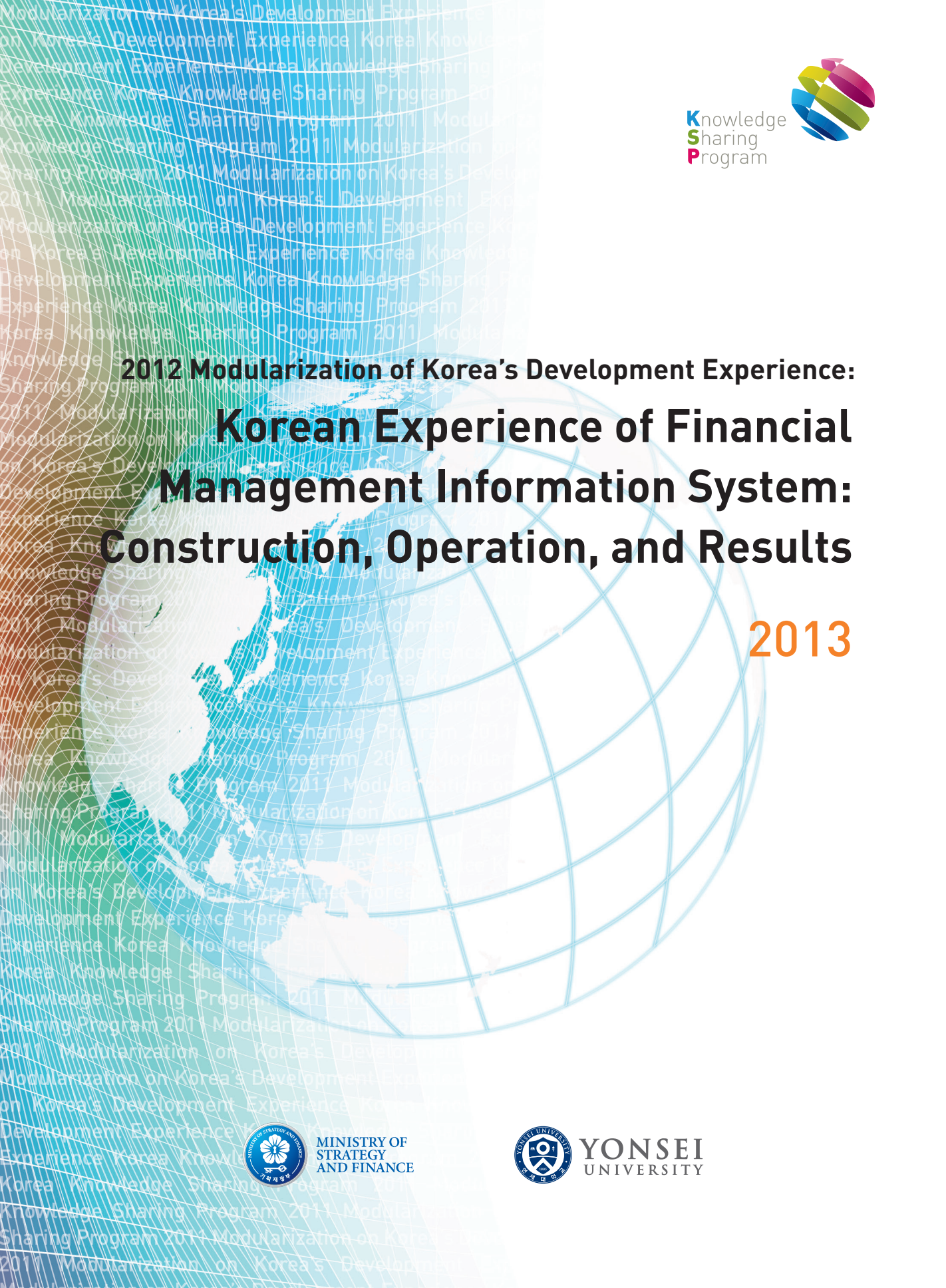

MINISTRY OF STRATEGY AND FINANCE

YONSEI UNIVERSITY

2012 Modularization of Korea's Development Experience:

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2012 Modularization of Korea's Development Experience

Korean Experience of Financial Management Information System: Construction, Operation, and Results

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Preface

The study of Korea's economic and social transformation offers a unique opportunity to better understand the factors that drive development. Within one generation, Korea has transformed itself from a poor agrarian society to a modern industrial nation, a feat never seen before. What makes Korea's experience so unique is that its rapid economic development was relatively broad-based, meaning that the fruits of Korea's rapid growth were shared by many. The challenge of course is unlocking the secrets behind Korea's rapid and broad-based development, which can offer invaluable insights and lessons and knowledge that can be shared with the rest of the international community.

Recognizing this, the Korean Ministry of Strategy and Finance (MOSF) and the Korea Development Institute (KDI) launched the Knowledge Sharing Program (KSP) in 2004 to share Korea's development experience and to assist its developing country partners. The body of work presented in this volume is part of a greater initiative launched in 2010 to systematically research and document Korea's development experience and to deliver standardized content as case studies. The goal of this undertaking is to offer a deeper and wider understanding of Korea's development experience with the hope that Korea's past can offer lessons for developing countries in search of sustainable and broad-based development. This is a continuation of a multi-year undertaking to study and document Korea's development experience, and it builds on the 40 case studies completed in 2011. Here, we present 41 new studies that explore various development-oriented themes such as industrialization, energy, human resource development, government administration, Information and Communication Technology (ICT), agricultural development, land development, and environment.

In presenting these new studies, I would like to take this opportunity to express my gratitude to all those involved in this great undertaking. It was through their hard work and commitment that made this possible. Foremost, I would like to thank the Ministry of Strategy and Finance for their encouragement and full support of this project. I especially would like to thank the KSP Executive Committee, composed of related ministries/departments, and the various Korean research institutes, for their involvement and the invaluable role they played in bringing this project together. I would also like to thank all the former public officials and senior practitioners for lending their time, keen insights and expertise in preparation of the case studies.

Indeed, the successful completion of the case studies was made possible by the dedication of the researchers from the public sector and academia involved in conducting the studies, which I believe will go a long way in advancing knowledge on not only Korea's own development but also development in general. Lastly, I would like to express my gratitude to Professor Joon-Kyung Kim and Professor Dong-Young Kim for his stewardship of this enterprise, and to the Development Research Team for their hard work and dedication in successfully managing and completing this project.

As always, the views and opinions expressed by the authors in the body of work presented here do not necessary represent those of the KDI School of Public Policy and Management.

May 2013

Joohoon Kim

Acting President

KDI School of Public Policy and Management

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Summary

1. Introduction

Like many other countries, Korea has recently reformed its Public Expenditure Management System (PEMS). But the ways the Korean government implement these reforms have some unique features. Korea took a non-evolutionary approach, the so-called big-bang approach, instituting radical changes from practices and processes it had been using for over 50 years, all in a relatively short period of time.

Korea adopted new budgeting and treasury management systems. Korea also changed its accounting from a cash-based system to an accrual-based one. It has also developed a new integrated financial information management system, which it is using to this day. Budget is now formulated via a top-down process, in accordance with five-year forward estimates. Execution is possible at the speed of light, via KFMIS, an electronic system. Treasury management has dramatically improved its efficiency and transparency than before. New accounting and performance evaluation systems are expected to change the Korean PEMS from an input-oriented to a result-oriented system.

However, there is no reform without resistance or obstacles, which the Korean government has to overcome. By implementing a decade-long reform agenda, Korea has learned important lessons to share with world, for developing countries (DC) in particular.

The purpose of this book is to share Korean knowledge with DC. As such, this study describes the nature of Korean financial reforms, backgrounds in which the reforms were implemented, and case studies of overcoming numerous institutional obstacles. This book also includes useful suggestions for DC that want to reform their PEMS into systems that are more efficient, transparent and accountable.

2. Institutional Change (1): Reform of Budget System

Korea changed its national budget system by employing four new frameworks: the mid-term expenditure framework, top-down budgeting, a performance management system, and a system dealing with program budgeting.

2.1. National Fiscal Management Plan (NFMP)

The National Fiscal Management Plan (NFMP) is Korea's mid-term expenditure framework, based on a five-year rolling plan. The NFMP is a plan to set forward estimates that serve as baselines for budgetary resources allocations. Therefore, the NFMP includes forecast of socio-economic changes in a five-year period, in addition to updates on the national vision, national development planning, and national priorities.

2.2. Korean Top-down Budget Formulation System

The basic idea behind Korea's budget reform was to adopt a four-step budget formulation system. As the first step, the Ministry of Strategy and Finance (MOSF, the Korean BO) disburses lump sum amounts to each line ministry, based on the NFMP. Each line ministry then allocates the apportionment to its own priorities and strategies. At the third step, the MOSF reviews whether requirements like expenditure ceilings and national priorities are being met at the line ministry level and whether each ministry is allocating its apportionment for the national interest. Lastly, the MOSF formulates national budget for the following fiscal year.

In practice, the MOSF complies with about 80percent of the budget requests made by line ministries. However, the MOSF audits the remaining twenty percent very carefully, adjusting budget request accordingly.

Top-down budgeting requires a very sophisticated MTEF, which allows the central budget office to set its allocated budget for each ministry. The central budget office also needs support from a dependable performance evaluation system, allowing the BO to determine whether the funds are being spent wisely. Therefore, the adoption of a top-down formulation system also meant that a new MTEF and a performance evaluation system were adopted as well. In fact, all systems are interconnected with one another.

2.3. Performance Management System (PMS)

As mentioned before, the Performance Management System (PMS) is an essential part of Korea's budget reform, since it is closely related to top-down budgeting. The PMS consists of two sub systems.

First is the Performance Goal Management System (PGMS). It aim is to quantitatively measure the performance of each line ministry through a variety of performance indicators. It was a very difficult task to establish valid indicators. Researchers, experts, and public officers all spent a number of years and to formulate reliable indicators and measures.

Korea's central budget office submits the "Performance Plan and Performance Report" to National Assembly each year. Through this report, parliament representatives can monitor the performance and budget information of various administrative branches. The PGMS is considered an informal feedback platform, in relation to budget and performance.

The Second PGMS is the Self Assessment of Fiscal Programs (SAFP), which is similar to the American Program Assessment Rating Tools (PART). As a result, the similarities have resulted in some calling the SAFP a Korean PART, or K-PART. The Korean BO can automatically cut at least 15% of any line ministry's budget for any program evaluated as "unsatisfactory" by the SAFP. Meanwhile, there are no automatic budgetary increases for programs evaluated as "excellent." The SAFP is clearly a negative incentive system, but it serves as a tool to make line ministries aware of the importance of enhancing performance.

2.4. Program Budgeting

The Korean government reformed its budget structure from a project-based to a program-based system. Budget structure has been reclassified into a cascading manner. Each program includes several activities, and each activity consists of several projects.

As the government adopted the program budget, there were various advantages.

First, by reconciling the project contents (or the project plan) with the budget, the chances of it being understood by any third party member increased (thereby also increasing the project's transparency), basic information to encourage effective resource allocation was established, and served as the basis for mid-term fiscal planning.

Second, calculating and providing management accounting information was now available through the estimation of total program costs. Indeed, estimating the future costs has significantly enhanced the efficiency of projects and promoted responsible public finance.

Third, as productivity by program was now measurable, evaluating the results became much easier.

3. Institutional Change (2): Reform of the Government Cash Management System

The objective of a government cash management is to ensure that adequate cash is available to pay for expenditures when they are due. Governments should also minimize idle cash, and thus government borrowing costs, managing various risks related with financial markets simultaneously.

The Korean government has adopted several big changes in its cash management system, modeled on active cash management systems founded in advanced countries, as follows.

3.1. Reform of the Systems of Government Cash Receipts and Payments

Like many developing countries, Korea had semi-automated systems for handling government cash receipts and payments. Although the banking system in Korea had a nation-wide network of branches (with ample coverage and communications infrastructure) collecting treasury revenues required complicated procedures like paper notices, cash receipts by commercial banks, and the actual manual process of accounting and reporting the results. Time delays for 1-2 months and heavy costs were inevitable in this slow and semi-automated system. There were also concerns of fraud and theft-related regarding government revenue collection.

The payments system was also semi-automated and lacked integration. Payment requests were processed through regional or local treasury offices, and were submitted for payment and settlement against the government account in the central bank. In addition, payment by treasury checks had important disadvantages. Checks decrease the speed of disbursements by payers, due to time delays between the issuance, encashment and clearing of a check, which also gives rise to significant check floats. Writing and delivering checks is expensive, and can introduce errors, affecting the effectiveness of the cash management system. These transactions also exposed themselves to the possibility of fraud.

In the early years of the 21st Century, the Korean government consolidated the revenue collection systems and standardized procedures. It also expanded the use of electronic revenue collection, turning the semi-automated systems into fully-automated ones. The Electronic Bill Presentation and Payment (EBPP) System played a central role in reforming the government cash receipts system.

The Korean government also abolished the use of the treasury checks for its payment system. Instead, it introduced an electronic payment system that allows automatic fund

transfers from the government account to the recipient's account. This virtually eliminated payment delays and idle balances and thus reducing operational risks.

3.2. TSA

In 2005, the Korean government introduced the Treasury Single Account system as the first major step toward adopting the active cash management system used in advanced countries. Each TSA is a bank account, or a set of linked accounts, through which the government can process all receipts and payments. This unified structure of government bank accounts gives a consolidated view of government cash resources.

The TSA has various benefits. Firstly, it lowers liquidity reserve needs and reduces bank fees and transaction costs. It also allows for complete and timely information on government cash resources, and improves operational control during budget execution. In addition, it facilitates a regular monitoring of government cash balances, and improves the quality of fiscal data, enabling higher quality cash flow analyses and forecasts.

3.3. The Full-fledged Initiation of the Active Government Cash Management System

Although the establishment of the TSA in 2005 was a major step toward the active cash management system, the Korean system was still far from perfect. Most governmental ministries would exaggerate their budget requests, largely because of the uncertainties in cash flow forecasts. These exaggerations increased cash reserves, and this increase made the cash flow forecasts even less reliable. Furthermore, because of these problems, treasury authorities could not fine-tune their system, one of the essential requirements of active cash management in the advanced countries.

Nevertheless, the Korean government announced it would initiate a full-fledged active cash management by 2010. The contributions made by the Digital Budget and Accounting System (DBAS), in use since 2007, has been considerable. As stated above, DBAS is a comprehensive system that consolidates and computerizes a variety of procedures from the reporting of government cash receipts and payments, to the investment of idle cash in financial markets. This information infrastructure provides real-time cash flow information and thus allows for more accurate forecasts. A special module to enhance the forecasts was added to DBAS in 2010.

4. Institutional Change (3): Reform of National Accounting System

4.1. Significance of the Accrual-based National Accounting System

The Korean central government has adopted an accrual-based national accounting system, in order to overcome the limitations of its then cash-based accounting system. This established the foundation of long-term fiscal management, through accurate analysis and projections of the nation's financial position. With the adoption, the government has also established a systematic and comprehensive way of reporting assets, liabilities, revenues and expenses in its financial statements. In addition, it was now possible that any change in values of national assets and liabilities would be reflected in financial statements. Also, the costs associated with various programs now can be calculated separately for each program, which enables performance evaluations and feedback for future planning. Through these changes, it is expected that users of national accounting information will obtain useful information for decision-making.

4.2. Major Initiatives for the Adoption and Implementation of National Accounting System in Korea

The reform of national accounting system by the government has been discussed publicly since the 1997 economic crisis, when the government made financial reforms to overcome the crisis. This included the modification of a number of relevant laws and regulations, including the National Finance Act, the National Accounting Act, and the National Accounting Standards. The reforms also established a budgetary accounting system designed to support these modifications.

The accrual-based national accounting system in Korea has its roots in the National Finance Act and the National Accounting Act. The National Finance Act covered the overall aspects of national finance such as the formulation, execution and settlement processes; the National Accounting Act set forth matters regarding the preparation of financial reports. The National Accounting Standards, which provide the principles for preparing national financial statements, are ministerial ordinances of the National Accounting Act.

To ensure smooth implementation of the accrual-based national accounting system, the government has launched major initiatives as follows.

Firstly, the National Accounting Standards were prepared based on a performance-based fiscal system. Secondly, the government modified the chart of accounts (COA)

systematically; standardized required input data; and recorded transactions automatically under the Korean financial management information system (or DBAS) in order to facilitate the practical application of a national accounting system. Lastly, the government plans to introduce a valuation system takes into consideration all the unique characteristics of each asset and liability, enabling a realistic asset/liability valuation.

In addition, a considerable part of closing adjustments can now be automatically and recorded under the system. This includes the calculation of depreciation expenses under accrual-based accounting, translation of assets and liabilities denominated in foreign currencies, and recognition of accrued revenues or expenses, as well as the elimination of intra-governmental transactions between funds or between ministries or agencies. This is intended to reduce the workload of public officials in charge of accounting, and minimizing valuation errors.

4.3. Implementation of the Accrual-based National Accounting System

The DBAS was designed to implement an accrual-based accounting system in the Korean government in a substantive way. The basic factors of such system to produce reliable and useful information on national accounting were as follows: the reorganization of the COA, the linkage of budgetary accounts with the COA, and the management of required input data by the COA.

In order to produce accounting information under the accrual-based system, in general, transactions or events are recorded by "accounting slips," with amounts and relevant accounts in a computerized system as they occur. However, under the DBAS, general budgetary transactions do not require the additional double-entry bookkeeping job. For example, when a system user enters the amount into the relevant (single) budgetary account, it becomes linked to the COA. This automatically produces a journal entry in an accrual-based double-entry manner. By virtue of such structure, the user can easily adapt to the accrual-based accounting system and errors in financial reports can be minimized.

The most prominent advantage of an accrual-based national accounting system is that a variety of information for decision-making can be produced. Therefore, financial statements, notes to the financial statements and relevant appendixes should contain a variety of information, which is referred to as required input data. Sufficient information on each COA needs to be managed in a systematic manner.

5. Digital Budget & Accounting System (DBAS): Korean Public Financial Information System

The Digital Budget & Accounting System (DBAS) is an integrated financial management information system that was developed by Korean government. It is often called "dBrain" short for "digital Brain," signifying an intelligently integrated finance management system in the digital era.

It encompasses all the fiscal activities for Korean government, from budget formulation, execution, reporting and auditing. For most countries using PFMIS, budget systems are separated from treasury system. FMISs of central government are not directly linked to those of local governments. Korean DBAS seamlessly handles treasury activities as well as budget formulation in one truly integrative system. The benefit of being integrated is to utilize national financial resources strategically based on national priorities.

Cem Dener, senior expert in public finance management department in World Bank, evaluates DBAS as follows, after he directly looked into DBAS.

> *"Republic of Korea's DBAS is one of the most developed finance management information systems which I ever seen...[the] DBAS is one of the most integrated and unique financial information system in the world." (2010)*

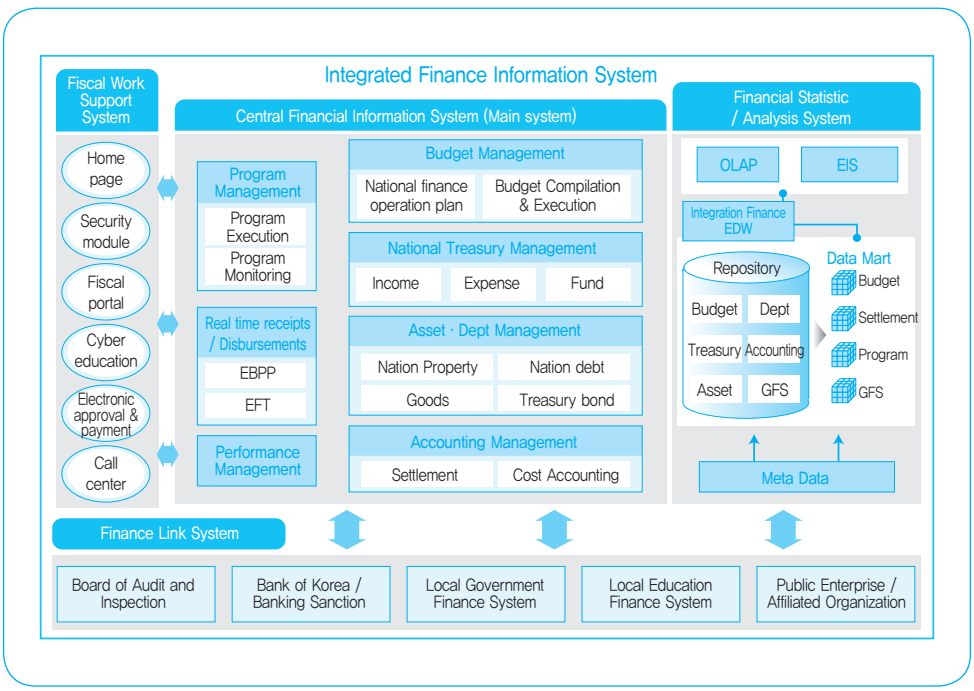
The DBAS is an essential tool for innovating Korean PEMS. About 55,000 financial managers who deal with all the revues and expenditures are using DBAS every day. It seamlessly handles about 300,000 transactions for 6 trillion Korean won (equivalent to about 5.3 billion US dollars) on average every day.

<Main Features of DBAS>

- Adopts new financial management ideas
- Covers new range of government finance
- Shares synthetically government finance management information
- Secures responsibility of transparency and finance operability in real time
- Makes financial management more efficient
- Makes national treasury management more efficient
- Establishes clean system, which eliminates possibilities of corruption in the public sector

An associative relation of entire configuration and each components of a digital budget accounting system are as drawn as below. DBAS is consisted of three major components: the Central Financial Information System, Finance Link System, and the Financial Statistics/ Analysis System.

Figure | Composition of DBAS



The Central Finance Information System (CFIS) is the main sub-system that performs a one-stop automatic connection to all national finance business processes, like fiscal planning, budget formation, execution, and treasury management. CFIS is consisted of five sub-systems as follows.

5.1. Program Management System (PMS)

This component manages the entire life-cycle of fiscal activities from the beginning to the end of each project and program. Since a manager registers each project in the DBAS, the PMS stores all the information related to this project as follows: detailed description about the project, related reports like feasibility studies, budget requests, budget allocated, execution performance, performance evaluation data, and much more.

These information supports decision-making responsibilities related to budget and treasury management, and the results of daily financial operations keep on being recorded on PMS. Due to this feature of life-cycle management, the integrity of the project can be maintained even when the project manager is changed.

5.2. Budget Management System (BMS)

The BMS component of DBAS electronically supports the budget reforms Korean government has established: mid-term expenditure framework, top-down budge, and performance management scheme.

Budget formulation requires decision-making based on comprehensive information. BMS provides information for staff in charge of budgeting, and alleviating the need for manpower requirements through the automated compilation of budgetary chores.

5.3. National Treasury Management System (NTMS)

The NTMS handles all the treasury activities related to revenues and expenditures. It is equipped with the Electronic Billing Presentation and Payment (EBPP) module and Electronic Fund Transfer (ETF) module for the cash management. The following diagram illustrates that the payment for the goods and services to the government is electronically transferred to the creditor's bank account. The process itself is not extraordinary, but it is nonetheless carried out in real-time via DBAS.

5.4. Assets and Debt Management System (ADMS)

The ADMS carries out all the business processes related to "national property/goods management," "bond management," and "debt management."

5.5. Account Management System (AMS)

The AMS has a function of automatic journaling, which means that every transaction made will be automatically classified by accounts and transaction types in real time. It also calculates costs for each program. The program cost is to be utilized as one of basic information for Performance Management System.

The beauty of AMS is that it does not require project managers with high level accounting skills, since the AMS automatically organizes all the transactions with a journal.

5.6. Real-time Receipts/Disbursement System (RTRDS)

The RTRDS has a function of automatically managed all nations revenue and expenditure management by information system.All processing is handled automatically in real-time. RTRDS includes the Electronic Billing Presentation and Payment (EBPP) module and the Electronic Fund Transfer (ETF) module.

5.7. Performance Management System (PfMS)

The PfMS function consists of all related financial performance management. The PfMS includes performance plans, performance reporting, management self-evaluation, in-depth evaluation, and performance status management.

6. Lessons of Korean Financial Reform and Suggestions for the World

Korean government has recently reformed its PEMS significantly, changing many processes and practices relating to budget formulation, execution, and treasury management with the introduction of a new accounting system. As a result of such reforms, the Korean PEMS is transformed to a modern performance-oriented PEMS, supported by a state-of-the-art financial information management system, called DBAS.

The transition was, however, not without its obstacles. Korea wants to share knowledge of overcoming such difficulties with other countries, especially the developing countries (DC). Korean experience of financial reform can be helpful to DC, and are as follows:

- Introducing a new budget system means a long process of getting consent from many concerned people. One way of getting consent is to study foreign cases in depth. World best practices have potential to persuade people into reform. But as many people as possible should participate in the review of best practices, and in the process of designing new budget system. Pilot tests are essential and helpful, for they reveal unexpected cases.
- Mid-term expenditure framework should be flexible to the changes in the financial environment. Revenues of some DCs partly depend on foreign aids, which might be contingent on international affairs. For some DCs, exchange rates for currencies are so volatile that they harm the MTEF. To prepare for such incidental changes, DC needs to develop the MTEF with simulation functions.
- Many DC have their own performance evaluation systems, but they usually have difficulty in connecting performance evaluation with budget formulation. The Korean

government has a negative incentive system for performance evaluation. Budget for any program or project evaluated as "unsatisfactory" is automatically cutback by 15% from previous year's budget amount.

- A key to Government Cash management system reform is the computerization of business processes. Computerized treasury management systems enhance the accuracy and convenience of receipt and payment of national funds. It also provides information about cash flow in real time. Forecast on cash flow in near future will be enhanced as well. The development of the treasury information management system should, however, be done with cooperation of related officials, for automatic electronic processing has drawbacks and threats. It makes the job of cash managers faster and more convenient but the complex codes and electronic procedures do not allow them to understand the whole process. Daily cash management requires very frequent coordination between the cash manager, the government debt manager, and the monetary authorities.
- The computerization of the whole process makes security issues much more important. The recent episodes about Wikileaks provide a good example of the importance of security.
- It is very important to build an incentive system for cash management, for the exchequer alone cannot monitor everything. In advancing to a more sophisticated cash management system, the specific responsibilities of cash managers, public debt managers, and the monetary authorities need to be delineated more clearly, in updated memoranda of understandings. The Ministry of Finance develops guidelines for treasury management, and then gives incentive to those who observes its guidelines.
- An increasing number of countries have recently been employing an accrual accounting system. The Korean government has adopted a dual system, utilizing a cash-based accounting system for budget formulation, while using accrual accounting for settlements. There are two keys for the successful introduction of accrual accounting. First, computerized automatic journaling helps public officials to use the new accounting systems with relative ease. Secondly, the government has to set up a roadmap to supply human resources who can handle accounting matters with high skills.
- When developing a public financial information system, Korea decided to develop in-house rather than off-the-shelf. In-house keeps maintenance cost low, and is also convenient to update the system according to the changes in laws, rules, and policies. Korea recommends DCs to develop their own FMIS rather than to customize canned-software.
- Each DC is different in its IT infrastructure and in the demand for financial information management. Some DCs might need full-fledged FMIS, while the other DCs might

demand the electronic receipts and/or payments only. Korea's DBAS is consisted of many modules from budget formulation to financial statements. That means a DC has a choice to adopt any one or more modules built in DBAS upon their needs.

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Chapter 1

Introduction

Introduction

On January 1st of 2008, the Korean government launched its Digital Budget and Accounting System, or also known as dBrain. This was the government's integrative financial management information system (GIFMIS), developed in-house by Korean specialists.

dBrain is certainly an integrative system, as it encompasses entire gamut of financial activities from budget formation, implementation, accounting and financial statement. It covers not only the ministries and agencies of central government, but also the local governments.

About 15,000 financial managers who deal with all the revenues and expenditures are using dBrain every day. It handles about 300,000 transactions per day, worth 6 trillion won (equivalent to 5.3 billion US dollars) on average each day.

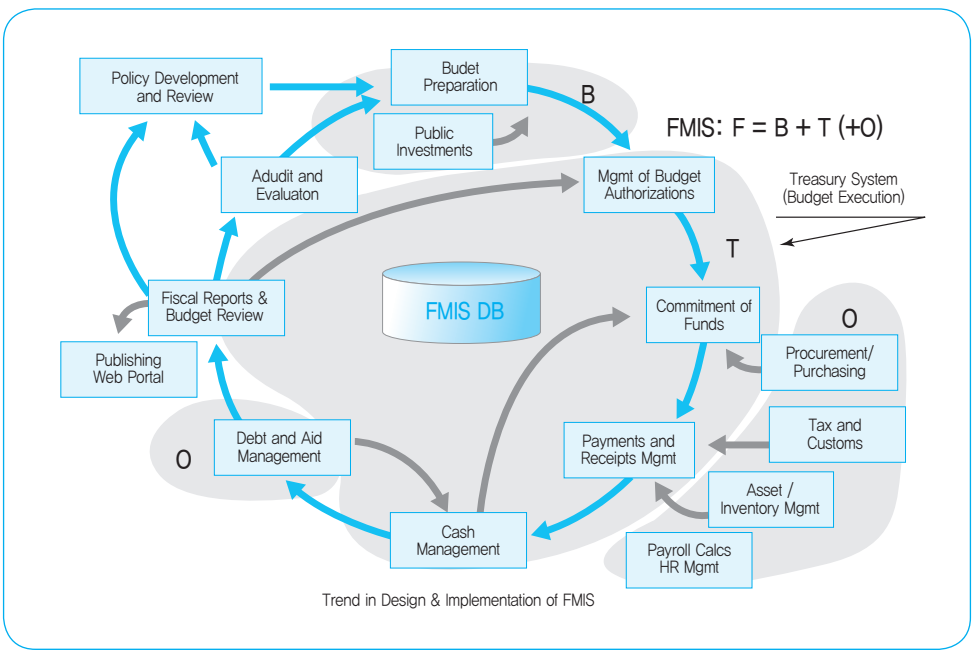
dBrain is a tool to support Korean innovation of financial management system. Korea has introduced a modern public expenditure management system (PEMS), reforming the budget system, cash management system, and the accounting system. Those reforms require enormous amount of financial information. Without a proper tool to handle all the information traffic, any reform toward modern PEMS would not be feasible.

The main purpose of this book is to explore the Korean GIFMIS, or dBrain. However, explanation on the dBrain alone does not provided clear understanding, since it has been developed together with other institutional changes like new budgeting, treasury management, and accounting system. Only after understanding the surrounding systems, one can figure out what dBrain is, for what it has built, and how it functions.

Chapters 2, 3, and 4 illustrate the institutional changes: the newly reformed budget system, new management of treasuries via electronic devices, and the accrual-based accounting system. Chapter 5 then explains the Korean financial management information system in more depth.

Each chapter presents background circumstances, currently working systems, lessons learned from Korean reform, and recommendations for the developing countries.

The following diagram illustrates the general view of FMIS, which consists of B for Budgeting System, T for Treasury System and O for Other Financial Systems. B, T, and O can be processed electronically, for which FMIS has been designed. Chapter 2 of this book deals with B, Chapter 3 with T. Subsystem O has many components, one of which is the accounting system. Chapter 4 of this book discusses the accrual accounting system, which was adopted by the Korean government. Lastly, and most importantly, Chapter 5 delves into the Korean FMIS, or dBrain.



The main system of dBrain is called Central Financial Information System (CFIS). CFIS also represents the concept of FMIS=B+T+(O) as follows:

(B) Budget Management System is directly related to Chapter 2 (Budgeting System).

(T) National Treasury Management System is for Chapter 3 (Government Cash Management).

(O) Accounting Management System and Asset Management System are developed in relation with accrual accounting system.

(FMIS) Sum of B+T+(O) and other supporting systems compose the entirety of dBrain, which is the main theme of Chapter 5, but this electronic system has to work with other institutions harmoniously for it to function properly.

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Chapter2

Institutional Change (1): Budget Reform

1. Background of Budget Reform
2. National Fiscal Management Plan: Korean Mid-Term Expenditure Framework
3. Top-down Budget Formulation
4. Performance Management System of Korea
5. Introduction of the Program Budgeting System
6. Assessment on Korea's Budget Reform and Recommendations for Developing Countries

Institutional Change (1): Budget Reform

1. Background of Budget Reform

1.1. Shortfalls of Traditional Budget System

Korea had been using the traditional budget system, focusing on due processes, until the reforms in 2004. The traditional system allocated financial resources in a centralized way, based on strict control of budgetary inputs. It made a great deal of contribution to the rapid growth of the Korean economy. Nonetheless, there were problems beset in this institution.

As for operational efficiency, budget under the traditional system was spent without a thorough evaluation on performance. Furthermore, the old system had no overt institution to enhance efficiency in allocating resources. Resource allocation for national priorities is often harmed by line ministries' self interests. Consequently, some areas and sectors received excessive budgets, while others suffered from budget shortfalls.

Under traditional bottom-up budgeting, line ministries were likely to get more allocation with more budget requests. Consequently, the Central Budget Office (BO) tended to review the requests, to cut as much of them as it could. The process of cutting the budget sizes was very time-consuming, and allocation did not always match the national priorities. As the review process became a game between BO and the line ministries, budget formulations were very sensitive to any particular circumstances year round. The principles of budget formulations in accordance with national strategies was undermined on numerous occasions.

1.2. Best Practices of OECD Countries

Budget reforms are very country-specific, for each country has unique problems to cope with. There exists a great deal of variety in the budget reforms among OECD countries. Despite this, however, there are common measures among their budget reform practices. It is often called modern Public Expenditure Management System (PEMS).

PEMS tightens the management of fiscal deficits, and puts more emphasis on the results of the public resources used, than on input controls. It gives more fiscal autonomy to the line ministries, in order to enhance operational efficiency and accountability. As a consequence, BO responsibilities have changed from input-control to outcome performance. It is also apparent that PEMS reinforces decentralization, together with centralization, when analyzing the allocation of national financial resources.

1.2.1. UK

After the financial crisis of 1978, the British government drastically decreased the budget spending power of its ministries. Without any additional new funding, ministries had to reduce budgets on their own.

The Code for Fiscal Stability of 1997 was a legislative action for budget reform. For the effective application of The Code, the British government has managed the state budget by operating two separate systems, the Department Expenditure Limit (DEL) based on the multi-year budgeting and the Annual Managed Expenditure (AME). Within the range limited by DEL for three years, the UK government ministries have considerable flexibility in budget execution, but are obligated to participate in the Spending Review every two years. As the DEL is a plan valid for three years, completing the Spending Review implies securing stable supply of resources for three years to the ministries. Through the DEL system, the stability of ministries has greatly enhanced. That is, the uncertainty of resource supply has been removed. Heads of agencies are able to seek their long-term goals in the predictable future state.

While promising a stable budget supply for the next three years, the Treasury signs the Public Service Agreement (PSA) with the line ministers for their promises to achieve public aims and objectives.

1.2.2. Sweden

The budgeting system of Sweden was drastically reformed during 1996~97. Under the former budget system, deliberations on the executive budget by the Parliament took over five months. The appropriation of Parliament often ended up with spending increases from the executive budget proposal.

The economic crisis of 1992 called for a faster and more effective budgeting system that can be more easily understood by its people. The Swedish government established the Commission of Inquiry for budget reform.

The Commission of Inquiry launched reforms on budget structure and processes for achieving a balanced budget at the earliest possible date. It set the target of government fiscal deficit not to exceed 3% of GDP. To achieve this target more efficiently, the Commission established a two-stage top-down budgeting system.

The Swedish top-down budgeting system first sets the total amount of expenditure for the forthcoming year, in accordance with the mid-term expenditure framework, which reflects long-term forecast on economic conditions. It then decides the expenditure ceilings for 27 areas. The total amount of expenditures and allocations for the 27 areas can then be appropriated by its Spring Congress.

Once the ceilings are set, the administrative branch divides the 27 expenditure areas into 47 policy areas, and then divides the policy areas into about 500 projects for ministries and agencies. The executive budget proposal for detailed budget allocation is reviewed, and appropriated by the Autumn Congress until the fiscal year.

1.2.3. USA

It is tradition for the US congress to play a prominent role in formulating the budget. The Office of Management and Budget (OMB) prepares the Presidential Executive Budget, following a bottom-up process. First, it notifies the guidelines for budget requests to departments and agencies, given the President's political interests and priorities. And then each department and agency makes spending requests. After reviewing these requests, the OMB finalizes the Executive Budget to be submitted to Congress.

The Presidential Budget is essentially a request to Congress. Congress thus is not obliged to take the proposal as it is. However, it explicitly or implicitly has many influences on the decision-making process of the Congress, for the Presidential Budget plays a key role in delivering the national policies and priorities of the President.

When the Presidential Budget is submitted, the Congress approves the appropriation bills after dividing into two categories. One is the mandatory spending and the other is discretionary spending. The mandatory spending, which is composed mainly of social security expenditures, follows the PAYGO, pay-as-you-go, principle. That is, when departments request the budget for new projects or increases in the spending for existing projects, they should submit either the financing plans for new or additional budget resources, or reduction plans of existing projects. It is a device to suppress spending increases, by riding popularity of the Congress members and to achieve the goal of a balanced budget.

1.2.4. Australia and New Zealand

Australia made many achievements in fiscal system reform in 1990s, and the most distinctive among them was the Forward Estimates, which is an Aussie mid-term expenditure framework. The Forward Estimates presents a total budget ceiling and a baseline of expenditures, by sector for the next five years. Each spending department receives the outlay set by the Forward Estimates if there is no particular change in the environment of politics and economy.

In New Zealand, reforms were promoted to operate government like private companies. As a result, the government accounting system shares those found in many private companies, introducing performance evaluation systems and performance-based budgeting.

1.3. Korean Reform Movement Toward PEMS

The currency crisis of 1997-1998 triggered Korea to benchmark the best practices around the world. Case studies on leading OECD countries provided precious wisdom in designing Korean reform toward modern PEMS, as follows:

a. Introduction of National Fiscal Management Plan (NFMP)

b. Introduction of Top-down Budget Formulation System

c. Introduction of Program Budgeting System

d. Performance Management Budget System (PMBS): Korean Performance Oriented Budget System

e. Introduction of Accrual Accounting and Financial Statements

f. Construction of Government Integrative Financial Management Information System, so called dBrain

First four out of six major changes mentioned above are directly related to budget reform. These topics are going to be explained in detail as follows.

2. National Fiscal Management Plan: Korean Mid-Term Expenditure Framework

2.1. Background History

Korea has a very successful legacy of national planning. The Korean government established the Five-year National Socio-economic Development Plan seven times in a row

for a 35 year period between 1962 and 1996. During this time, Korea achieved a miraculous economic growth. The growth was backed by a strategic allocation of scarce national resources under the 'select and focus' principle, though implemented in authoritative ways.

As the Korean society became more democratic, however, the government began to permit the autonomous growth of the private sector. Korea finally withdrew the nation-wide strategic plan in 1997.

Coincidentally or not, Korea soon suffered from the Asian currency crisis in late 1997. Many people believed that strategic resource allocation planning would be resumed in order to overcome the crisis.

The Korean government needed to set up a new national plan, but one that was different from its authoritative past. The economic and social development plan in the past was somewhat a totalitarian plan, covering both the public and the private sectors. The new national plan should be more democratic and more adaptable to a developed country, so that it sets priorities in the public sector only, letting the private sector become self managed.

Western developed countries tended to be reluctant to build a national plan, for they were suspicious of the efficacy of authoritative resource allotment. However, as fiscal deficit problems worsened and requests for efficient use of resources continued, they began to formulate the mid-term expenditure framework (MTEF) in the 1980s and 1990s. As a result, most advanced countries have MTEF nowadays, something that also influenced Korea.

The period of the MTEF varies from country to country. Sweden has a three-year MTEF for 27 spending areas. In the UK, a three-year MTEF is updated every two years, and the US formulates a five-year MTEF for discretionary spending, which is revised every year on a rolling basis. In the Netherlands, a five-year MTEF was established in the form of coalition agreement.

The Korean MTEF, called National Fiscal Management Plan (NFMP), is a five-year plan, reviewed on a rolling basis. The year 2004 was the first year of NFMP inception.

2.2. Main Features and Functions of the NFMP

2.2.1. Main Features

World-renowned American professor Allen Schick gave some comments on Korean budget reform, noting that the MTEF should meet the following requirements.

First, is the plan released to the public as a formally documented form?

Second, is the political leadership directly involved in making the plan?

Third, is the plan actually being used for the allocation of budget resources?

When these three questions are answered positively, the framework is considered a mid-term expenditure framework of a country. Korea's National Fiscal Management Plan (NFMP) introduced in 2004 met all of these requirements.

First, it is not only published to the people, but also submitted to the National Assembly, in accordance with National Finance Act.

Second, the NFMP reflects the policy priorities of the President, and it is confirmed every year at the across-ministerial Fiscal Strategy Meeting presided over by the President.

Third, projects not included in the NFMP are very difficult to provide with budgetary support.

2.2.2. Major Functions

The NFMP, Korean MTEF, has three major functions: macroeconomic stabilization over the medium-term, strategic resource allocation according to national priorities, and the predictable supply of budget resources to line ministries.

a. Macroeconomic Stabilization over the Mid-term Period

Economic business cycles are always in a state of flux. However, without an MTEF, increased revenue during the boom period leads to surge spending, resulting in an overheated economy. On the contrary, during a recession period, the government reduces its spending due to decreased revenues. It is like cutting the water supply when people are thirsty.

British government handled this problem by introducing a multi-year budgeting system, providing a valuable lesson for Korea. Korean government decided to introduce multi-year planning, not the multi-year budgeting.

By making use of the MTEF, the Korean government allocates its financial resources over a five-year period in a counter-cyclical manner. That is, government can spend more fiscal resources to cope with economic recess. Meanwhile it reduces spending in a period of boom to stabilize the economy.

For example, during the global financial crisis in 2008, the Korean government formulated a deficit budget by increasing the public spending and front-loading the budget to stimulate the economy. The budget deficit has temporarily increased, but the NFMP is being established in the direction of easing the deficit in the long run by keeping a tightening fiscal policy stance from 2011.

The deficit problem that recently emerged in many countries can be tackled strategically through a medium-term fiscal plan. Even if a deficit occurs in the short term, it allows

aiming to achieve a surplus or sound finance in the medium term. Balance in the budget is not a target of a single year. Rather, it is a target to be achieved in a certain period of years.

b. Strategic Allocation of Resources

A nation performs a number of functions simultaneously, and has to determine 'social priorities' by reflecting the preferences of many parties involved. The National Fiscal Management Plan is the numerical representation of these policy priorities over a mid-term period.

The following <Table 2-1> shows the resource allocation plan by major areas in the NFMP for 2009~2013. Between 2009 and 2013, the largest fund will be spent on welfare and education, while R&D shows the highest growth rate of investment.

Table 2-1 | Example of NFMP by Areas

(Unit: trillion won)

Area	2009	2010	2011	2012	2013	Average Annual Growth Rate
R&D	12.3	13.6	14.9	16.6	18.4	10.5%
Industry & Economy	16.2	14.4	15.1	15.9	17.0	1.3%
Social Overhead Capital	24.7	24.8	25.3	25.9	26.7	2.0%
Agriculture	16.9	17.2	17.4	19.2	17.6	1.2%
Welfare & Labor	74.6	81.0	85.3	90.7	96.9	6.8%
Education	38.2	37.8	40.7	44.3	48.3	6.0%
Culture	3.5	3.7	3.8	3.9	4.0	3.4%
Environment	5.1	5.4	5.5	5.7	5.8	3.5%
Defense	28.5	29.6	30.9	31.3	33.7	4.2%
Foreign Affairs	3.0	3.4	3.4	3.4	3.4	3.6%
Domestic Security	12.3	12.9	13.2	13.7	14.0	3.3%
General Administration	48.6	49.5	52.7	54.0	54.8	3.0%
Total Expenditure Planned	284.5	291.8	306.6	322.0	335.3	4.2%

Source: Ministry of Finance and Strategy

c. Predictable and Stable Supply of Budget to Line Ministries

The figures in the NFMP are the baselines of expenditure. Presuming status quo, the corresponding amount indicated in the NFMP is expected to be allocated to each line ministry. Of course, assumptions may require modification on some occasions such as

when inflation is rapidly rising, or the currency exchange rate fluctuates over the expected range. In this case, the baseline expenditure in the NFMP and the actual amount of budget allocation may be different.

Assuming there is no big changes in environment, spending ministries are able to forecast the approximate budget amount to be assigned for the next few years. Benefit of this system is clear. Spending ministries can decide their own strategies for policymaking and policy implementation with relatively stable supply of financial resources.

Such improvement of the predictability enables line ministries to formulate the development plan for relevant areas in a stable manner. It also minimizes the problems of pending the projects midway, due to budget shortfalls.

2.3. Procedures of Establishing NFMP

At the end of each year, the guideline for the NFMP is provided to line ministries by the Ministry of Strategy and Finance (MOSF), the Korean central budget office. Then, line ministries submit the individually prepared mid-term plans to the MOSF by late January.

MOSF examines the policy directions by sector and major issues. To do this, task forces are organized for each of the sectors. They are composed of government officials and private experts, from research institutes and universities.

Every May, all Cabinet members attend the "Meeting for Financial Resource Allocation." They discuss their plans for fiscal expenditures, along with the measures to secure fiscal soundness.

In June, opinions from all social standings are collected through a series of public hearings by sector.

Afterwards, the NFMP is prepared for the following five years, and it is reflected in the budget formulation.

In October, the government submits the draft budget to the National Assembly with the NFMP. Main contents of the NFMP are as follows.

- Assessment of the previous year's NFMP
- Analysis on current economic and social conditions
- Inspection results of domestic and external conditions for fiscal management
- Directions of fiscal management and resource allocation for the next five years
- Policy directions by sector and plan for fiscal investments
- Improvements in the fiscal management system

2.4. Assessment and Lessons of NFMP

Among many fiscal systems introduced by the Korean government, the NFMP is considered to be the most successful one. Budget officials in line ministries say as follows:

"When we first heard about the introduction of the NFMP, we thought it would be just another new attempt, mostly short-lived. However, its power began to be emerged over time as projects not included in the NFMP were too difficult to get budget allocation. Therefore, more and more efforts are being made by line ministries to accurately reflect their needs and strategies to the NFMP."

Due to the introduction of the NFMP, the following changes have occurred.

First, the previous due process of budgeting concerned only a myopic perspective. The NFMP requires a longer-term vision about national priorities.

Second, in the past, line ministries announced their own long-term plans, not considering national priorities and budgetary conditions. As a result, plans without funding measures were published and did not strengthen public confidence, for many were simply declarative plans. However, after establishing the NFMP, effective consultations are provided when line ministries draw up mid-term and long-term plans, and the government is able to earn trust of the people as policy is announced after securing resources.

Third, rational and strategic allocation of resources is pursued by adding a new process in budget formulation. The "Meeting for Financial Resource Allocation" of the cabinet carries extensive discussion on the national priorities and projects.

Fourth, by taking the mid-term balanced approach in fiscal management, public finance is able to serve as an automatic stabilizer. Under the multi-year budgeting system, expenditures are made within multi-year revenues. Accordingly, public finance plays the economic adjustment function, recording surpluses during times of prosperity, as well as deficits during economic slumps.

Not only the advanced countries, but also many developing countries (DCs) establish mid-term plans. However, DCs are very susceptible to revenue fluctuations. The unexpected changes in international conditions such as exchange rate, overseas aids and loans are not uncommon in DCs. The amount of annual revenue is so volatile that it causes the large gap between mid-term plans and the actual budget. The effectiveness of any mid-term plan is often undermined, and they get used to be it as merely a formal process.

As a mid-term plan hinges greatly on domestic and external variables, it is necessary for DCs to equip a special function, like a simulation function. It takes into account any number of scenarios about the financial future. That is, it is recommended for DCs to plan

expenditure frameworks, which can be flexibly adjustable to sudden changes in exchange rates, inflation and foreign aid.

Fortunately, the dBrain has extensive simulation features. Each country can customize the simulation functions to fit its respective needs.

3. Top-down Budget Formulation

Korea introduced the top-down budgeting system in 2003. As the Korean economy became the world's 12th-largest, the traditional bottom-up budgeting system had trouble operating its public finances. Korea had used the bottom-up budgeting for 55 years since the nation was founded in 1948. For strategic use of fiscal resources of the government, a new budget system was needed, and thereby the introduction of the advanced top-down system.

A top-down approach has been applied to the private sector since the 1920s, but the world's application to the government sector was not until 1974 when US federal government enacted the Congressional Budget and Impoundment Control Act. In Europe, the top-down budgeting was introduced by the UK and Sweden in 1979 and 1990 respectively, after they experienced the financial crisis. Since then, British Commonwealth countries and early OECD member countries have come to introduce the system in the government. Korea adopted this new system as well in 2003, after completing a pilot project in 2002.

3.1. Background of Adopting Top-down Budgeting

3.1.1. Expanded Scale of Public Finance

When the traditional bottom-up approach was introduced in Korea, the size of public finance was small and the number of government projects was manageable. Thus a lot of emphasis was placed on fast decision-making by a few elite members. However, as economic development lead to democratization, and managing the quantity and quality of fiscal projects has become very complicated. Though more budget officials were needed to handle such responsibilities, the government did not increase the staff due to its inclination toward "small government." It consequently caused a serious bottleneck in the budget formulation process. Let's take an example. In 1996, one budget official was responsible for 69 projects, and they amounted to 1.2 trillion won (about $1.0 billion). In 2003, however, one staff member had to review 153 projects worth a total of 3.9 trillion won. Under the traditional time-consuming budgeting system, reasonable budget formulation was difficult.

3.1.2. Exhaustive Vicious Cycle between Excessive Budget Requests and Drastic Curtailment

Under a traditional bottom-up approach, spending ministries and agencies played very limited roles in the process of budget formulation. In fact, their roles consisted solely of requesting for budget resources. The decision-making power over resource allocation was exclusively given to the central budget office (BO).

Therefore, spending ministries began to compete in obtaining greater budgets than the other. The most typical way of competition was to request the most that they could. They made their request for budgets much more than they actually needed, being wary of big cuts ahead during budget reviews. The sum of the request made by individual ministries is often several times larger than the central budget office could afford.

Counteracting the excessive requests, the central budget office tended to choose 'drastic cuts.' Once after cutting up to 80% of the previous year's budgets, the BO increased further cuts in subsequent years. Therefore, there was little room to allocate resources to new projects. Budgets for projects, some of which had been continued for several years, were cut up to 50 percent.

The vicious cycle of excessive requests and drastic cuts is well described in the table below. During the 1990s and early 2000s, there is about 16% to 21.5% difference between the requested amounts by line ministries, and the final budgets approved by the Ministry of Planning and Budget (MPB), then the central budget office of Korea. The MPB slashed the requested amounts by 30% to 40% every year during the first stage of budget review, and that it finalized the draft budget by increasing them one by one in detail.

The process of reviewing the budget requests was a painstaking task in itself, and it also created a deep distrust between the budget office and spending ministries. Since they distrusted each other, they were stingy in sharing information. The budget office did not inform spending ministries about the amount of available resources, and the spending ministries did not provide sufficient information about the projects under their authority of implementation. After all, the dealing between the two with concealed information caused serious side effects in budgeting, and lowered the quality of budget formulation.

In the process of budget cuts, even essential projects had considerable leeway to face funding cuts, and highly motivated and creative new projects were frustrated in many cases. New projects that had not yet started were easy targets of curtailment. In addition, there was distortion in the process of gradually raising the amount after slashing the requests. In some cases, projects with lower priorities had budget increases ahead of others. Accordingly, the draft budget was likely to have a different shape from that based on analysis of the overall priorities.

Information was also distorted. New projects that found it hard to secure funding requested for small amounts at first, but once projects were embarked on, line ministries pushed for increases in their project costs. In one case, the cost of a project almost doubled through 12 changes. In particular, the budget for the project of Korea Train Express completed at the total cost of 18 trillion won was nearly three times more than the initially requested amount. However, if such new projects did not receive additional budget, they were likely to remain incomplete. Due to these circumstances, a lot of complaints were raised and funded by the government as well as the National Assembly and citizens.

There were many cases in which the purposes for expenses would change after securing the budget through existing projects. For instance, maintenance expenses for existing facilities and equipment were used for purchasing new facilities or equipment, and part of construction costs was spent to purchase of additional land to secure another budget. Numerous such cases were pointed out by the Board of Audit and Inspection.

3.1.3. Increased Necessity for Strategic Resource Allocation

Traditionally, the Korean government placed a high priority on the economic development areas in budgeting. In the 1970s, spending on economic development was 20.3% and had increased to 30% by 2003, far above the average 9.7% among OECD countries. In other words, a significant portion of the government resources was spent in the economic fields. Large spending in one specific area meant delayed development of other areas. Becoming an advanced country, the focus of the government's direct expenditures more tended towards education, welfare, national defense and social security. Considering agriculture-fishery sector with weakening competitiveness, public education becoming less satisfying, increasing demand for local fiscal expansion and the need to expand R&D to develop future growth engines, restructuring resource allocation became a necessity for the Korean government.

However, under a traditional budgeting system, only microscopic adjustments could be affordable on the basis of the existing structure of resource allocation. As the forest can hardly be seen for the trees under a bottom-up approach, it was difficult to drive for restructuring in budget allocation.

Individual projects have their own validity, and thereby support groups for those projects are organized. However, if analysis on priorities among areas is not proactively conducted prior to project feasibility study, the direction of fiscal commitment may become unclear. In this context, considering weak analysis function of the traditional budgeting system, a new device was required to accomplish the goal and direction in the process of budgeting.

3.2. Process of Introducing New Budgeting System

As an alternative to overcome the problems discussed earlier, the new top-down budgeting system was introduced. By applying this system in budgeting, line ministries perform their yearly budgeting within assigned expenditure ceilings of the year, which are fixed on the basis of the five-year National Fiscal Management Plan. Line ministries submit budget requests after autonomously restructuring their projects within the ceilings, then the Ministry of Strategy and Finance formulates the draft budget by reviewing these requests.

The top-down budgeting is a completely different approach from the traditional Bottom-up budgeting used for the past 50 years. Therefore, the government had to resolve numerous issues before introducing the new system, including how to set the total ceiling by ministry, who should have power to make decision, how to smoothly reach an agreement on ministerial ceilings, what countermeasures could be taken in case line ministries failed to observe expenditure ceilings due to unexpected large spending, whether autonomous budgeting would bring the intended effects and the possibility of moral hazards in line ministries. Furthermore, the government had to take a new look at the purpose of the system, the reason for introducing and relationships with the National Assembly. Therefore, after a series of steps over the years, the new top-down approach was introduced in Korea.

3.2.1. Suggestion to Adopt a New Budgeting System

After the Asian financial crisis of 1998, the Korean government began to explore the introduction of a new budgeting system. In case of OECD countries, they had been operating the top-down budgeting since its introduction between the 1970s and 1990s, and research institutions in Korea such as the Korea Development Institute reported at that Korea had to introduce a similar system.

3.2.2. Benchmarking Overseas Cases

In 2003, the Korean government benchmarked the top-down budgeting of Sweden and Norway, and also received advice from the World Bank.

3.2.3. Pilot Implementation

In 2003, the Ministry of Planning and Budget (MPB), the central budget office at the time, raised the need to introduce the top-down budgeting system in the ministry's annual policy report to the President. A trial-run was conducted in four organizations (National Tax Service, Korea Customs Service, Fair Trade Commission and Public Procurement Service) when formulating the budget for 2004.

Afterwards, in order to fully adopt the new system, its introduction was included in the Government Finance and Tax Reform Roadmap in July 2003 at the Presidential Committee on Government Innovation and Decentralization. In addition, the Planning Bureau for National Resource Allocation Improvement was established in the MPB in August 2003.

The results of pilot tests were very useful. Budget requests from the four agencies were all within expenditure ceilings, and it had positive effects in suppressing excessive requests for securing more budgets and in inducing the ministries' efforts for restructuring by allowing them to draw up their own budgets. Moreover, it was found that the binding force of the National Fiscal Management Plan should be strengthened for successful operation of the system through a report to the National Assembly for its approval. Also, the government needed to develop systematic measures to minimize adverse effects caused by introducing a top-down approach, such as in-depth review on resource allocation proposal and methods to derive consensus from line ministries.

3.2.4. Full-adoption of the Top-down Budgeting

After collecting diverse opinions from internal and external experts on the results of pilot tests from the four organizations and proposing the plan for the introduction of the top-down system, which was mainly prepared by the Planning Bureau for National Resource Allocation Improvement, the implementation plan was established by the Ministry of Planning and Budget (MPB). This plan was reported to the Cabinet council in March 2004, and it was decided to apply a new system from the budget formulation in 2005. Finally, the fiscal reform on budgeting system was carried out after a period of 50 years.

Since then, the MPB has promoted aggressive activities to encourage internal and external consensus on top-down budgeting. Meetings with relevant agencies, forums and workshops were held in parallel with training for budget staff, because the new system could only be successful if all people and organizations related to the budget such as line ministries, public institutions, interested parties, the National Assembly, media and civic groups understand and cooperate on the operation of the system.

3.3. Korea's Top-down Budgeting System

The procedure of execution of Korea's top-down budgeting is largely divided into three steps: setting expenditure ceilings by sector and by ministry based on the national policy priorities which are indicated in the National Fiscal Management Plan; formulating ministerial budgets by each ministry and submitting budget requests to the budget authority for inspection; and adjustment.

Looking at the budgeting process by stages in detail, sectoral ceilings of projects in the National Fiscal Management Plan (NFMP) are set through discussions by region and sector on the basis of macroeconomic outlooks and mid to long-term spending during January to April. Within the annual budget limits, strategic allocation is performed by national priorities and the investment plans of key projects, and allocated amounts are used as spending ceilings.

After finalizing the draft NFMP prepared by the then Ministry of Strategy and Budget (MPB), decisions on total expenditure ceiling, sectoral ceilings and ministerial ceilings were made at closed meeting for resource allocation by all Cabinet ministers.

Agreed expenditure ceilings were informed to each line ministry by the Minister of Strategy and Finance by late April, and line ministries formulated their own budgets within the ceilings, by reflecting policy priorities and opinions of the interested parties.

These self-formulated budget proposals are discussed and supplemented with the MPB during June to August, and the draft budget is submitted to the National Assembly in September after having discussions and adjustments on changes in circumstances and unresolved issues at Cabinet meetings.

3.4. Assessment of Korea's Top-down Budget Formulation

The most visible change in accordance with the introduction of the top-down approach was the significantly lowered growth rates of line ministries' budget requests. In the past, the average rate of increase in budget requests was 25~30%. However, after introducing the top-down budgeting, it drastically decreased to 6~9%.

However, what is more important is a quantitative improvement in the national budgeting system as follows.

3.4.1. The Role as a Facilitator for Comprehensive Fiscal Reforms

Korea's top-down budgeting has been a catalyst for innovating various relevant systems. To successfully introduce the top-down system, 1) the National Fiscal Management Plan was required to set reasonable ceilings, 2) the performance management system had to be established to ensure the accountability of line ministries for expanded autonomy, 3) the budget structure was modernized to the program-basis, and 4) the account settlement system introduced double-entry bookkeeping and accrual accounting, and ultimately triggered an overhaul of Korea's fiscal management.

3.4.2. Improvement of Resource Allocation Structure

In addition to increasing autonomy of each ministry, the primary purposes of the top-down budgeting system are; realizing macroscopic resource allocation and strengthening policy review functions. European countries such as Sweden aimed at promoting fiscal soundness by improving the expenditure structures, including welfare spending restraints. Although fiscal soundness was not an issue in Korea, developing methods to enhance the efficiency of the spending structure was nonetheless necessary.

Advanced countries introduced the top-down budgeting after welfare spending had become excessive. In Korea, the top-down system was adopted when spending on economic areas was high, while welfare spending was in a rather poor state. Indeed, since the Roh Administration (2003~2007) introduced the system, the macroscopic structure of government expenditures has noticeably improved, when compared to the past. Spending on economic and industry fields, which are considered desirable when managed by the market economy, is decreasing, and welfare and defense sectors as inherently governmental functions are on the rise.

3.4.3. Strengthened Linkage between Policy and Resource Allocation

Along with the effect of improving expenditure structure, the top-down system has the ability to strengthen a review of policies in the budgeting process, from the standpoint of the public. Under the traditional budgeting system, overly heated debate between fiscal authority and line ministries happened every year, and in the process, there was a risk that policy or analysis tasks would be placed on the back-burner. However, the top-down system relieved the competition for resources between sectors and ministries, by presenting the size of budget they would need to use through sectoral and ministerial ceilings.

Although fierce competition for priorities occurs within sectors and ministries anyway to a certain extent, the fiscal authority is able to adjust the competing priorities more freely. For priority review, analysis and discussion on the order of problem solving within ceilings by sector and ministry are required. Therefore, the foremost tasks are actively discussed between the fiscal authority and line ministries, and plans to enhance the efficiency of budget spending are also vigorously discussed. In other words, due to the top-down budgeting system, various analyses are conducted and the policy review function in budget formulation is strengthened.

3.4.4. Autonomy and Creativity in the Field

An essential element to the top-down system is the rational sharing of roles between the budget office and line ministries. To achieve the intended effects of the system, the fiscal authority has to grant each role to line ministries. Especially in the case of individual

projects, the authority for primary decision should be given to line ministries, considering the high possibility of distortion by direct involvement of the fiscal authority.

As the economic development of Korea was spearheaded by the fiscal authority, the budget office had a great deal of power and role in the budget process, and line ministries' discontent over the stance of budget office was increased with ongoing specialization and decentralization.

However, after introducing top-down budgeting, many changes occurred to the central budget offices' role over the spending ministries. Advanced countries defined this system by declaring "Each minister is his own finance minister" (OECD, 2001). By the top-down system, spending ministries have greater flexibility in their budget preparation within their ceilings, and the number of cases the Ministry of Strategy and Finance had to review significantly decreased compared to the past.

Although a lot of positive changes were achieved, the top-down system still has features that could be improved.

Although the top-down system itself is a method designed for budget formulation, its success or failure depends on how closely it is connected to other relevant systems. How it realistically reflects the national strategy to the mid-term fiscal plan, and as a result, how closely the mid-term fiscal plan is linked to annual budgeting are important criteria for judging the allocative efficiency of the top-down system. Under the top-down system, expenditure ceilings are set with reference to the National Fiscal Management. However, as the ceilings are not open to the public, assessing allocative efficiency is very difficult. In addition, the extent of reflecting performance results evaluated by various performance management systems in budgeting is still not enough.

In Korea, the draft budget formulated by the administration following a top-down approach should be deliberated upon by the National Assembly. However, the top-down deliberation system is not adopted by the National Assembly. In most advanced countries operating the top-down budgeting, the administration's purpose of the top-down system is also applied to the congress as they are based on the parliamentary government system. However, since Korea is under the presidential system, only the administration applies the top-down approach in its budget formulation, and thereby impairing the efficiency of strategic resource allocation.

3.5. Lessons Learnt from Korean Top-down Budgeting

Developing countries will be able to introduce the top-down budgeting system as part of government reform, but objections are inevitable, since it is a matter of changing a nation's budgeting system.

In Korea, due to special circumstances of the financial crisis at that time, consensus on the view that a new budget system is required could be created without difficulty. However, there was much controversy over the type of system to be introduced, and ways of introducing the system. Therefore, the Korean government benchmarked the world's best practices and had consultation with the World Bank and foreign budget experts. Then, to build a consensus from the parties concerned, discussions and workshops were held in the central budget office on several occasions, and it narrowed to differences between senior decision makers and working groups. After having the internal decision-making, the government implemented both public relations and training programs for budget officials in relevant ministries.

In addition, pilot tests on a few ministries before fully adopting the new system also contributed to the successful introduction of the top-down system. During the pilot tests, specific issues such as how to set expenditure ceilings and how to allocate budget resources by sector within the ceilings were raised, and in the course of solving these issues, the central budget office gained confidence in full-adoption.

Developing countries should introduce the top-down system in a manner appropriate for each country. However, they will be able to refer to the lessons of Korea that "the government should take resolute measures in introducing a new system on the basis of sympathy and understanding of as many people as possible", while not undermining the basic principle, "Make the best budgeting system," in the process of obtaining understanding of many relevant parties.

In developing countries, numerous projects continuing for many years have not been completed due to a lack of multi-year expenses. Therefore, when formulating the budget following the top-down approach, they need to place an emphasis on allocating resources, and setting spending ceilings, particularly for existing projects' completion rather than increasing new projects.

4. Performance Management System of Korea

4.1. Trends of Advanced Countries and Korea

4.1.1. Global Movement for Administrative Reform toward Performance

Entering the 1990s, there were massive movements for administrative reform in developing countries. Focusing on the ideology of New Public Management, "Provide more public services at less cost" was pursued as the basic idea. These movements aimed at

reducing waste factors in the public sector through thorough management of performance and active role of the government to stimulate the economy.

To respond to those needs, the Performance Agreement was introduced in New Zealand, and the UK established the Public Service Agreement system. In the US, the performance report system was introduced, based on the Government Performance and Results Act. The changes felt in these countries spread to OECD countries, to the point that there are few developed countries without performance management system in recent years.

Specific details of the performance management system vary from country to country, but there are three key points in common: 1) even government affairs are measured by objective values to a great extent; 2) performance of the government is evaluated based on the measured results; and 3) appropriate feedback is applied according to the evaluation results.

The performance management system of the US federal government consists of three parts as follows:

① Under the GPRA (Government Performance and Results Act), which was established during the Clinton administration, departments and agencies should submit their performance plans and reports, with extensive review by the US Congress.

② The PMA (Presidential Management Agency) introduced by President Bush assesses five aspects, including each organization's e-government level and fiscal management condition through the BSC (balanced scorecard).

③ The PART (Program Assessment Ratings Tool) is a method for evaluation and performance management, under the responsibility of the OMB (Office of Management and Budget).

4.1.2. Korea's Performance Management System for Fiscal Projects

There are three components to Korea's performance management system.

The first is the Performance Goal Management System, which is similar to the GPRA of the US. The administrative branch submits annual performance plans and reports to the National Assembly for congressional review.

The second is the Fiscal Program Assessment System, and it resembles the PART of the US system. Through this system, the performance of fiscal projects is evaluated, and projects with poor performance have their funding cut by more than 10 percent compared to the previous year. Furthermore, by identifying success factors and barriers by project, enhancement of project performance is promoted for the future.

The third is In-depth Analysis System, adequacy and efficiency of which 10 projects designated by the central budget office are evaluated with sophisticated analytical tools.

4.2. Performance Goal Management System (PGMS): Korean Performance Oriented Budget System

On the basis of the National Finance Act, the head of each central agency prepares the performance plan for achieving the agency's strategic objectives and goals for the year, and submit the performance report. The head of the central agency draws up the consolidated annual report on performance after gathering all performances on its revenues, expenditures and public funds, and the results are reported to the dBrain.

If the goals are met, the agency should provide a detailed description on what efforts were made to achieve the goals, as well as their ramifications are to the organization. In particular, presenting performance targets, a necessity for budget adjustments and future plans are required. On the contrary, if the goals are not achieved, reasons and causes should be explained in detail, along with the improvement plan, including future efforts to reach the goals. Performance targets and the necessity for budget adjustment should be presented as well.

4.3. Performance Plan and Performance Report

In January 1999 following the Asian financial crisis, the Korean government decided to introduce the performance-based budgeting system to improve the efficiency of its fiscal resources. For this, pilot projects were first conducted, and the new system was phased-in by stages, given Korea's inexperience in measuring the performance of the government sector and its utilization of fiscal management. After selecting 16 ministries and agencies, such as the Rural Development Office in the Ministry of Agriculture and Forestry, and the Policy Planning Office in the Office of Legislation, the government asked them to develop performance indicators.

These 16 ministries and agencies adopted the performance budget from the budgeting for year 2000. However, some performance targets were abstract and some indicators were not appropriate to be used as a standard to measure performance. Therefore, they were all revised through discussions between relevant organizations and the central budget office, the Ministry of Planning and Budget (MPB). In December 1999, the draft budget, based on the performance-oriented budget system, was finally approved by the National Assembly, for the first time in Korea.

The performance plans of 16 pilot projects were submitted to the National Assembly, and also opened to the public via the MPB website. In addition, opinions and reviews on the

performance plans were collected from experts. When formulating the budget for 2001, 12 ministries and agencies were added to the pilot project, and the number of test-run projects increased to 39, by bringing in 11 more ministries and agencies in 2002.

In 2003, the focus of operation of the performance-based budgeting system shifted to the ministry-level from office-level in ministries. Of the total 56 line ministries and agencies, 22 were selected as leading organizations, and performance goals and indicators of 30% of their fiscal projects were developed for preparation through performance plans.

The National Finance Act was legislated by the National Assembly in September 2006, and it required all fiscal projects in all line ministries to adopt the Performance Goal Management System. Therefore, every line ministry had to draw up performance plans and reports, and submit them to the National Assembly. In accordance to this act, '2007 Performance Report,' covering all projects in all line ministries was published in 2008, allowing government achievements and issues to be addressed and easily monitored.

In the fiscal operation conditions and performance report, settled accounts, performance by performance indicator and input costs are listed. Especially when reporting the performance by performance goal unit in Chapter 4, input costs by performance goal unit should be indicated. In 2008, direct costs were recorded as input costs due to the incomplete accrual accounting system. However, since accrual accounting came into force in 2009, not only direct costs, but also indirect costs such as personnel expenses and supporting expenses came to be included in the input costs. Therefore, performance report by performance goal unit should be presented in the following format.

Table 2-2 | Scheme of Performance Report by Strategic Goals

* Strategic Goal: _____
  Performance Goal: _____

1. Description: Detailed contents of performance goals, especially the logical relation to the strategic goals to which the performance goals belong

2. Input Costs

	2008	2009	2010	2011	2012
o Performance Goals					
- Projects					

3. Performance Indicators

	2008	2009	2010	2011	2012
o Performance Goal					
• Indicator A					
• Indicator B					
- Performance Evaluation					
• Indicator A					
• Indicator B					

4.4. Self Assessment of Fiscal Programs (SAFP)

4.4.1. Korean Program Assessment Tool

If the Performance Goal Management System monitors accomplishments toward the goal, the Fiscal Project Assessment System evaluates efficiency and adequacy of projects. In terms of efficiency, how many of the originally intended outcomes are achieved and measured? Adequacy of projects implies appropriateness of methods in operating projects and project-related inputs.

The Korean government legislated the Nation's Administration Assessment Act, and introduced the performance evaluation system for central administrative agencies. Evaluations are conducted on five categories: 1) major policies, 2) fiscal performance, 3) personnel management, 4) organization, and 5) informatization.

However, among these, fiscal performance is separately assessed on the basis of National Finance Act under the name of Fiscal Project Assessment System. Accordingly, the Fiscal Project Assessment System is managed by the Ministry of Strategy and Finance (MOSF), while other performance evaluations are supervised by the Office of Government Policy Coordination.

For the Fiscal Project Assessment System, one-third of fiscal projects administered by each line ministry are chosen every year in consultation with the MOSF. Then, to evaluate their performance, 11 common questions composed of three categories—four questions for planning stage, another four questions for management stage, and three questions for performance & feedback stage—are formulated. The questions are asked to line ministries, and there are 1~3 additional questions by project type. The line ministries themselves have to response with yes or no answers to these questions, and the MOSF is able to conduct the meta-evaluation, or in-depth evaluation, on the self-evaluated results by ministry.

SAFP assigns a project to one of five performance categories: excellent, good, average, poor, or extremely poor. In principle, funding for projects that received a rating of excellent or good will be increased, and those with poor or extremely poor performance will have budget cuts by more than 10 percent compared to the previous year.

4.4.2. Assessment Procedures

SAFP consists of two processes, line ministries' self-assessment on their projects, and the confirmation inspection of the Ministry of Strategy and Finance on the self-evaluated results.

a. Self-assessment Stage

Central administrative agencies implement the self-assessment by organizing the 'Self-assessment Committee'. For conducting the self-evaluation, one-third of the entire fiscal projects are selected every year under agreement with the Prime Minister's Office and Ministry of Strategy and Finance. The evaluation criterion covers all aspects of project planning to management and performance as shown in the table below.

Table 2-3 | Typical Questions used for SAFP

Stage	Category & scores	Evaluation indicators
Plan (30)	Planning	1-1. Is it clear for the purpose of this project?
		1-2. Isn't this project similar to other project or they are duplicated each other?
		1-3. Is the way of implementing this project efficient and appropriate?
	Plan for Performance	2-1. Are the performance indicators reflect the project goals meaningfully?
		2-2. Is the goal of performance challengeable?
Mgt (20)	Project Management	3-1. Is the execution of financial resources according to the plan?
		3-2. Does the monitoring system function to improve problems?
		3-3. Is the evaluation objective and comprehensive?
Feed-back (50)	Performance Achievement	4-1. Are the goals of indicators achieved as planned?
		4-2. Is this project evaluated as an effective one?
		4-3. Does the efficiency improved in the implementation of this project?
		4-4. Are the results of evaluation and consultation used for feedback?
Total Score		

Each central administrative agency self-checks semi-annual achievements in June each year, and examines annual performance (January 1st~December 31st) between January and February the following year.

A five-step evaluation: 1) planning stage (validity of project objectives and contents), 2) promoting stage (rationality of project development scheme), 3) implementing stage (adequacy of project management & implementation and performance management), 4) outcome stage (achieved performance), and 5) utilizing stage (utilization of evaluation results), is conducted by the evaluation committee members, and answers are restricted to yes and no only. The head of the committee draws up the final assessment comments after collecting evaluations on target projects by evaluation indicator.

Ratings based on the absolute criteria are assigned depending on the final scores, and projects with low performance will be at a disadvantage in budget formulations for the following year.

b. Higher Evaluation Stage

The Fiscal Project Evaluation Division in the Ministry of Strategy and Finance is responsible for the fiscal performance portion (general fiscal sector, informatization sector and R&D sector) of the spending ministries' self-assessment. Additionally, the division conducts Meta evaluation on the self-assessment results submitted by R&D ministries. There are five procedures in meta evaluation: 1) Organization of evaluation support group and Meta Evaluation Committee, 2) Execution of verification and inspection, 3) Receipt and handling of objections, 4) Finalize the results of verification and inspection, and 5) Remedial actions.

To ensure fairness and professionalism of the assessment, outside leading experts are selected as Meta Evaluation Committee members. Members of the committee inspect: 1) appropriateness of performance goals and indicators for self-assessment, 2) maintenance of objectivity and fairness in self-assessment process and methods, and 3) necessity to integrate or abolish similar and duplicate projects or improve project processes.

Before finalizing assessment results, the Meta Evaluation Committee sends draft results to line ministries and receive their objections. After reviewing the objections, assessment results are confirmed by May 29.

c. Utilization of SAFP Results

The results of fiscal project assessment are utilized in three ways.

First, the next year's budget is formulated based on the evaluation results. In principle, projects that received poor performance marks from the Meta evaluation are recommended for cuts in their budget by more than 10 percent. However, to avoid mechanical calculations, if linking the results to calculations is difficult when considering the cause of low performance, the projects will be excluded from budget cuts. Even projects with excellent ratings are susceptible to funding cuts if they are overlapping investments or need re-designing and reorganization.

Second, the results of Meta evaluation are used for project restructuring and enhancement. Projects recommended for performance reorganization of implementation systems, improvement of financing methods and integration or abolishment of similar and duplicate projects reflect those recommendations and enhance their performance. Improved parts of projects can be an important decision criterion in budget requests and discussions for the following year. Furthermore, if projects judged as having low performance are unit projects, although their total budgets may be slashed by the Ministry of Strategy and Finance, adjustments between detail projects or sub-detail projects within the projects are determined autonomously by line ministries.

Third, the results are taken as information supporting the project-related agencies' policy judgment. The meta evaluation results are informed to the relevant National Commissions, and reported to the Government Affairs Evaluation Committee, under the Prime Minister's office. In addition, by submitting the results to the concerned standing committees in the National Assembly, accountability of public administration is enhanced.

In 2006, the budgets for the projects evaluated as poor performance from the self-assessment of 2005 were reduced by 13.5%, compared with the previous year.

As this system has continued over the years, line ministries put more efforts into their performance, in order to avoid lower ratings. Consequently, the ratio of projects with poor and extremely poor performance decreased to 5.3% in 2007 from 15.7% in 2005, illustrating the effectiveness of the Fiscal Project Assessment System.

4.5. Lessons Learned from Korean Performance Management System

Korea has made great efforts to operate public finance more effectively, just like many other countries. Referring to best practices of developed countries, the government is advancing performance management system that is appropriate for Korea's specific situation. Accordingly, a preliminary feasibility study was introduced as a proactive performance management system, and the Fiscal Project Assessment System and performance plan & report system were adopted for post-evaluation of performance.

Currently, Korea's performance management system has been firmly established.. Primarily, the system increases the operative efficiency of public finance, yet strengthening the distributive efficiency and fiscal discipline are promoted as well.

However, there are difficult challenges in the public sector. Performance, payment and investment plans in the private sector are closely related to one another. Nevertheless, resources in the public sector are allocated in order of importance, rather than performance of budget commitments. Therefore, more resources are invested in failed policy areas in some cases. For example, a greater budget is allocated to a police station whose crime rate is high, but criminal arrest rate low.

In the public sector, the 'importance of project' is an essential decision point unlike the private sector, but measuring it by objective indicators is very difficult. In terms of the preliminary feasibility study, how to calculate benefits has always been a subject of debate, and organization of measurement indicators has become an important issue in the Fiscal Project Assessment System. Regarding the performance plan & report system, accurate measurement of project performance continues to be a challenge. The Korean government

has made continuous improvements in performance indicators and measurement for the past 10 years, but still needs more time and efforts for consensus on their validity and reliability.

Even if measurement of performance can be judged accurately, there still remains a problem, in that performance and budgeting are not well linked to each other. If a project receives poor or extremely poor performance from the Fiscal Project Assessment System, its budget for next year is automatically reduced by 10~15%. However, for excellent-rated projects, the government does not provide any incentives at all. Korea's performance evaluation system is, so to speak, a negative incentive system.

As with Korea and other countries, developing countries will attempt to increase the productivity of the public sector, and introduce the performance management system. They are able to adopt a system for performance management, but whether enhancement of operative and distributive efficiency will be truly achieved is in doubt.

For each country, it is appropriate to develop the performance management system tailored to its own circumstances. However, we recommend them to refer to Korea's preliminary feasibility study, and promote the performance management from resource allocation stage. In addition, easy access to performance information by project managers and budgeting staffs should be promoted and if possible, it is necessary to reflect such performance information in fiscal decisions. Developing the performance management system suitable to the situation of each country, an integrated fiscal information system like DBAS should be developed to facilitate the seamless use of performance information.

5. Introduction of the Program Budgeting System

5.1. Necessity to Introduce the Program Budgeting System

During the late 1990s and early 2000s, the Korean government introduced innovative fiscal systems. The National Fiscal Management Plan was adopted as Korea's medium-term fiscal plan, and the top-down budgeting system was also introduced, along with three performance management systems.

However, by introducing the new systems, conflicting issues between the traditional budget structure and the new systems began to surface. The traditional budget structure consisted of 20 sections, 66 sub-sections, 977 items, 2,337 detail sections and 7,918 sub-detail sections. However, as the National Fiscal Management Plan is composed of 14 areas and 56 sectors, there was a difference in the budget structure. Therefore, the government had to switch the National Fiscal Management Plan for five years to one-year budget and allocate the resources to 7,918 sub-detail sections.

Moreover, as the budgeting system in the past adopted bottom-up method, the basic units of budgeting were 7,918 detailed projects. However, after introducing the top-down budgeting system, it was impossible to set the spending ceilings to 7,918 detailed projects one by one. For setting national priorities, the government was in need of a budget structure with reasonably small numbers.

In addition, the expenditure items composed of 49 divisions and 102 sub-divisions constrained the autonomy of budget execution, due to overly segmented items. To operate public finance with a focus on performance, the autonomy of budget execution had to be expanded. Therefore, rather than requiring strict observation of the expenditure items, it was necessary to allow autonomous budget execution by line ministries within their ceilings.

Under the performance management system, spending ministries and agencies set performance goals and indicators. It is most desirable that the organization chart fits into the structure of the budget book. That is, it is most desirable for an organization to perform one or a small number of functions written in the budget book. Before the reform, however, the structure of organizations did not fit into the structure of budgetary functions. An agency often carried out many different functions, while several agencies performed one function again and again. There was a discord between budget structure and performance management structure. For that reason, anew budget system was needed to harmonize organizational units, budget structure and the performance management system.

As a solution to the above problems, a program budgeting system was suggested. The program budgeting system was already being used since the 1960s and 1970s in advanced countries such as the US and Canada, and the Philippines had also introduced the system, upon advice by the World Bank. Throughout the 1980s and 1990s, advanced countries began to formulate the budget through a top-down approach, on the basis of program budgeting structure.

The Korean government reformed its budget structure to a program-based one in 2005. In a way, the change of budget structure to program budgeting was performed after introducing the National Fiscal Management Plan, a top-down budgeting and performance management system, between 2003 and 2004. It seemed that the order of innovation is reversed. However, when consensus on the budget structure change was formed, it turned out to be the best timing for the reform to be implemented.

The most ideal budget structure is ① establishing the mid-term fiscal plan focusing on programs, ② setting expenditure ceilings based on the mid-term plan, ③ executing the budgets autonomously within programs, ④ estimating the cost by program, and ⑤ implementing a performance assessment. However, to reduce the confusion implementing the new system, the program budgeting was applied in phases during 2005~2007.

In 2005, the first year of introduction, all central government agencies reformed the budget structure to the program structure, and the National Fiscal Management Plan for 2005~2006 was drawn up on the basis of the program structure. In 2006, a trial run of the program budgeting system was conducted in budget formulation. However, budget items were adjusted in 2006, and the cost by program was estimated in 2007 when DBAS was completed.

5.2. Significance of the Program Budgeting System

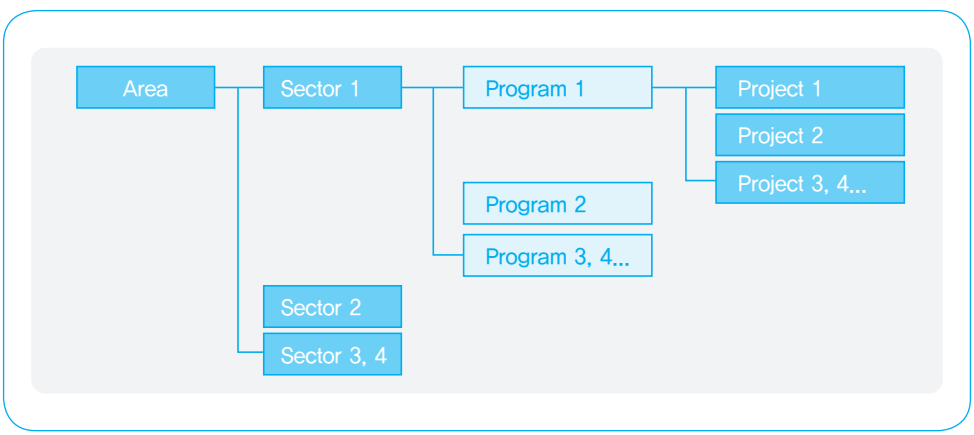
Program budgeting system is defined as a set of relevant and meaningful projects using the resources to pursue specific policy objectives under the control of a single manager (Diamond). However, managers in general organizations have a hierarchy. There are directors and team managers under heads and chiefs, and there are section chiefs and officers under them as well. Due to such organizational structures, the program budgeting system is structured in a cascading way.

In other words, a set of projects controlled by heads or chiefs is one program. Projects coordinated by directors or team managers are unit programs within the program, and those managed by section chiefs and officers are called program activities.

5.2.1. Reorganization of Functional Classification

Overall, functions of the state are divided into large, medium and small functions. Areas are included in the large function, and sectors and programs are corresponding to the medium and small function, respectively.

Figure 2-1 | Cascading Structure of Programs



Source: Ministry of Finance and Strategy

This hierarchical structure is well-suited to the newly introduced top-down budgeting system. After allocating the national resources to each area first, spending ceilings by sector are set within the areas, and then budgets by program are allotted within the ceilings.

Currently, there are 16 areas and 66 sectors in the Korean government. Before adopting the program budgeting structure, the National Fiscal Management Plan consisted of 14 areas and 56 sectors, while budget expenditures were composed of 20 sections and 66 subsections. Therefore, setting the ceilings for budget expenditures based on the National Fiscal Management Plan was a very complex process. However, after reorganization, as the National Fiscal Management Plan and budget structure both follow 16 areas and 66 sectors, the allocation of resources has been simplified. To perform 66 areas as a medium function, about 771 programs are being operated. These programs are divided into 3,431 projects and there are 8,831 detailed projects.

5.2.2. Program Structuring

Any changes to the budget structure should be executed under close consultation between the central budget office in charge of budget formulation and line ministries responsible for project implementation. Accordingly, budget structure reforms were carried out by taking the following steps:

① The budget authority established the main principles in program settings and conveyed them to line ministries.

② Each line ministry set up its program structure autonomously, and special circumstances deviated from the main principles were discussed with the budget authority.

③ The budget authority finalized the budget structures in desirable directions in consultation with line ministries.

④ Briefings on the new system were held for budget officials and project managers.

5.2.3. Program Budgeting System and Expansion of Budget Execution Autonomy

The main reason for introducing the program budgeting system is to improve the efficiency of fiscal operation. In the past, although achieving the project performance was important, adhering to the budget for projects broken down by item was a more essential subject. Therefore, once the budget was formulated by item, very limited autonomy in executing the budget was allowed.

However, program budgeting is a system that minimizes input control and maximizes output orientation. Therefore, diversion between expenditure items within budget should

be allowed to the greatest extent, or the need for diversion itself should be fundamentally eliminated. Therefore, the government needed significant reduction of the budget items.

As there were 49 divisions and 102 sub-divisions in the past, the autonomy of budget execution was greatly constrained. However, after introducing the program budgeting system, the government planned to reduce the number of items for budgeting to around 10. Although eventually 47 divisions decreased to 23 divisions by reflecting the opinions of budget officials, project managers now enjoy much more flexibility in their budget execution than in the past, and they should take more efforts to improve project performance. By introducing the program budgeting system, Korea's budget system has moved a step closer to performance-oriented development.

5.2.4. Cost Calculation by Program

Before introducing the program budgeting system, only direct project expenditures were recognized as the project cost. However, as indirect expenditures such as personnel expenses for government officials and building maintenance expenses were not included as direct project expenditures, it could not be the true cost of the project. Therefore, the Korean government decided to calculate the program cost by allocating indirect expenditures by program, since the program budgeting system was introduced simultaneously with the double-entry bookkeeping and accrual accounting system. Consequently, major indirect expenditures, such as personnel expenses and basic operating expenses for project of each office and bureau in line ministries, have been reflected in the project cost since 2007. In addition, since 2008, expenses of staff departments including planning & management office and general affairs department are included in cost estimations by program.

5.3. Benefits of the Program Budgeting System

As the government adopted the program budget structure, there have been various advantages as follows.

Firstly, by reconciling project contents (project plan) with the budget, 1) the possibility of understanding the projects by a 3rd party (transparency) has increased, 2) basic information for effective resource allocation is well provided, and 3) it serves as the basis for the mid-term fiscal plan establishment.

Secondly, based on facilitated estimation of total costs by program, calculating and providing management accounting information is available, and has enhanced the efficiency of projects and public finance.

Thirdly, as productivity by program is measurable, the evaluation of the results has become easier.

6. Assessment on Korea's Budget Reform and Recommendations for Developing Countries

6.1. A "Big Bang Approach" to Budget Reform

The Asian Financial Crisis of 1998 provided the Korean government with the opportunity to make radical changes to various fiscal systems that had been used for the past 50 years. For 10 years since then, the government has achieved fiscal reforms appropriate for the situation in Korea, including introduction of a top-down budgeting system, medium-term fiscal plan, performance based budgeting and a program budgeting system, by referring to the best practices of advanced countries, and has been concentrating its efforts to fully implementing the system. As many innovations have been simultaneously implemented for about 10 years, it may well be called the big bang approach.

Table 2-4 | Introduction of Major Reform Measures

Year	Introduction of New System	Remark
1999	Performance-oriented Budgeting System	Pilot test with 16 agencies
2003	Top-down Budgeting	
2005	National Finance Management Plan	
	Performance Management System	Submission of Performance Plan, all ministries
	Self Assessment of Fiscal Projects	
2006	Program Budgeting	
2008	Operation of KFMIS(DBAS)	Developed since 2004
2009	Accrual Accounting	Developed since 1999
	Submission of Performance Report	All ministries

Source: Ministry of Finance and Strategy

There are several factors as to why the Korean government used the big bang approach in its budget system reforms.

First, the people's demands for fiscal reform were high. Seeing the new public management movements that took place mainly in developed countries since 1990s, the people and political parties called strongly for budget system reform.

Second, the introduction of the top-down system required two basic reforms for its successful operation. One was a reasonable setting of expenditure ceilings for top-down

budgeting; accordingly, establishing amid-term fiscal plan was essential and necessary. The other reform was adding responsibilities to line ministries on their extended autonomy, by the introduction of the top-down budgeting system. Therefore, the government adopted the performance management system, and has been evaluating the project performance across all line ministries. As explained, the mid-term fiscal plan, top-down budgeting and performance management system are one set of reforms, so the big bang approach was adopted for their simultaneous implementation.

Third, since budget system reforms could not be solely handled by the central budget office, they were implemented in cooperation with all line ministries. In Korea, the government established the Presidential Committee on Government Innovation and Decentralization as an advisory body to the President. The role of this committee was to set up a road map for innovation, and on which line ministries could base their reforms. It could be understood in the context of the UK in 1980s, when it promoted the fiscal reform after its financial crisis by establishing an across-the-ministerial committee. As they were the control tower for innovation and assistance of all line ministries, the UK was able to achieve reform following the big bang approach.

Fourth, the advanced infrastructure in Korea supported the government's big bang-type fiscal reform. As the world's 12th largest economy, Korea has a developed and advanced private sector. Introduction of the accrual accounting and establishment of the integrated fiscal information systems, such as program budgeting system and DBAS, were partially influenced by the private sector. As the private sector has been accustomed to the accrual accounting system, operated the budget focusing on programs and generally used the ERP (Enterprise Resource Planning) system, government's fiscal reform was supported by the private sector.

The big bang approach has the advantages of minimizing resistance to reform and achieving budget system innovation in the short term. However, there are concerns over discordance among fiscal systems. In other words, if the purpose of system introduction intended by the leading organization is not well delivered and understood by other following organizations, it is difficult to achieve a successful reform. Therefore, when introducing new systems, the Korean government provided various symposiums, seminars and education training, as well as operating call centers and cyber assistance services.

Some discordance was the result of the newly-adopted systems. Although the cost of project could be calculated with the introduction of an accrual accounting system, a system offering comprehensive information on the cost of project and results of performance assessment had not been developed to that point. Therefore, the calculation of costs and performance assessment was operated separately. In terms of the top-down budgeting system, line ministries still consider that their autonomy has not been not greatly improved, due to a number of remaining restrictions.

Discrepancy was also caused between the administration and the legislature. The administration establishes the National Fiscal Management Plan (NFMP), and submits the draft budget to the National Assembly after formulating in a top-down manner, based on the NFMP. However, the National Assembly is still deliberating the budget, following the bottom-up approach. The next 10 years will be a time for minimizing the side effects caused by the big bang approach, and improving the systems that have been introduced in the last 10 years.

6.2. Recommendations for Developing Countries

Developing countries should find the most appropriate way of reform, given the circumstances of each country. However, when considering the experience of Korea, the big bang approach can be recommended for budget system reform.

Reforming the budget system is an important institutional innovation, enough to change the future of the country. As introducing the foreign system without adequate preparation will result in failure, it is necessary to make a carefully-deliberated decision.

However, simply investing a long time does not imply making a deliberate decision. As can be seen from Korea's experience, reforming the budgeting system requires more than a change to one system. Rather than being independent of each other, the 'mid-term fiscal plan, top-down budgeting system and performance management system' are a set of interrelated systems. Therefore, introducing top-down budgeting without a medium-term fiscal plan does not improve the efficiency of fiscal operations. In addition, if top-down budgeting is adopted without a performance management system, fiscal accountability may be weakened. Establishing the mid-term fiscal plan without the support of the performance assessment system is same as setting an idle plan.

In reforming public finance, building fiscal infrastructure is also important. When backed by fiscal infrastructure such as program budgeting structure, accrual accounting and integrated fiscal information system, there is a high possibility of achieving success. In Korea, fiscal infrastructure was established simultaneously with the fiscal system reform, and some were built thereafter.

Most developing countries are thought to have insufficient infrastructure. However, the strategy of reforming fiscal systems after completing the fiscal infrastructure first will take very long time. Gradual reform itself is not wrong, but it should consider the opportunity cost of time. There is also an appropriate time to reform. When it does come, the big bang approach maybe a good choice.

2012 Modularization of Korea's Development Experience
Korean Experience of Financial Management Information System: Construction, Operation, and Results

Chapter 3

Institutional Change (2): Government Cash Management Reform

Institutional Change (2): Government Cash Management Reform

1. Introduction

1.1. Objectives of Treasury Management

The objective of government cash management is to ensure that adequate cash is available to pay for expenditures when they are due. Like households and firms, government expenditures are under a cash constraint. Government cash refers to notes, coins, and deposits held on demand by government institutional units with a bank or another financial institution. In addition, cash equivalents are defined to be highly liquid investments that are readily convertible to cash on hand.

Management of government cash is necessary because there are mismatches between the timing of payments and the availability of cash. A primary objective of government cash management is to ensure that adequate cash is available when expenditures are due. At the same time, governments should also minimize idle cash, and thus government borrowing costs, managing various risks related with financial markets at the same time.

Government cash management includes the following steps: (1) management of the flow of receipts (fiscal revenues, debt issuance proceeds, and the like) and payments (such as fiscal expenditures and debt service expenses); (2) management of those balances that are held by government bodies, including investments outside of government; (3) proactive policies to manage short-term borrowing and lending outside government to offset volatility in government cash flows, thereby maintaining a low target balance at the central bank; (4) investment in the associated systems.

First of all, management of government cash receipts requires tremendous man-power and incurs costs since there are so multiple kinds of government revenue: various taxes,

fines, and debt issuance proceeds. Fraud and theft related with government revenue collection are also major concerns. Best-practice management of receipts should minimize these problems and secure government cash inflows. In Korea, electronic automation reduces these problems and makes the process more transparent.

Similarly, computerization of government payments makes the process more convenient and transparent. Until 2003 when the Korean government replaced the old payment method of treasury checks with electronic payment methods, several agencies were responsible for the business of government payments. Computerization of payments decreased costs with these agencies and shortened the time interval between the government's payment decision and the arrival of cash. Furthermore, computerization of government payments enhances the government's ability to forecast future cash flows by collecting more accurate information on a large scale.

Management of cash inside the government is also important and there are two models available: simple and active cash balance management models. Under the simple model, the cash manager does not actively invest the cash balance in the financial market. Rather, the cash manager will generally deposit the balance at the central bank or at commercial banks when there is a surplus, and fund a cash shortage by short-term borrowing programs such as the T-bill program or a line of credit with banks.

In contrast, active cash balance management aims to smooth out the ministry of finance's balance at the central bank and is much more challenging. In many euro countries, the government sets an end-of-day balance target for its treasury single accounts. Cash managers in these countries usually actively invest the excess balance or borrow in the financial markets to reach the balance target. Advanced countries use various fine-tuning models to maintain a stable balance.

The Korean government adopted several major reforms in its cash management system, moving toward the active cash management system used in advanced countries. In the early 2000s, the Korean government reformed its government cash receipts and payments systems. In addition, it introduced the TSA in 2005. More than the simple integration of the accounts of governmental entities, successful implementation of the TSA requires, as preconditions, enhanced ability to forecast the inflows and outflows of government cash, coordination between various governmental entities, and consideration of the impacts on monetary policy and financial markets. In 2010, the Korean government announced its transition into a full-fledged active cash management system. Efficient government budget and accounting systems are necessary for the transition, since active cash management requires a vast amount of information about government expenditures and planned spending. In addition, forecasting cash inflows is critical.

This chapter draws upon the Korean experience of cash management reform and makes suggestions to developing countries. The following subsection explains the best practices in government cash management. Section 2 introduces the Korean experiences of reforming the systems of government cash receipts and payments. Section 3 explains the introduction of its treasury single account (TSA) and Section 4 presents its recent transition to a full-fledged active government cash management system. Section 5 assesses the Korean experiences and the current state of its government cash management system, and suggests policy recommendations to developing countries.

1.2. Best Practices in Government Cash Management

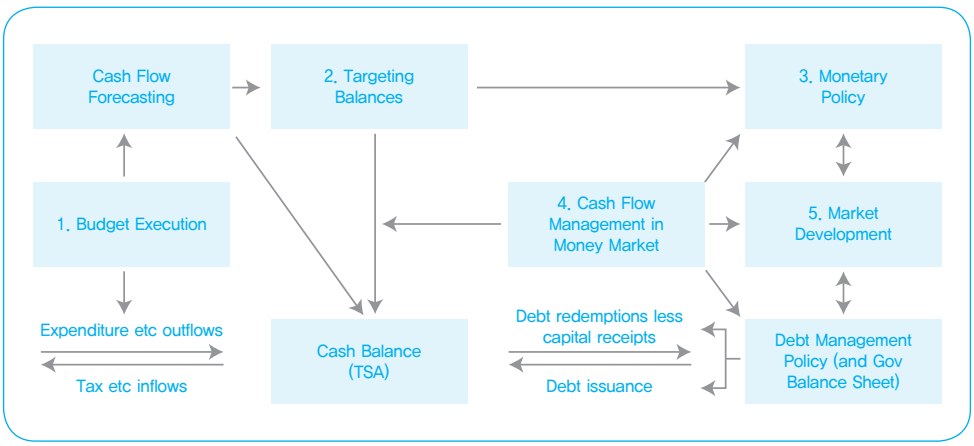
There are several common features in the active government cash management of most advanced countries. The starting point for active management is effective management of government cash receipts and payments. Receipts and payments within the government and between the government and non-government sectors, as well as the associated account structure and processes to ensure timely processing and a reduction of unnecessary idle balances, should be included. Two approaches are usually adopted to strengthen the management of government cash flows: a correct incentive structure and a preauthorization system.

Second, governments in advanced countries adopt a TSA arrangement, which is the centerpiece of the infrastructure needed for effective government cash management. A consolidated treasury account structure allows for the netting and aggregation of balances and the preparation of consolidated cash flow forecasting. The highest account in this pyramid is the ministry of finance's account at the central bank. This practice is usually referred to as the TSA structure, which appears to be fundamental for effective government cash management. Obvious advantages of the TSA arrangement include reducing idle cash and alleviating excessive borrowing. The TSA also has benefits that go beyond the requirements for effective management of cash balances, in that it can reduce credit risk (the government's exposure to the failure of individual banks to honor their obligations).

Third, efficient cash management requires the ability to forecast daily cash flows across the TSA. This must be coupled with an ability to monitor actual changes at a rate close to real time. Such forecasting and monitoring is important to facilitate the achievement of budget policy targets in an orderly way, and to ensure that budgeted expenditure is smoothly financed, avoiding disruptive payment delays. It is also helpful to devise strategies for a smooth cash flow profile, minimizing idle cash balances and reducing borrowing costs, as well as establishing a seamless implementation of monetary policy. Forecasting systems use a variety of techniques, tending to draw on both bottom-up information – the detailed information available to line ministries and tax departments – and top-down analysis – the

center's experience of how total spending and revenue varies over time. It is important to emphasize the use made of relevant spending or revenue departments' own knowledge; they are closer to the transactions than the Treasury, and they monitor actual cash flows. This requires good information networks, both personal and systems-based. Where relevant, this can be backed-up by information from local branches of the Treasury or central bank.

Figure 3-1 | Links of Cash Management with Various Policy Issues



Source: Williams (2009)

Fourth, best practice includes effective coordination between monetary and cash management policy. Active cash balance management implies that excess cash positions will be invested in domestic assets, which has the effect of injecting liquidity into the system that the central bank in turn has to organize. If the government cannot forecast cash inflows and outflows accurately, there would be large volatility in the government cash balance, which often thwarts the central bank's monetary policy. Payments that the government makes and receives from nongovernment sectors are made through accounts at the central bank. Thus, an increase in the government cash balance means the absorption of liquidity from the banking system, while a decrease in the government cash balance means an injection of liquidity into the banking system. Therefore, volatility of the government cash balance directly contributes to volatility in the reserve balance of the banking system.

Last, government cash management has various implications for the development of financial markets, especially money markets. Active cash management is linked to the development of domestic financial markets. The use of repo or similar secured market instruments by government cash managers or by the central bank contributes to activity in the money market and stimulates the government bond market, since domestic government

bonds are normally preferred collateral. This in turn makes treasury securities more attractive to banks as a liquidity management instrument, and spurs the development of the market infrastructure required for an interbank repo market, since it greatly reduces the risk to any bank when lending to another bank.

Lienert (2009) summarizes the key elements of best practices into the following nine features of modern cash management. These can be used in evaluating government cash management systems of developing countries.

Table 3-1 | Nine Features of Modern Cash Management

Fundamental features
a. Centralization of government cash balances and establishment of a TSA structure
b. Clear understandings on the coverage of the cash planning framework
c. Ability of making accurate projections of short-term cash flows
d. Adequate transaction processing and accounting framework
e. Timely information sharing between relevant institutions
f. Appropriate institutional arrangements and responsibilities
Desirable features
a. Utilization of modern banking, payment, and settlement systems
b. Use of short-term financial market instruments for cash management
c. Integration of debt and cash management

2. Reform of the Systems of Government Cash Receipts and Payments

2.1. Problems in Korea's Past Receipts and Payments Systems

Like many developing countries, Korea had semi-automated systems of government cash receipts and payments. Although the banking system in Korea had a nationwide network of branches with ample coverage and an adequate communication infrastructure, treasury revenue collection was composed of complicated procedures including paper notices, cash receipts by commercial banks, and a manual process of accounting and reporting.

There are various sources of government revenues: taxes, fines, debt issuance proceeds and so on. In Korea, most of these revenues were collected by using the government's own system and regional offices. Fines and some other revenues were collected by another system and a few government funds collected their revenues with manual systems.

Time delays of one or two months and heavy costs were inevitable in this slow and semi-automated system. In particular, revenues collected by some government special accounts were reported one or two months later. Bills and forms of receipt were different by revenue sources and thus by systems. For example, tariff revenues were processed through a receipts system called KT-Net, while harbor facility fees were collected using a different system called KL-Net.

There were also concerns of fraud and theft related with government revenue collection. In 1994, the Board of Audit and Inspection of Korea discovered that tax revenues of several local governments had been stolen by some of the staff at local tax collection offices. Collection of local government taxes had not been computerized to the same extent as national taxes. The gap in the tax collection process had been exploited by some local office staff to steal tax revenues for several years. The resulting scandal accelerated the computerization of tax collection processes across the country, as well as the introduction of audit and inspection systems in local tax collection offices.

The payment system was also semi-automated and not integrated with other government financial management systems. Payment requests went through regional or local treasury offices and were submitted for payment and settlement against the government account in the central bank. In addition, payment by treasury checks had important drawbacks. Checks slowed the speed of disbursements by payers due to time delays between the issuance, encashment and clearing of a check, which also gave rise to significant check floats. Writing and delivering checks is expensive and can introduce errors, reducing the effectiveness of the cash management system. These transactions were also exposed to the possibility of fraud.

Finally, there was also waste within the government. In the case of expenditures for everyday necessities and other payments whose total amount should be roughly estimated, treasury checks were not used and cash was allotted in advance. In this situation, the payment process was not transparent.

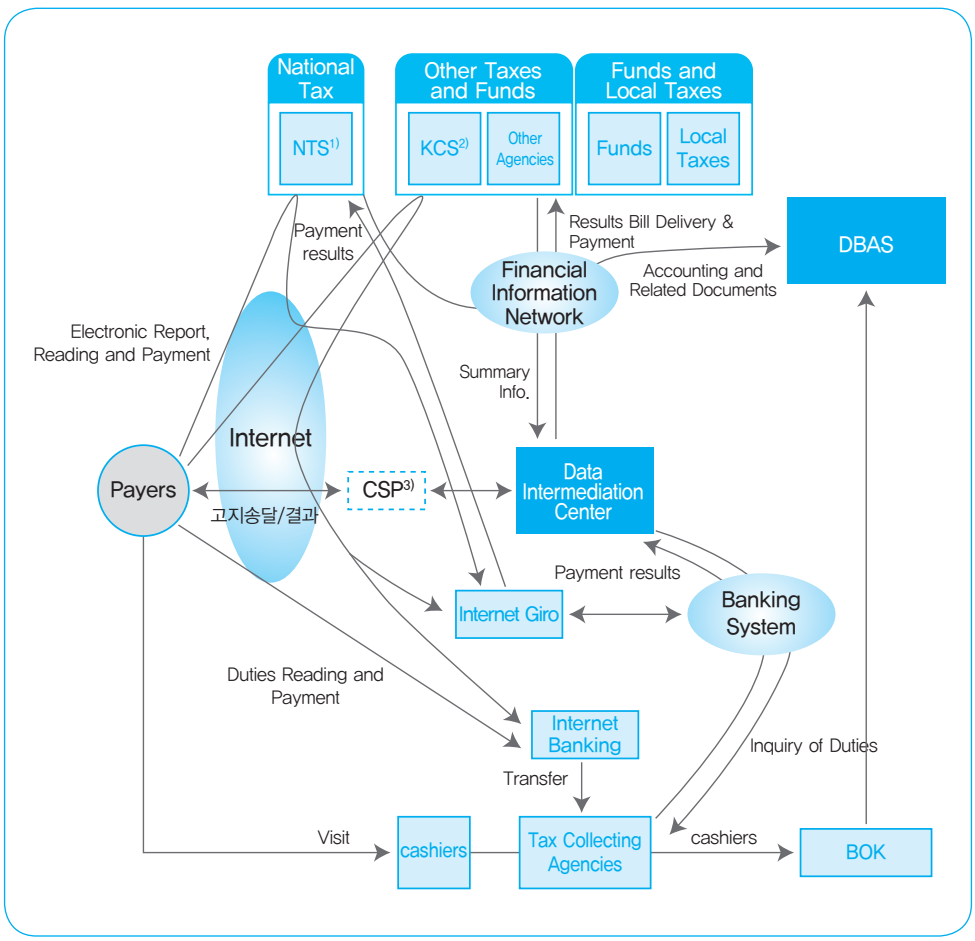
2.2. Reform of the Government Cash Receipts and Payments Systems

In the early 2000s, the Korean government undertook a series of major reforms of its cash receipts and payments systems. Revenue collection systems were consolidated, and related procedures were standardized. Electronic revenue collection was also expanded, and fully automated. The Electronic Bill Presentation and Payment (EBPP) System played an important role in the reform of the government cash receipts system.

An EBPP system processes electronically all the steps from bill presentation to the final payment, and thus many offices and institutions are now connected to the system. The

government issues and presents its bills through collecting agencies. The government sends its decision information about the bill to a data intermediation center. The center processes the information and presents the bill information to the collecting agencies. Payers can pay the bill with commercial banks, both on and off line. The funds paid by the payers are transferred to the TSA in the Bank of Korea (BOK), the central bank of Korea. BOK reports the payment to the government through the DBAS. The following figure depicts the government revenue receipt system in Korea and the flow of funds.

Figure 3-2 | EBPP System for the Government Revenue Collection



Notes: 1) National Tax Service
2) Korea Customs Service
3) Consumer Service Provider

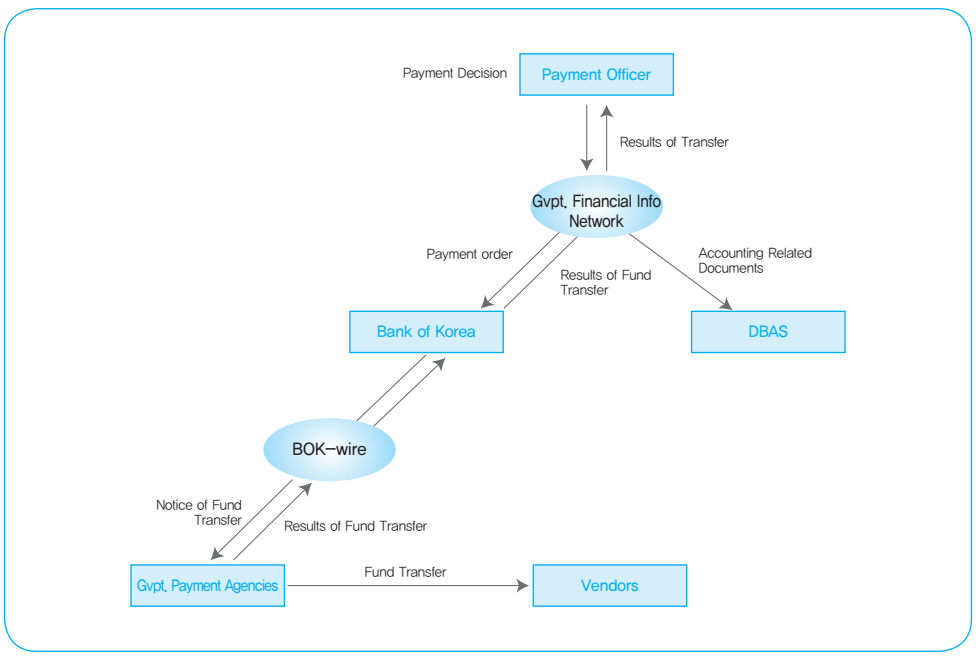
Source: Ministry of Finance and Strategy

With regard to the payments system, the Korean government abolished the use of treasury checks. Instead, it introduced an electronic payment system that allows automatic fund transfers from the government account to the recipient's account, eliminating payment delays and idle balances, thus reducing operational risks. One of the objectives of the treasury should be to eliminate or shorten any delay in payments. A good international practice has been to automate the payment processes by adopting an electronic payment system, with direct payments to the bank account of the beneficiary.

In this new payment system, the spending units submit payment requests (payment orders) to the treasury, which checks them against authorized limits and processes them for payment from the TSA through one of the interbank payment systems. The funds are then deposited in the recipient's account in a commercial bank.

These kinds of reforms required an efficient information infrastructure. In Korea, the National Financial Management System (NAFIS) played this role. NAFIS is the first comprehensive financial management system in Korea that is linked with all government entities and agencies. NAFIS digitizes and automates all financial transactions, and enhances the analysis and forecasting of financial conditions. Until the DBAS went into full operation in 2007, NAFIS was used by all 52 central government ministries and agencies in Korea.

Figure 3-3 | Korean Government EFT System



Source: Ministry of Finance and Strategy

Among these interconnected systems are the Accounting Inspection System of the Board of Audit and Inspection, the Budget Allocation and Management System of the Board of Planning and Budget, the Tax Information System of the National Tax Service, the Tariff EDI system of the National Tariff Administration, the Fine Management System of the National Police, National e-Procurement System of the Procurement Administration, the defense budget system of the Ministry of Defense, the Local Tax Management System of the Kyungki Provincial Government, the National Finance Management System of the Korea National Bank, the Electronic Certificate System of National Computerization Agency, and more. The implementation of NAFIS enhanced the efficiency and transparency of public financial management in the Korean government. However, it did not put into practice double-entry and accrual accounting, included as a feature in the DBAS.

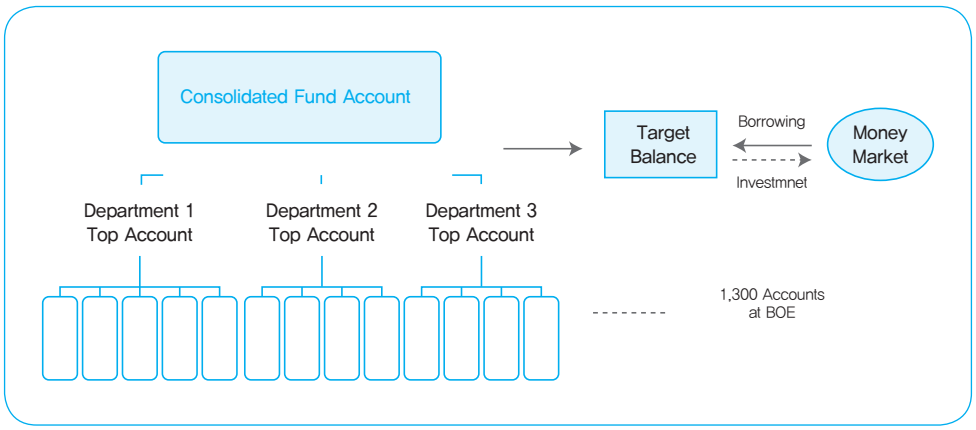
Since the information in NAFIS is very important and usually confidential, the problem of security accompanied the introduction of NAFIS. A computerized system, especially one based on the Internet, opens up the risk of access by non-authorized third persons. To ensure perfect security, the Korean government implemented physical disconnection of servers in some offices, installed security software, and implemented telecommunications security policies.

3. Introduction of the TSA in Korea

3.1. TSAs in Advanced Countries

Governments in advanced countries have adopted the TSA as a central feature of cash management. A TSA is a bank account or a set of linked accounts, through which the government transacts all its receipts and payments. This unified structure of government bank accounts gives a consolidated view of government cash resources. A TSA involves the consolidation of all government cash balances into a single account, usually and preferably at the central bank. This consolidation allows the ministry of finance to minimize the volume of idle balances in the banking system, with consequent cost savings. Cost savings derived from the interest saved from using cash surpluses in one area of government activity to cover cash shortages in another. If cash is not consolidated, the extra cash requirement has to be financed by borrowing.

Figure 3-4 | The UK TSA System



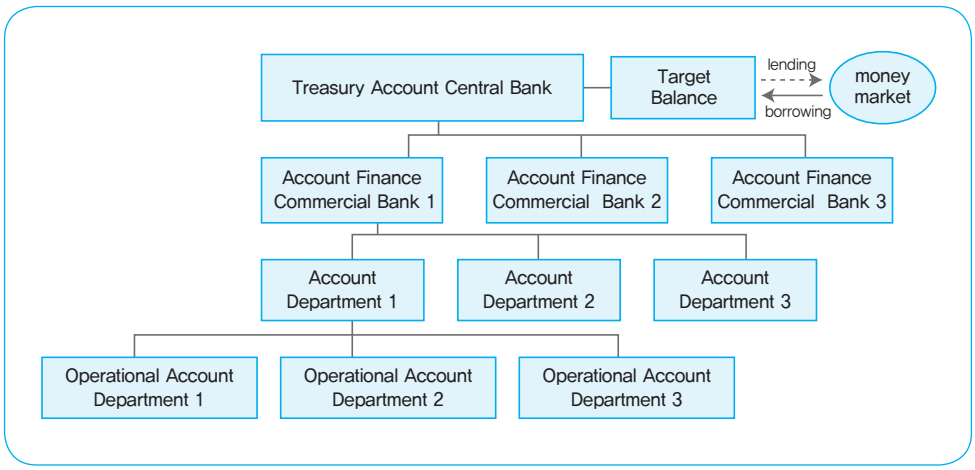
Source: Ministry of Finance and Strategy

In the UK, all central government cash balances are aggregated into a TSA maintained at the central bank. There are no extra-budgetary funds that are outside the system. Local authorities and state-owned enterprises are outside the central system, and hold their cash balances in the commercial banking system. The Debt Management Account (DMA), which is managed by the U.K. Debt Management Office (DMO), is used to balance any daily surplus or deficit in the government funds. As can be seen in the preceding figure, the consolidated fund account is at the top of the pyramid. Underneath are many department accounts and subaccounts. DMO keeps the balances of all accounts (except the consolidated fund account) at zero.

By borrowing and lending in the market, the DMO needs only a small balance at the Bank of England to cope with changes late in the day. In practice, the DMO operates by targeting an end-of-day balance at the Bank of England of just £125 million in 2007, which is 6.7% of the daily expenditures of the UK government, and 0.3% of the total assets of the DMO. The DMO employs various cash management operation tools, including a regular T-bill program, an ad hoc T-bill program, and weekly or daily RP arrangements.

Like the U.K., the Netherlands also has a pyramid of government accounts. However, subaccounts of the Netherlands government are held at commercial banks. DSTA (Dutch State Treasury Agency) concentrates the cash flow at the TSA in the central bank, De Nederlandsche Bank (DNB), and keeps the balances of the sub accounts at zero.

Figure 3-5 | The Netherlands TSA System



Source: Ministry of Finance and Strategy

The Netherlands have agreed to keep their balances in the range of €0 to €50 million, in practice targeting the middle of that range, and the Netherlands recently announced a target of €25 million. Liquidity effects are therefore negligible. The Netherlands government employs various cash management operation tools of RP, short-term deposit at commercial banks, and Treasury exchange agreements.

France also has a well-developed TSA at its central bank, Banque de France. The TSA includes the balances of local authorities, municipalities, and quasi-governmental bodies, as well as the central government revenue and spending departments (including overseas authorities). Cash and debt management is the responsibility of Agence France Trésor (AFT), which is an agency of the French Treasury, which in turn is part of the Ministry of Economy, Finance and Industry. AFT actively manages the TSA, and has developed a cash flow forecasting capability accordingly. It invests (and if necessary, borrows) surplus funds in the money markets, with a view to maintain a low and stable end of day balance in the TSA, and ensuring the best return on the investment of surplus cash. AFT operates a centralized payment system. The spending agencies make expenditure commitments and forward payment requests to one of nearly 4,500 regional treasuries. Payments are made from the regional sub-accounts of the TSA. Closing balances in the sub-accounts are swept into the TSA in real time. The French government does not use accounts with commercial banks.

Unlike European countries, the U.S. Treasury deposits collected revenue at the collecting agency's financial institutions, with a view to stabilize funding liquidity in the market. This

is called the Treasury Tax and Loan program (TT&L), and the financial institutions are called note option depositories. The US Treasury receives interest from these deposits and has the right to request the funds to be sent to the government account at the New York Federal Reserve Bank. The US Treasury does not have an explicit target for its balances, but normally keeps $ 5 to $ 7 billion.

3.2. Introduction of the TSA in Korea

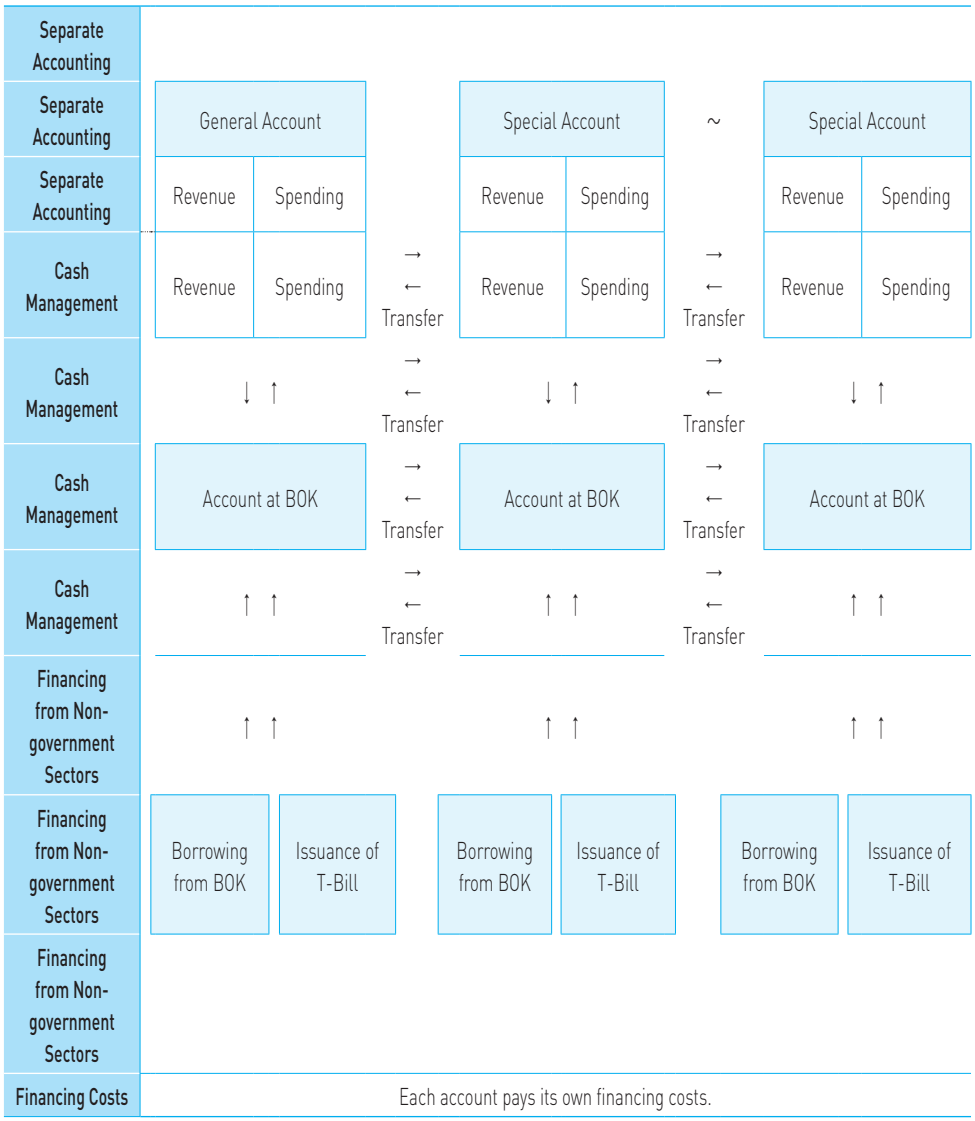
In 2005, the Korean government introduced the TSA system as the first major step toward active cash management. From the perspective of the Korean government, the most important disadvantage of the previous system using multiple government accounts was that it limited the ability of the treasury authority to centralize all cash and allocate efficiently. The general account and various special accounts had their own sources of revenue, which were not easily transferable to each other in response to changing circumstances. In addition, various accounts were intricately interrelated through a complicated flow of grants and loans, resulting in idle cash and higher costs.

This problem was particularly severe for a few years after 2003, when Korea experienced a so-called "Credit Card Crisis," and the subsequent economic downturn. The Korean government responded to the downturn with an early budget execution in order to boost the economy. The inefficient cash management system with multiple accounts, however, increased the government debt and the financing costs tremendously. The government debt was 13.5 trillion in 2003, 21.6 trillion in 2004, and 28.0 trillion in 2005; the financing costs were 51.5 billion, 128.3 billion, and 243.1 billion, respectively. This rapid increase in the debt and financing costs precipitated the reform of the government cash management system in Korea.

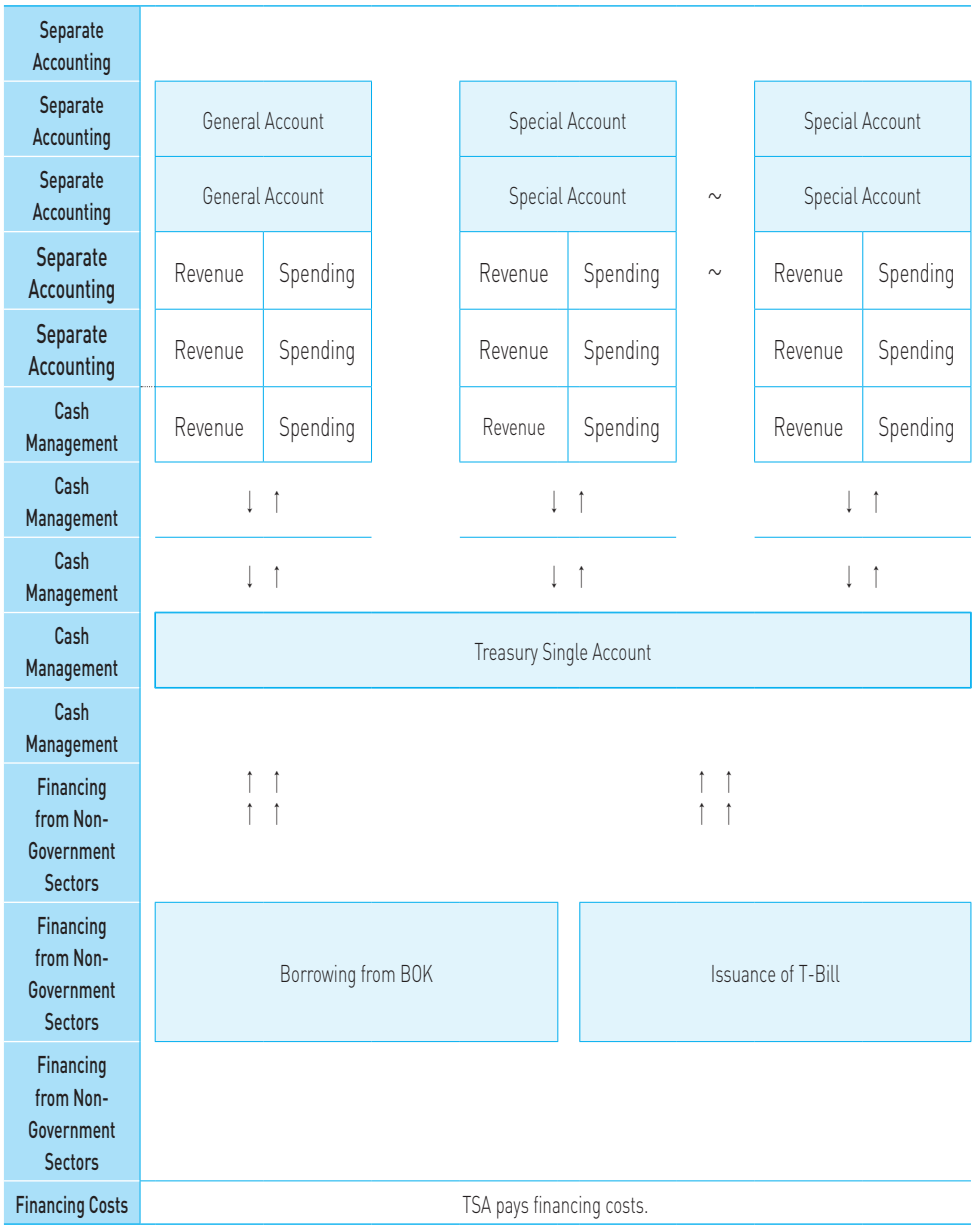
While lowering debt and financing costs was a key driver for the introduction of the TSA, they were not the only reasons, as the TSA has many other benefits. Firstly, it lowers liquidity reserve needs and reduces bank fees and transaction costs. It also allows complete and timely information on government cash resources and improves operational control during budget execution. In addition, it facilitates regular monitoring of government cash balances and improves the quality of fiscal data, enabling higher quality cash flow analysis and forecasts.

Table 3-2 | Introduction of the TSA in Korea

• Before TSA introduction in Jul. 2005



• After TSA introduction



Source: Ministry of Finance and Strategy

The introduction of the TSA, however, had preconditions. For example, in the case of some special accounts, it is very difficult to predict the timing of cash inflows and chronic net outflows. If these special accounts are included in the TSA, these problems will be transferred as well. Considering this point, the Korean government initially excluded a few special accounts from the TSA and gradually included them.

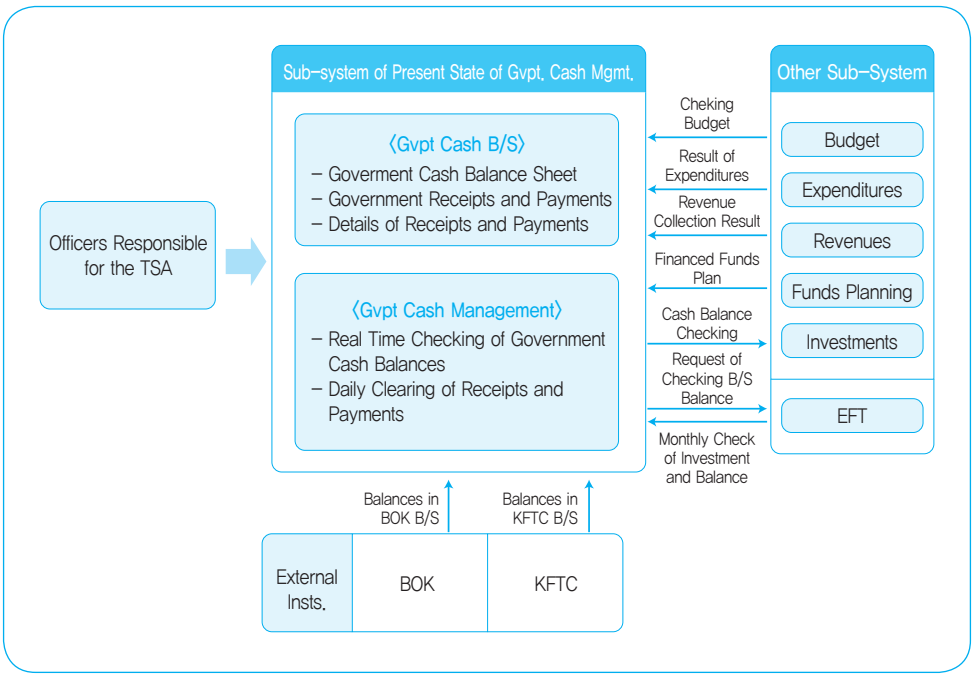
In addition, coordination between various governmental entities was very important. There were many meetings and negotiations between governmental ministries and units. Sufficient tests for the new system were also important, because errors in computerized systems can result in huge costs. If credibility is not fully established, it is very difficult to gain political support for the computerization process.

The legal framework also required amendments to permit establishment of the TSA. The Korean government amended the Fund Management Act and other related laws and regulation in order to establish the TSA. After these preparations, the TSA was finally introduced for the general account and 10 special accounts on July 2005. However, accounting of the revenues and expenditures of these accounts has remained separate, even after the introduction of the TSA.

A well-functioning information and communication infrastructure is inevitable with the implementation and management of the TSA. In Korea, NAFIS was the information infrastructure for the TSA. Since 2007, the DBAS, a more advanced and comprehensive system, has replaced NAFIS. In the DBAS there are two modules for government cash management: government cash operation and government cash management. These modules are very convenient because all the relevant activities are contained within this system.

A more important function provided by the DBAS is, however, the collection and processing of the information on government receipts, payments and expenditures. This information is provided by another sub-system, “The Present State of Government Cash Management,” which contains information such as the current balances in the TSA and each subaccount, daily receipts and payments, annual accumulated receipts and payments, and more. The following figure explains this sub-system.

Figure 3-6 | Sub-system of Present State of Government Cash Management



Source: Ministry of Finance and Strategy

4. Transition to a Full-fledged Active Government Cash Management System

Although the establishment of the TSA in 2005 was a major step toward an active cash management system, the Korean system still had a long way to go. Most governmental ministries used to exaggerate their cash requirements, largely because of uncertainties in their cash flow forecasts. These exaggerations increased the required amounts of stand-by cash, which in turn made the cash flow forecasts even more uncertain. Furthermore, these problems made it impossible for the treasury authority to conduct fine-tuning, one of the trademarks of active cash management in advanced countries. The government invested its cash holdings only when the cash would not be needed within one week. The uncertainties also made implementation of monetary policies by the BOK difficult. Another problem was that six of the eighteen special accounts were excluded from the TSA.

To tackle these difficulties, the Korean government announced it would initiate full-fledged active cash management by 2010. The contribution of the DBAS, which had been in use since 2007, was critical for the successful transition. The DBAS is a comprehensive

information infrastructure for consolidating and computerizing all procedures from the reporting of government cash receipts and payments to the investment of idle cash in financial markets. Real time information about cash flows is provided, thus allowing more accurate forecasting. A special module to enhance cash flow forecasts was added to the DBAS in 2010.

The Korean government adopted various measures for active cash management. It proclaimed the Guiding Principles of Government Cash Management, which intensified fiscal discipline. Coordination between the treasury authority and other governmental entities was also strengthened and three of the six special accounts, which had been excluded from the TSA, were included in 2010. In addition, the government introduced a target balance system in which the treasury authority sets the target and manages cash balances on a daily basis. These measures facilitate active government cash management, including the use of fine-tuning by the treasury authority.

These new measures make the government cash management system in Korea closer to those in advanced countries. In particular, these measures allow the Korean government to conduct fine tuning. The Korean government did not use fine tuning even after the introduction of the TSA in 2005. However, the newly adopted target balance system and the cash operation on a daily basis made fine tuning an affordable tool for government cash management, and as a result, the government account balances has exhibited less volatility.

Table 3-3 | Features of New Government Cash Management System

	Before July 2010	After July 2010
Allotment of Cash and Expenditure	• No particular guidelines • No penalty even when the allotted cash is not spent	• New adoption of Guiding Principles of Government Cash Management • A penalty is imposed in future cash allotment when the allotted cash is not spent
Inclusion of the TSA	• General account and twelve special accounts	• General account and fifteen special accounts
Government Cash Operation	• No daily target • Cash operation on a weekly basis	• Targeting the TSA balance daily • Cash operation on a daily basis
Agencies of Govt Cash Investment	• Only one financial institution	• Multiple financial institutions

Source: Ministry of Finance and Strategy

5. Assessment and Suggestions for Developing Countries

5.1. Assessment of the Korean Reform

The computerization of taxation systems is underway worldwide, not only in developed countries but also in developing countries. The Korean case shows that partial computerization does not expel inefficiency in tax agencies, nor does it eliminate tax revenue theft. In Korea, computerization of the national revenue management system was introduced at a rapid pace to local tax agencies in the 1990s, but tax revenue theft persisted until the whole process of taxation, from sending bills to collecting tax, was fully computerized in the early 2000s.

Just as computerization of national tax collecting systems contributes to reducing corruption and inefficiency in tax agencies, computerization of government funds disbursement can also reduce corruption and costs. Although there was little corruption concerning disbursement of government funds in Korea even before full computerization of the national revenue management system, the computerized disbursement system itself blocks any attempt of exploitation, such as arbitrarily controlling the timing of disbursement by tax officials.

After establishing TSA in July 2005, the Korean government was able to reduce its financing costs and efficiently use the funds across accounts. In the second half of 2005, the Korean government was able to reduce interest payments from the BOK by as much as 62.7 billion won.

As collecting revenue and disbursing funds came under control, the Korean government used funds in the TSA for 259 days in 2005, when there was a demand for borrowing in four special accounts. The endeavor to reduce time and cost concerning the management of national revenue by streamlining administrative processes was also noticeable.

Unlike when there was limited cash flow to the national revenue system, the TSA did not contribute to effective management of national revenue when there was an overflow of cash; excessive funds were not actively managed and as a result, the government possessed too large of an amount of non-interest funds. At last, the Korean government shifted to a more active management of national revenue in July 2010. The data required to assess the results of active cash management are emerging, and thus more time is needed to make an assessment.

At this point in time, it can be said that the Korean government cash management system was in an interim phase as it progresses toward an advanced, active government cash management system similar to those in developed countries. As discussed above, a desirable national revenue management system would include the following features:

① Effective government receipt and payments disbursement.

② Consolidated cash management in a TSA and active management of excessive revenues.

③ Accurate forecasting of government cash inflows and outflows.

④ Coordination between government cash management, monetary policy, and establishment of a cooperative system with the central bank.

⑤ Consideration of the interaction between government cash management and the development of financial markets.

In Korea, as for ① Effective government receipts and payments, the government streamlined the process, reduced labor and cost, and as a result, transparency in collection and disbursement of national revenue was possible. In Korea, credibility in electronic transactions and centralization of the payment process are well established. As for ② Consolidated cash management in a TSA and active management of excessive revenue, Korea began to manage the national revenue with the TSA from July 2005. In addition, Korea's national revenue prediction system has been more accurate with the introduction of the digital budget and accounting system. As for the ③ Accurate forecasting of government cash inflows and outflows, Korea needs to develop an accurate prediction system for national revenue. Thanks to the digital budget and accounting system already implemented, Korea has been able to build a prompt and accurate database. Korea also needs to develop an accurate model of national revenue flow and enhance information sharing with offices dealing with national revenue collection and disbursement. As for ④ Coordination between the government cash management and the monetary policy, and establishment of cooperative system with the central bank, the communication between the national government and the central bank is regular. Finally, for ⑤ Consideration of the interaction between the government cash management and the development of financial markets, excessive national revenue is deposited in the accounts of financial institutions, rather than managed in the short-term RPs.

Williams (2004), discussing the development of national revenue management in four phases, argues that for active management of national revenue, the accurate prediction of cash flow is necessary. Korea is now moving from phase 3 to phase 4.

Phase 1: TSA

Phase 2: forecasting capability

Phase 3: rough tuning

Phase 4: fine tuning

On the basis of recent developments, Korea will be able to actively manage excessive cash holdings and fine tune national revenue. As for the management of excessive revenue and short-term funding, the policy should focus on the development of short-term financial markets. More cooperation between the national government and central bank is required.

5.2. Suggestions for Developing Countries

Korea transformed its government cash management system into one that is more similar to developed countries, all in a relatively short period of time. The reasons for success are various. Above all, the expansion of computerization based on IT technology expedited the transformation. The environment of government cash management systems has changed as well. The government introduced various methods of tax payment and payments disbursement, as the government budget expanded and the size of the economically active population increased. Despite all these changes, Korea was able to operate the national revenue service in a stable manner because of computerization. The expansion of computerization enabled accuracy and convenience in the collecting and disbursing of national revenue.

At the same time, computerization enabled real-time information concerning the flow of national revenue. Of course, computerization is necessary but not sufficient for establishing a perfect forecasting system of cash flows. Cooperation between related offices and the development of deliberate and accurate forecasting models are key. Still, computerization is the foundation for the development of an accurate cash flow forecasting system.

Computerization also increases the transparency of tax and customs administration, and thereby reduces corruption. When the administrative procedures lack transparency, the potential for corruption is likely to increase. Computerization of the tax and customs administration systems could allow for online filing of tax and customs forms. This would potentially eliminate many opportunities for corruption. Computerizing the tax system would also enhance the adequacy of administrative procedures including: compliance, tax audit, taxpayer services, sanctions and appeals, customs clearance procedures, pre-shipment inspection, and information sharing.

The Korean experience indicates that partial computerization did not expel the inefficiency and tax revenue theft associated with the old, non-computerized system. Full implementation of computerization is needed to obtain the benefits as intended.

Computerization is also beneficial with regard to the government cash payment systems. Access to information on government performance is critical for the promotion of transparency and government accountability and minimizing corruption with respect to government expenditures. Computerized systems help auditors or the public with access to the information on government performance.

It should be noted that cooperation among related offices and personnel is required in the process of computerization. Sufficient tests are also important because errors in computerized systems can produce massive costs. If credibility is not fully established, it is very difficult to continue the computerization process.

It is true that Korea obtained various desirable results in its government revenue receipts and payments systems through computerization. However, as electronically connecting government offices allows efficiency and transparency, it also increases the problem of security. The computerized system, one especially based on the Internet, has the risk of allowing the connection to non-authorized third persons. The WIKILEAKS incident in 2010 showed that computer security systems can be vulnerable to outside penetration. To ensure perfect security, Korean government implemented physical disconnection of servers in some offices, installed security software, and developed policies for tele-communications security. Until now, Korea has been successful in fighting non-authorized 3rd party access. Those countries in the process of developing a computerized national revenue system should be aware of the heightened security measures that the Korean government has taken with regard to computerization.

In the process of computerization, there are several points that should be acknowledged. As the whole process of revenue receipts and disbursement became computerized, the Korean government was able to do business more promptly and accurately. Yet, the complicated computerization process makes it difficult for the staff to review the entire process. In case of emergencies, such as crucial damage to the computer system, manual bookkeeping is required. When tax revenue office personnel are accustomed to a computerized system, they are unable to go back to a manual system. Furthermore, they will have difficulties whenever changes are made in the national revenue system. Thus, there should be pre-planned emergency measures with regard to obtaining sufficient number of personnel who have experience in manual bookkeeping, and the capacity to track national revenue records.

Computerization is the basis for optimal management of national revenues. Designing a cautious incentive system is a higher level task. Design of the incentive system is crucial with regard to making the national revenue forecasting system more accurate, because it is impossible for the person in charge of cash management to monitor and control every in and out flow of government cash. Thus, providing related regulations and measures with incentives and punishment is more efficient. As discussed above, the Korean government established measures for national revenue disbursement in order to prevent malpractice in the allocation and disbursement of national revenue. When an office ignores the pre-established measures, the Minister of Strategy and Finance can reallocate the fund of the office in question.

In order to enhance the accuracy of the forecasting system of national revenue, the offices need to share not only statistics concerning income and spending of each office, but also information related to government cash flows. The creation and maintenance of a personal network among the cashiers of government offices are important for the success of such a system. If the cash flow of the national revenue shows unexpected behavior, this information should be provided through the network.

The Korean government has tried to enhance its cash flow forecasting through the introduction of "advance notice system" for large amount expenditures, and penalty when the monthly plan of a line ministry is proven wrong. In Korea, government expenditures in excess of 50 billion KRW (around USD 40 million) must be cleared by the Treasury in advance. In addition, a penalty in allotting government cash is imposed on the ministry whose monthly expenditure plan is significantly greater than the actual payment. The Korean government is also introducing various techniques of analyzing the trends of revenues and expenditures.

Cooperation between the government and its central bank is also crucial. In Korea, the treasury and the central bank cooperated during the process of creating the TSA, and during the major steps of reforming government cash management. Such cooperation is a required condition for an efficient government cash management system. When information regarding national revenue management is shared with the central bank, an error by the central bank in the prediction of circulated money is reduced. This again creates efficiency in the central bank's monetary policy. Since Korea transformed its government cash management system to an active one in July 2010, the Korean government has succeeded in maintaining a stable target balance. Stability of the target balance has enhanced the predictability of the central bank's monetary policy. And from the government's perspective, the information regarding the central bank's monetary policy is crucial for short-term management of the cash flows.

Governments in some developing countries have trouble with the ever-expanding number of bank accounts, and the burden of monitoring and controlling them. They could consider outsourcing the job of managing the bank accounts to the central bank, as in Korea. Central banks, which are closer to commercial banks than the governments, can do the job more efficiently. For example, the Bank of Korea guides, assists and monitors financial institutions receiving Treasury funds on behalf of the central bank, so as to reduce inconvenience to the general public.

Meanwhile, there are many developing countries whose governments and central banks issue short-term bills toward the same investor base. The use of different but similar instruments for monetary policy and cash management potentially risks market fragmentation and the loss of the benefits from a larger and more liquid T-Bill market.

Essentially the same demand is spread over the two types of instrument, so the volume of each issue is likely to be smaller than it might be otherwise, which will tend to reduce liquidity. Transference of issuing central bank bills to the government in order to enhance the development of domestic bond markets should be considered.

2012 Modularization of Korea's Development Experience
Korean Experience of Financial Management Information System: Construction, Operation, and Results

Chapter 4

Institutional Change (3): Introduction of Accrual Accounting System

Institutional Change (3): Introduction of Accrual Accounting System

1. Overview of the Accrual-based National Accounting System

1.1. Background and Purposes of the Adoption of Accrual-based National Accounting System in Korea

A cash-based national accounting system refers to one that records and reports revenues and expenditures based on cash flow. This accounting system has been adopted and used by many countries around the world, because it makes budgets and settlements easier to understand, and allows for better control over the formulation and execution of budgets. The Korean central government had been also using this system to prepare its budget and settlement reports prior to 2008.[1]

While using a cash based accounting system, the government's non-cash assets and liabilities—national receivables, national properties, commodities and national debts—were not linked to the settlement of revenue and expenditure. These non- cash assets and

1. The national accounting entity of Korea consists of a general account, other special accounts, special enterprise accounts and funds. For special enterprise accounts and funds, accrual-based accounting has been used along with cash-based accounting in accordance with the Enterprise Budget and Accounts Act and the National Finance Act (previously, the Framework Act on Fund Management). This is probably because the government's special enterprise accounts and funds are similar to private sector businesses in operational style. On the contrary, cash-based accounting has been applied to the general account and other special accounts.

liabilities were recorded based on separate laws.[2] As the recognition and valuation of assets and liabilities were determined by the relevant laws, they were not closely related to the process of revenue and expenditure settlement. These assets and liabilities could not be considered as based on economic substance, because they were recognized only when satisfying the criteria as set forth in the laws. Moreover, it was difficult to determine total assets and liabilities at the ministry, agency level, or government-wide level, because they were divided into separate reports. Since all cash inflows were recorded as revenues, it was difficult to identify whether they resulted from revenues earned in the current period, a decrease in assets, or an increase in liabilities. Similarly, it was difficult to identify whether cash outflows are as a result of expenses, an increase in assets, or a decrease in liabilities.

In order to overcome such limitations of the cash-based accounting system and establish the foundation for long-term fiscal management through accurate analysis and projections of the national financial position, the government has adopted an accrual-based national accounting system with the following purposes in mind.

Table 4-1 | Purposes of the Adoption of Accrual-based National Accounting System in Korea

Purposes	Detailed Action Plan
Comprehensive and systematic support for fiscal management	• Manage information about national finance on a comprehensive basis, by successfully integrating fragmented information produced by fund or asset • Provide support to ensure that national finance is managed on an integrated financial basis, not on the basis of the individual management system
Establishment of the foundation for long-term fiscal management through accurate analysis and projections of national financial position	• Improve the accuracy of analysis of national financial position by conducting objective valuation of national assets and liabilities on accrual basis • Build a solid foundation for fiscal management according to long-term financial projections by predicting the future financial capability

2. Under the pre-2008 Korean government accounting system, a separate report was drawn up for national receivables, national properties, commodities, and national debts on the basis of the National Receivables Act, the National Property Act, the Commodity Management Act and the National Finance Act, respectively. The report was subsequently submitted to the National Assembly along with the report on settlement of revenue and expenditure.

Purposes	Detailed Action Plan
Support for successful implementation of financial reform projects such as a performance-based fiscal system	• Provide support to ensure the successful implementation of the national accounting system and consistency among fiscal management systems, by effectively linking the national accounting system with other financial reform projects such as a program-based budget system or a performance-based fiscal system
Establishment of a substantial decision support system	• Produce and manage diverse accounting information on national financial position and financial operations • Enhance the accuracy and quality of policy decisions by analyzing and processing accumulated financial information and providing such information on a timely basis for decision- making

Source: Ministry of Finance and Strategy

Due to the adoption of an accrual-based national accounting system, the government has established a systematic and comprehensive way of reporting assets, liabilities, revenues and expenses in its financial statements. Changes in economic resources, as well as cash flows, can now be recognized as assets or liabilities. Changes in values can also be reflected in financial statements. For example, in the case of long-term construction projects, construction costs paid or incurred are recorded as an asset. Additionally, when there are changes in economic values not involving cash flows with respect to securities, tangible assets, receivables and provisions, even such changes can now be recognized. Costs (or expenses) associated with various programs can be accumulated separately by program, which enables performance evaluation and feedback for future planning.

Above all, important groundwork has been laid for accounting information to be gathered and presented at the ministry, agency and government-wide levels. Before the new system was adopted, information on financial position and financial operating results had been processed separately by fund in each ministry or agency. Accordingly, it was difficult to identify information on financial positions and financial operating results at the ministry or agency level. Furthermore, financial reports that were managed under different laws, such as the National Finance Act, the National Property Act, and the Enterprise Budget and Accounts Act, can now be managed under an integrated accounting system.

On the other hand, the accrual-based national accounting system involves various costs,[3] which might lead to biased information from inaccurate estimates. Despite such drawbacks, in order to overcome the limitations of cash-based accounting, accrual-based national

3. These include costs for training national accounting professionals, establishing and maintaining a new accounting system, and securing the reliability of accounting information.

accounting system was adopted so that users can access accurate accounting information crucial for decision-makers. This was the significance of introducing the accrual-based national accounting system in Korea.

Table 4-2 | Single-entry Bookkeeping vs. Double-entry Bookkeeping and Cash Basis Accounting vs. Accrual Basis Accounting

Single-entry Bookkeeping	Double-entry Bookkeeping
• Only record revenues and expenditures - Record assets and liabilities separately - Lack of well-linked information among financial statements	• Link revenues and expenditures to assets, liabilities, revenues, and expenses - Record changes in assets and liabilities simultaneously - Verify information automatically according to the principle of equilibrium - Consistency in linked information among financial statements
Cash Basis Accounting	**Accrual Basis Accounting**
• Record when cash is received or paid - Records are made only when there are cash receipts and payments - After acquisition costs are recorded, the value is not changed	• Record when transactions or events occur - Records are made at the time of the occurrence of transactions regardless of cash receipts or payments - Assets and liabilities are presented in substantial economic value

Source: Ministry of Finance and Strategy

1.2. Characteristics of the Accrual-based National Accounting System

1.2.1. Importance of Budgets in National Accounting

Budgets are the most important features in national accounting, which is differentiated by national accounting from private sector accounting.

In companies, budgets function as a tool that helps set business targets and ensure efficient management. Although budgets play an important role in business activities, they would be meaningful only when they are based on accurate accounting information. Regardless of how elaborately the budget is planned, companies should make every effort to generate profit through operating activities, make accurate records of accounting events, and produce reliable accounting information in order to be of value in the market. Although corporate budgets are subject to considerable internal (managerial) control, it almost has no external (legal) control. Therefore, accounting is more important than budgets in the private sector.

On the contrary, in national accounting, budget control is by far the most important priority, and budgets are considered more important than accounting. This would be even more evident under the cash-based national accounting system, which emphasizes budget control. The government budget is usually controlled by the Congress (IFAC, 2004). That is because the government needs to impose taxes on its people in order to secure the total budget.[4]

While a company's budgetary decisions do not determine its revenue, those of the government determine most of its revenue. This fact makes internal and external control of budget important in the government. Of course, accurate recording of actual accounting events is important for the government as well. The accounting information and financial operation results of the current year are important as performance evaluation data, and at the same time act as an important factor in deciding the size of the following year's budget. This is why the government should have diverse and accurate accounting information for effective performance evaluation and budgeting. It is also why the relationship between budgeting and accounting is a fundamental issue in government's financial management.

1.2.2. Distinct Characteristics of National Assets: Recognition and Valuation

In the private sector, assets refer to resources controlled by an entity as a result of past transactions or events and from which future economic benefits are expected to flow to the entity. The future economic benefits generally mean inflows of cash. When defining assets like this, however, it is questionable whether state-owned infrastructure assets (e.g. roads, railways and harbors) or military assets (e.g. missiles and fighter planes) can be recognized as assets, because future cash inflows are not likely to occur from those assets.[5] Consequently, the capability of providing public services can be added in the definition of government-specific assets.[6] However, some caution is required in adding the concept of public services, because there is a risk that the scope of assets could be expanded indefinitely.

In practice, the measurement and valuation of infrastructure can be a significant issue because they are large in scale and difficult to determine their acquisition date. U.S. local

4. Chatfield (1990) says that government agencies should be able to decide what they want to do, estimate the costs required to implement the decision, and impose taxes which are sufficient to support it financially.

5. Government-specific assets may also include heritage assets, such as cultural properties, and natural resources. At the moment, heritage assets and natural resources are usually recognized as assets within a very limited range. This is not because of the issue of future economic benefits but because of the difficulty of reliable measurement.

6. An asset is a resource owned (or substantially owned) or controlled by national accounting entities as a result of past transactions or events, and from which the entities may provide public services in the future or future economic benefits are expected to flow to the entities directly or indirectly (see Article 9(1) of the National Accounting Standards).

governments once introduced a grace period with respect to the measurement and valuation of infrastructure assets (see Paragraph 148 of the GASB No. 14). The Korean government also adopted a grace period regarding the measurement and valuation of infrastructure assets as stipulated in Article 1 of the Addenda of the National Accounting Standards, which was legislated in March 2009. It states that infrastructure assets acquired prior to the application of the Standards may not be recognized as assets if their acquisition cost is difficult to be measured or reasonably estimated. In such cases, the type, acquisition date, and management status of the assets should be disclosed in the Required Supplementary Information (see Article 3 of the Addenda of the National Accounting Standards).

1.2.3. Characteristics of the Presentation of National Accounting Information

An income statement, which systematically presents revenues and expenses, is a key financial statement in private sector accounting, and net income is regarded as major accounting information because the goal of any business is to make a profit. The basic transaction type in business is an exchange transaction through sale and purchase and, thus, expenses are closely linked to revenues. The principle of matching costs with revenues, which is based on this idea, is a fundamental principle of private sector accounting, emphasizing the need to analyze revenues and expenses simultaneously.

Conversely, one of the most important aims of the government is to provide high-quality public services and, therefore, the measurement and valuation of costs for each public service is significant information in national accounting. Countries that have adopted an accrual-based national accounting system differ in how the cost information is presented, but they all share a common feature in that they emphasize such information, more than private businesses do. Government revenues depend primarily on taxes, and are not directly related to costs of administrative services. This is called a non-exchange transaction. A non-exchange transaction, a concept contrary to the exchange transaction, is one in which economic resources are not exchanged through the process of sale and purchase. Typical examples of non-exchange transaction are taxation and provision of public goods (and public services) by the government. Taxation is not directly based on benefits earned from the supply of public goods, and failing to pay taxes does not necessarily mean that no benefits were gained from public goods, due to the characteristics of public goods. The characteristic of non-exchange transactions by a government is closely associated with the fact that, unlike private sector accounting, operating results are not significant information in national accounting. While profits generated from sales are important for businesses, profit-making is not an important issue for the government. Rather, it is more important to spend collected tax revenues on programs efficiently. As a result, the Korean central

government has divided financial statements into those that present cost information and others that present tax information.

2. Application of the Accrual-based National Accounting System

2.1. Reform of the National Accounting System in Korea

The reform of the national accounting system by the government has been discussed publicly since the 1997 economic crisis, when the government made financial reforms to address it. The core of such reforms has been to modify relevant laws and regulations, including the National Finance Act, the National Accounting Act, and the National Accounting Standards, as well as to establish a financial management information system supporting those modifications.

2.1.1. Background of the Reform

After the financial crisis of 1997, the Korean government publicly announced the introduction of an accrual-based national accounting system in May 1998. The government confirmed the introduction of the system as a government policy task in June 1998 at the Planning and Budget Committee and then announced a plan for the reform of the financial management system. Subsequently, the Ministry of Finance and Economy developed a roadmap for the reorganization of governmental accounting system showing a willingness to introduce an accrual-based national accounting system to the entire government by 2003.

However, it took much longer than expected to reorganize the existing system and establish the new relevant system in the government. The Committee on Government Reformation and Decentralization played a leading role in pursuing the accrual-based national accounting system as one of major reform projects again in 2003. In addition, thanks to the active engagement of governmental ministries such as the Ministry of Finance and Economy, the Ministry of Planning and Budget, and the Board of Audit and Inspection, some visible achievements were registered. These achievements include the National Finance Act enacted in 2006, the National Accounting Act enacted in 2007, the National Accounting Standards in 2009, and the Korean financial management information system (KFMIS) in 2007. With these achievements, the Korean central government introduced the accrual-based national accounting system in earnest by 2009.

2.1.2. Enactment of Relevant Laws and Regulations

It is considered that the accrual-based national accounting system of Korea has its roots in the National Finance Act and the National Accounting Act.

The National Finance Act was enacted in 2006 as a legal framework for national financial operations, by integrating the previous Budget and Accounting Act and the Framework Act on Fund Management. This new Act aimed at creating a new framework for national financial operations; enhancing fiscal efficiency by establishing a plan for national financial operations and introducing a top-down budgeting and performance management; improving the transparency of national finance by expanding the disclosure scopes of fiscal information and preparing a report on tax reduction and exemption; and enhancing fiscal soundness by reinforcing the requirements for compilation of supplementary budget and establishing a national debt management plan. The National Finance Act covers the overall aspects of national finance such as formulation, execution and settlement processes of budget.

The National Accounting Act was enacted in 2007 with an objective to enhance the transparency and reliability of the national accounting system, and establish a legal basis to adopt the accrual-based national accounting system in ministries or agencies, for the purpose of providing useful and appropriate information on national finance. Also, this Act prescribes matters based on the National Accounting Standards and the preparation of financial reports.

A legal framework for the national accounting system has been established on the basis of the National Accounting Act, which provides guidelines on the preparation of financial reports and the National Finance Act, which in turn sets forth matters on the submission procedures of financial reports. The National Finance Act serves as the foundation for the Korean national accounting system such as the formulation, execution and settlement processes of budgets, whereas the National Accounting Act serves as the basis for the preparation of financial reports under the accrual-based national accounting system. The National Accounting Standards, which provide the principles for the preparation of national financial statements, are ministerial ordinance of the National Accounting Act.

2.1.3. Major Activities for the Implementation of Accrual-based National Accounting System

To ensure smooth implementation of the accrual-based national accounting system, the government has implemented major initiatives as follows.

Firstly, the National Accounting Standards were designed in accord with a performance-based fiscal system. The national accounting system, including the National Accounting Standards and relevant technical releases, completed along with other financial reform

projects such as a program-based budget system, was established so that the national accounting system could support performance-based financial operations. The statement of financial operations, which is based on a cost management system, generates cost information by program. Program costs, a core indicator of performance management, can be utilized as useful information for efficient allocation and management of national resources (see 2.B. (3) for more details).

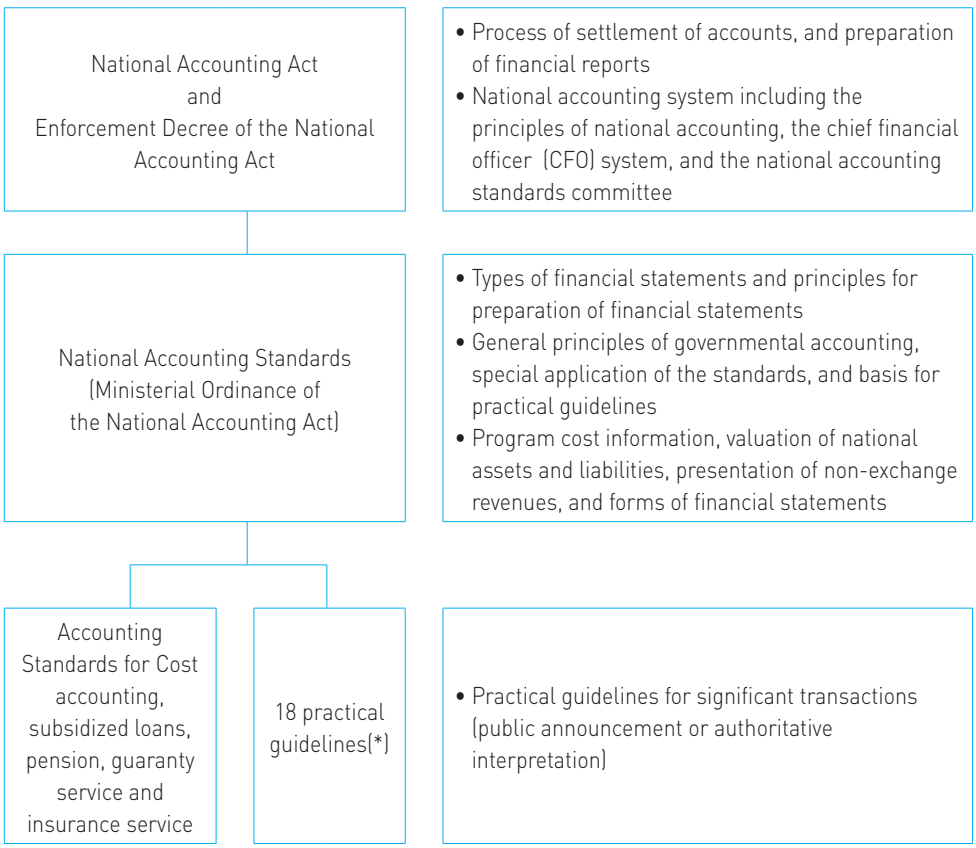
Secondly, the government has modified the chart of accounts (COA) systematically; standardized required input data; and recorded transactions automatically under the DBAS, in order to facilitate the practical application of the national accounting system. One of the main objectives of the accrual-based system is to produce useful and diverse information for decision-making related to national accounting. In order to meet this objective, a new system to manage diverse information by COA was required, which led to the standardization of the required input data by COA. In addition, for the purpose of reducing the workload of public officials, who are accustomed to the cash-based system and minimizing errors in accounting processes, a new computerized system that allows the budget to be automatically recorded has been designed (see 3.A.(1)~(3) for more details).

Lastly, the government has planned to introduce a valuation system, considering the unique characteristics of each asset and liability, which enables a realistic valuation of various national assets and liabilities. Currently, accounting standards or technical releases for the measurement of specific assets and liabilities, such as infrastructure, government cash, loans, national bonds, and provisions for pension, have been established. In addition, a considerable part of closing adjustments, such as the calculation of depreciation expenses under accrual-based accounting, translation of assets and liabilities denominated in foreign currencies, and recognition of accrued revenues or expenses, as well as the elimination of intra-governmental transactions between funds or between ministries or agencies, can now be automatically calculated and recorded under this system. This is intended to reduce the workload of public officials in charge of accounting and minimizing errors in valuation. The recognition of infrastructures, which have required a considerable amount of time to perform due diligence and valuation, has been appropriated on national financial statements. Also, an entire framework for the recognition of public officials' pension and the military pension provisions was established (see 2.B. (2) for more details).

2.1.4. Hierarchy of the Korean national accounting system

The hierarchy of the Korean national accounting system can be summarized as follows:

Table 4-3 | Hierarchy of the Korean National Accounting System



(*) As of the end of December 2011, there are 18 technical releases as follows:

No.	Name	Contents
1	Accounting for the accounts in the statements of financial position	• To explain accounts in the statement of financial position and provide a practical guideline of accounting for the accounts
2	Accounting for the accounts in the statement of financial operations	• To provide specific classification criteria for revenues and expenses • To explain accounts in the statement of financial operations and provide a practical guideline of accounting for the accounts
3	Accounting for the accounts in the statement of changes in net assets and in the report of national tax collection.	• To explain components of the statement of changes in net assets • To provide the purpose and principles of preparation of report on national tax collection

No.	Name	Contents
4	Accounting for government cash	• Characteristics of government cash accounting and general and special accounting for government cash
5	Accounting for national bonds, borrowings, and commitments to take a treasury obligation	• Practical guideline of accounting for issuance and repayment of national debt and amortization of present value discount
6	Accounting for lease	• Classification criteria of leases(finance leases and operating leases) and practical guideline of accounting for leases
7	Accounting for funds	• Accounting for contributions and charges • Accounting for reserves of funds which operates insurance and guarantee business
8	Accounting for off-budget transactions	• Definition of off-budget transactions and presentation in financial statements
9	Accounting for depreciation intangible and intangible assets	• Definition of and accounting for depreciation and modified approach on depreciation
10	Measurement of receivables and payables at present value	• Definition and valuation method of present value
11	Accounting for BTL and BTO	• Definition and accounting for BTL and BTO
12	Accounting for contingent assets and liabilities	• Accounting for contingent assets and liabilities and disclosure
13	Preparation of combined financial statements	• Preparation of combined financial statements by ministry, agency or the entire government
14	Accounting for infrastructures	• Classification, recognition, valuation of infrastructures • Alternative method for depreciation of infrastructures
15	Valuation and announcement of Pension	• Detailed accounting standards for pension
16	Detailed accounting standards for Subsidized loans	• Detailed accounting standards for Subsidized loans
17	Accounting for revaluation	• Revaluation of general tangible assets and infrastructures
18	Accounting for trust development service in relation to assets owned by government	• Accounting for trust development service in relation to assets owned by government

Source: Ministry of Finance and Strategy

2.2. Overview of the Korean National Accounting Standards

2.2.1. Overview of the National Accounting Standards

The National Accounting Standards are applied to national accounting entities, which comprise of a general account, special accounts and funds.[7] Government ministries or agencies prepare financial statements by integrating the financial statements of its general account, special accounts and funds while the government prepares the combined national financial statements by integrating the combined financial statements of each ministry or agency. Intra-governmental transactions between funds or between ministries or agencies will be eliminated, and some adjustments may be needed in the process of consolidation.[8]

Financial statements prepared pursuant to the National Accounting Standards[9] consists of the statement of financial position, the statement of financial operations, and the statement of changes in net assets, as well as notes to the financial statements. In addition, there are required supplementary information and appendices[10] as supplementary schedules.

Required supplementary information[11] means information not presented in the financial statements, but required to be provided in order to supplement the financial statements and

7. Local governments apply the Local Government Accounting Standards, a set of accounting standards for an accrual-based accounting system, while public institutions apply the Rule of Accounting Principles for Public Enterprises and Quasi-government Entities, a set of private sector accounting standards for public institutions.

8. In the preparation of combined national financial statements, some additional work is performed, such as the integration of government cash accounting and the adjustment of tax revenues in the national tax collection reports.

9. Financial statements should include the following information which is required to evaluate whether the government fulfills its accountability:
   - Information on the government's financial position, changes in the financial position, and financial operation results;
   - Information as to whether or not the government attains its operation goals effectively and efficiently;
   - Information as to the extent of compliance with the budget and other relevant laws.

10. Additional supplementary schedules, in accordance with individual laws, should be submitted in addition to the financial statements, notes, required supplementary information and appendices (see Article 57 of the National Accounting Standards). The schedules include a report on the present credit amount under the National Receivables Act, a report on national property management and operations under the National Property Act, and a report on commodity management and operations under the Commodity Management Act. The additional schedules are required because the criteria for recognition and valuation of receivables, national property, and commodity as set forth in individual laws differ slightly from those in the National Accounting Standards. The Reconciliation of Assets and Liabilities are also prepared to reconcile those differences.

11. In case of the federal government of the United States, Required Supplementary Information includes the following information: social insurance, deferred maintenance, unexpected budget balances, tax burden, tax gap, other claims for refunds, tax assessments, risk assumed, and unmatched transactions and balances. The current state of heritage assets is separately disclosed in the Stewardship Information, whereas it is included in the Required Supplementary Information in Korea.

enhance understanding of the financial statements, representing the characteristics of the national accounting system. It includes the following:

Table 4-4 | Required Supplementary Information

Required Supplementary Information
• Types, quantities and status of heritage assets
• Pension report, insurance report, and social insurance report (currently in a grace period)
• Report of national tax collection
• Statement of reconciliation of budget surplus (or deficit) to financial operating results
• Statement of financial operations by nature of revenue and expenses

Source: Ministry of Finance and Strategy

Appendices are used to provide additional information on the accounts presented in financial statements, when the relevant details need to be specified. Currently, there are appendices for financial instruments, short-term or long-term investments, receivables, property, plant and equipment, infrastructure assets, intangible assets, government bonds, and borrowings.

Notes on the financial statements explain significant accounting policies and matters that have a great influence on providing users with adequate information. They include significant accounting policies, repayment schedules of long-term debts, long-term provisions, contingencies, assets and liabilities denominated in foreign currencies, corrections of prior period errors and changes to accounting policies, and adjustments of net assets.

2.2.2. Statement of Financial Position and the Valuation of Assets and Liabilities

The statement of financial position presents the financial position of a national accounting entity, such as assets and liabilities at the date of the statement of financial position; and consists of assets, liabilities, and net assets. An asset is a resource owned (or substantially owned) or controlled by a national accounting entity as a result of past transactions or events, and from which the entity may provide public services in the future, or future economic benefits that are expected to flow to the entity directly or indirectly from the asset. Assets are disaggregated into current assets, investments, property, plant and equipment,

infrastructure assets,[12] intangible assets, and other non-current assets. Although owned by a national accounting entity, heritage assets[13] are not recognized as assets in the financial statements, and military assets may not be recognized as an assets in consultation with the Minister of Strategy and Finance.

Although in principle, an asset is recognized based on its acquisition cost, but the carrying amount of the asset will be reduced to its recoverable amount when its market value has declined significantly. However, the following assets are valued by taking into consideration their characteristics.

Table 4-5 | Valuation Methods of National Assets by Type

Type	Valuation Method
Securities	• Debt securities: amortized cost • Securities held for investment that can be measured at fair value: fair value (gain or loss on valuation should be reflected in the statement of changes in net assets)
Receivables	• Establish allowance for bad debts for estimated losses from doubtful accounts
Loans	• Record at present value of estimated net cash inflows (considering the principal, interest and the estimated amount of default on a debt) discounted with effective interest rates
Inventories	• The lowest cost among acquisition or market value, under which inventory should be recorded at market value when the market value declines less than the acquisition cost
Forfeited Assets	• Record at fair value at the time when their titles were vested in the government
Assets and liabilities denominated in foreign currencies	• Monetary assets and liabilities denominated in foreign currency are translated into Korean currency at the appropriate current exchange rate at the date of the statement of financial position

12. Plant, property and equipment are tangible assets that are held for use in the government's administrative activities that are expected to be used for more than one year. Property, plant and equipment are disaggregated into land, buildings, structures, machinery and equipment, vehicles, specialist military equipment, and other plant, property and equipment. In contrast, infrastructure assets are capital assets that are invested on a large scale to form a foundation of the country and have economic benefits over considerable periods. Infrastructure assets are disaggregated into roads, railroads, ports, dams, airports, water supply systems and other infrastructure.

13. Heritage assets refer to the assets, which possess significant historical, natural, cultural, educational, or artistic value, which the government should preserve indefinitely for current and future generations. Information pertaining to these assets such as the types and status should be disclosed in the required supplementary information.

Type	Valuation Method
Property, Plant and Equipment, infrastructure assets, and intangible assets	• Depreciate using straight line method, etc. (intangible assets should be valued only using straight line method). • Record at fair value when revalued • Infrastructure assets may not be depreciated as long as those assets maintain the same service potential as that of the acquisition date, and their maintenance expenses may replace depreciation expenses.
Long-term receivables and payables	• Record at present value when the nominal value is significantly different from the present value
Derivatives	• Record at fair value

Source: Ministry of Finance and Strategy

In principle, liabilities are recorded at the redemption amount at maturity. However, national bonds are recorded at issued price. Provisions for severance and retirement benefits should be an amount equivalent to the estimated amount of severance and retirement benefits that a government entity would be liable to pay, if all employees who are not entitled to the public official's pension or the military pension were to terminate their employment.

Provisions related to the public officials and military pensions have recognized as liabilities through consultation with the related ministries and seminars with various experts, and subject to deliberation and approval by the National Accounting Standards Committee. The recognition of provisions for pension is necessary, as it will lead to effective fiscal management that considers the sustainability of pension funds. It is also helpful in defining more clearly the economic burden the government will assume in the future. Also, provisions for guarantees and insurance services which government provides are recognized as liabilities.

2.2.3. Statement of Financial Operations and the Recognition of Revenues and Expenses

The statement of financial operations is a financial statement that presents operating results, including the costs of programs implemented in the fiscal year and the collection of costs from financial operations. Although similar to a corporate income statement, it is a financial statement reflecting characteristics of a nation in that its main purpose is to provide information on programs.

Table 4-6 | Corporate Income Statements vs. Statements of Financial Operation at the Ministry or Agency Level

Corporate Income Statement		Statement of Financial Operations at a Ministry or Agency level	
Sales (Revenues)	xxx	Program A	
Costs of sales	(xxx)	Gross Costs	xxx
Gross profit	xxx	less: exchange revenue	
Selling and administrative expenses (classified by nature)	(xxx)	Net costs	
		Program B	
Operating income	xxx	....	
Other income (expenses)	xxx	Management expenses	
Income(loss) before income taxes	xxx	Non-distribution expenses	
Income taxes	(xxx)	less: non-distribution revenues	
Net income	xxx	Net operating costs	
		Non-exchange revenues and others	
		Financial operating results	

Note 1 : The statement of financial operations at a ministry, agency or fund level in Korea is very similar to the statement of net cost at the federal government's departmental level in the United States

Source: Ministry of Finance and Strategy

In order to prepare a statement of financial operations, additional analysis on revenues and expenses is required. For revenues, they should be classified into exchange revenues and non-exchange revenues first. Exchange revenues arise when goods and services are provided. Non-exchange revenues[14] arise from the exercise of the government's power to demand payments (e.g. taxes, duties, fines, and penalties) from the public, and donations without giving equal value in exchange. Exchange revenue is either deducted directly from the relevant program or recognized as a part of non-distribution revenues. Most non-exchange revenues are presented in a statement of changes in net assets. However, national taxes are recognized in a report of national tax collection. The form of a statement of

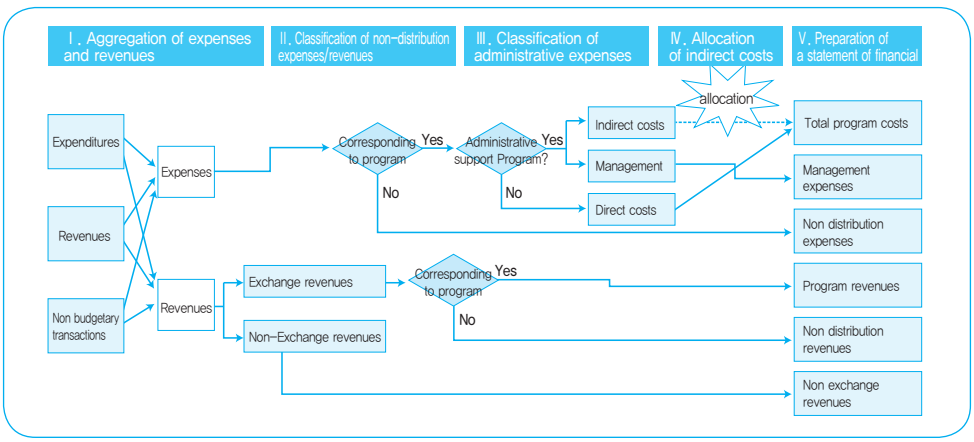
14. Exchange revenues are recognized when goods or services are provided and reasonably measurable. In contrast, non-exchange revenues are recognized as follows:
    - Taxes with self-assessments are recognized when a taxpayer files his or her tax return.
    - Taxes with compliance assessments are recognized when a taxpayer is notified of taxes due by the government.
    - Withholding taxes are recognized when a withholding agent files and pays withholding taxes to the government.
    - For taxes entitled to postponement of payments or payments in installments, the entire amounts are recognized when the amounts of taxes are determined.
    - Charges due, donations, and non-reciprocal transfers are recognized when a legally enforceable claim is settled.
    - Fines or penalties are recognized when they are paid or when forfeiture is taken.

financial operations at a fund level, a ministry or agency level, or a government-wide level depends on how non-exchange revenues are presented.[15]

Expenses are decreases in net assets, arising either from the provision of goods and services, or from the outflow or usage of resources without any returns. They may be incurred in managing a program or otherwise performing general administrative operations according to their purpose.

The process in which revenues and expenses are classified and recorded in a statement of financial operations can be summarized as follows:

Figure 4-1 | Process of Recording Revenues and Expenses and Generating Cost Information in a Statement of Financial Operations



Source: Ministry of Finance and Strategy

15. At the combined national level, all non-exchange revenues including national taxes are recognized in the statement of financial operations.

3. Implementation of the Accrual-based National Accounting System

3.1. Process of Generating National Accounting Information on an Accrual Basis in Korea

3.1.1. Reorganization of the Chart of Accounts

In order to implement accrual-based national accounting system through a computerized system, the chart of accounts (COA) needs to be reorganized first in a systematic and standardized manner. The following is the structure of COA that is being used under the Korean national accounting system.

Table 4-7 | Structure of COA Under the Accrual-based National Accounting System

Category (Account Level 1)	Sub-category (Account Level 2)	Accounting headings (Account Level 3)	Sub-accounting headings (Account Level 4 and 5)
7 accounts (e.g. assets)	28 accounts (e.g. current assets)	Approximately 180 accounts for disclosure (e.g. cash and cash equivalents)	Approximately 1,100 accounts for management (e.g. government cash)

Source: Ministry of Finance and Strategy

Account Level 1 refers to the classification of assets, liabilities, net assets, revenues and expenses, all of which are fundamental components of financial statements on an accrual basis. In Account Level 2, the accounts of Level 1 are further classified into current assets, investment, property, plant and equipment, and others according to the classification criteria as set forth in the National Accounting Standards. Account Level 3 is the basic unit in financial reporting corresponding to a budget item, and refers to accounts for disclosure in financial statements such as cash and cash equivalents, short-term financial instruments, short-term investments, and receivables. Account Levels 4 and 5 are accounts that are used in accounting processes in order to provide detailed information on accounts. In Account Levels 4 and 5, more accounts may be added to meet the need for detailed accounting information. The table below shows an example of the COA structure established under the DBAS.

Table 4-8 | Example of the COA Structure under DBAS, the KFMIS

Account Level 1	Account Level 2	Account Level 3	Account Level 4	Account Level 5
Assets	Current assets	Short-term investments	Debt securities	National bonds
Assets	Current assets	Short-term investments	Debt securities	Public bonds
Assets	Current assets	Short-term investments	Equity securities	Stocks
Assets	Current assets	Short-term investments	Equity securities	Other equity securities

Source: Ministry of Finance and Strategy

3.1.2. Linkage of Budgetary Accounts with COA

In order to produce accounting information under the accrual-based system, in general, transactions or events are recorded by a so-called "accounting slip" with amounts and relevant accounts when they occur in a computerized system. However, under the DBAS, general budgetary transactions do not require an additional double-entry bookkeeping job. For example, when a system user enters the amount into the relevant (single) budgetary account, it becomes linked to the COA. This automatically produces a journal entry in an accrual-based double-entry manner.[16] By virtue of such a structure, the user can easily adapt to the accrual-based accounting system, and errors in financial reports can be minimized.

16. In order to generate accounting information under an accrual-based accounting system, closing adjustments may be made such as depreciation, recognition of allowance for doubtful accounts, translation of assets and liabilities denominated in foreign currencies, valuation of securities, recognition of prepaid or accrued expenses, recognition of unearned or accrued income, amortization of present value, and liquidity replacement. Although some closing adjustments are automatically generated under the KFMIS, others may be manually entered by the system user.

Table 4-9 | Example of Linking Budgetary Accounts with the COA under the KFMIS

Budgetary Account				COA Account
Level 1	Level 2	Level 3	Level 4	COA Account
Loans	Other private loans	1. National bonds	1. Short-term	National bonds
Loans	Other private loans	2. Public bonds	1. Short-term	Public bonds
Deposits and acquisition of securities	Other acquisition of securities	1. Stocks	1. Short-term	Stocks
Deposits and acquisition of securities	Other acquisition of securities	3. Other equity Securities	1. Short-term	Other equity securities

Source: Ministry of Finance and Strategy

3.1.3. Management of Required Input Data by COA

The most prominent advantage of an accrual-based national accounting system is that a variety of information for decision-making can be produced. Therefore, in order to make full use of such information, financial statements, notes to the financial statements and relevant appendices should contain diverse information, which is referred to as required input data. Sufficient information on each COA needs to be managed in a systematic manner. For example, when securities are acquired, information such as the maturity, number of stocks, interest rate, market value, and asset number may be necessary. For national bonds, information such as the purpose of use, management number, repayment methods, interest rate and payment method, date of issuance, and date of maturity may be required, in order to assist in making decisions on similar transactions in the future. The following table shows an example of required input data by COA under the DBAS.

Table 4-10 | Example of Required Input Data by COA

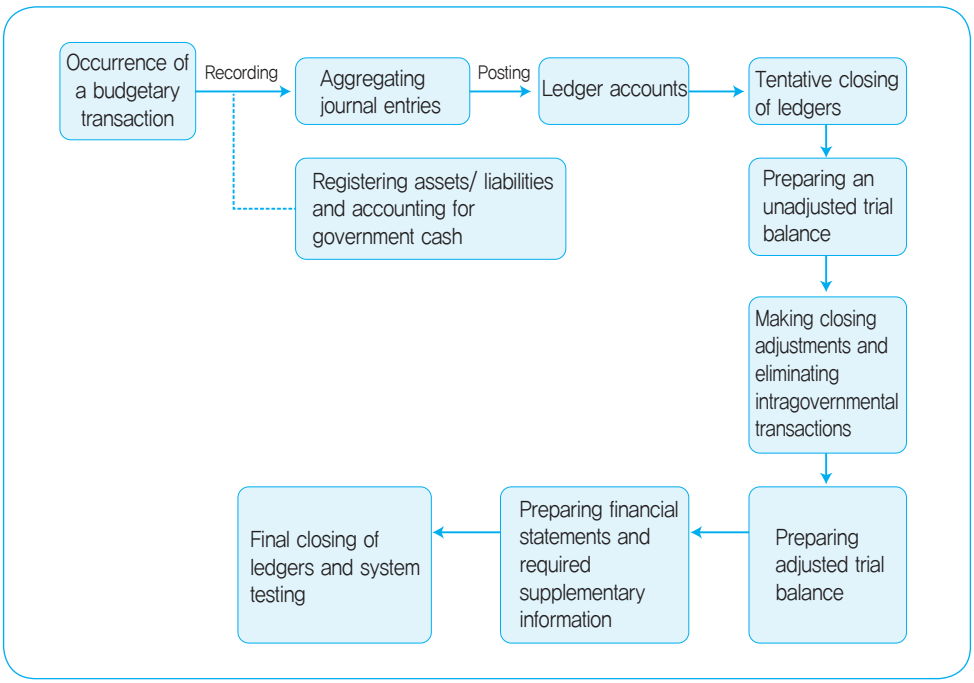
Sub-accounting headings	Debit/ credit	Required input data (1)	Required input data (2)	Required input data (3)	Required input data (4)	Required input data (5)	Required input data (6)
National Bonds	Debit	Issuing body	Asset number	Asset name	Acquisition cost	Nominal value	Nominal interest rate (%)
Stocks	Debit	Issuing body	Asset number	Asset name	Marketability	Number of stocks	Fair value

Source: Ministry of Finance and Strategy

3.2. Process of Preparing Financial Statements under the Accrual-based National Accounting System

The diagram below shows a process of preparing financial statements under the accrual-based national accounting system, starting from a budgetary transaction in the DBAS.

Figure 4-2 | Process of Preparing Financial Statements under the National Accounting System



Source: Ministry of Finance and Strategy

3.3. Auditing National Financial Statements

The BAI(The Board of Audit and Inspection of Korea) audited the FY2011 National Financial Statements, first prepared by the Central Government of Korea, according to new government auditing standards before the statements were submitted to the National Assembly at the end of May, 2012. Auditing National Financial Statements is to correct any errors in national accounting and to give reliable accounting information. Significant errors found by BAI were determined as follows:

Table 4-11 | Summary of Significant Accounting Errors

Categories of significant accounting errors	Related accounts
Underestimation of provisions for pension	Liabilities, Expenses
Over/Underestimation of assets and liabilities from errors of accrual-based accounting methodology. (Errors on revaluation of property, revenue recognition, impairment losses on assets, depreciation, and etc.)	Assets, Liabilities, Net assets, Revenue, Expenses
Underestimation of assets by omissions.	Assets, Net assets
Underestimation of liabilities related to the debt	Liabilities, Expenses
Intercompany transactions left on the statements.	Assets, Liabilities, Revenue, Expenses
Costing capital expenditure.	Assets, Expenses
Classification errors.	Assets, Liabilities, Net assets, Revenue, Expenses

Source: Ministry of Finance and Strategy

4. Evaluation and Suggestions for the Accrual-based National Accounting System

4.1. Characteristics of the Korean National Accounting System

The national accounting system in Korea has been characterized by the following three features.

First, the Korean national accounting system predominantly used U.S. federal financial accounting standards and forms of financial statements as a benchmark. In the financial operations statements of any given fund, at both the ministry or agency level, the cost information of each program is emphasized and non-exchange revenues are recognized separately. This is similar to the statements of net costs in the U.S. federal government. However, in case of a business-type fund, relevant burden charges are recognized in the statement, and all non-exchange revenues, including taxes, are recorded in the combined statement. This indicates that the characteristics of Korean government have influenced the national accounting system.

Second, the budget system in Korea is based on cash-based system, whereas its accounting follows the accrual-based system. The fact that budgeting and accounting have different systems may cause a lot of confusion in practice. In order to address this

problem, the government has established the DBAS, where the execution of a budget is automatically recorded with double-entries. This substantially reduces the workload of public officials who are accustomed to the cash-based system, and minimizing errors in accounting processes. In addition, a considerable part of closing adjustments, such as the calculation of depreciation expenses, translation of assets and liabilities denominated in foreign currencies, recognition of accrued revenues or expenses, as well as the elimination of intra-governmental transactions between funds or between ministries or agencies can now be automatically calculated and recorded under this system. In other words, Korean government has overcome the difficulties arising from the difference in recognition and recording, between its budgetary accounting system and financial accounting system, with outstanding information technologies.

Third, along with the introduction of the accrual-based national accounting system, all relevant legislation and systems have been modified. In the past, closing procedures in national budget were governed by the National Finance Act, while matters regarding national assets and liabilities were governed by the National Property Act, in addition to other related laws and regulations. Today, however, the legal system has been finely tuned in line with the adoption of the accrual-based accounting system. For example, the National Accounting Act was established to provide guidelines for the preparation of financial reports, and the National Finance Act was amended to prescribe the matters related to budgeting and settlement procedures. Other relevant laws and regulations, including the National Property Act and the Commodity Management Act, have also been modified to be closely related to the National Accounting Act, so that financial reports of every kind can be properly generated. Consequently, a well-organized system of national accounting was established.

4.2. Challenges and Solutions for the Introduction of Accrual-based National Accounting System

4.2.1. Conflicts between Ministries and Resolution thereof

The Korean government experienced conflicts among ministries when introducing the accrual-based national accounting system. Following active discussions on the introduction of the new system, there were discrepancies in perspectives of national accounting between the Ministry of Planning and Budget (MOPB), responsible for national budget policies, and the Ministry of Finance and Economy (MOFE), responsible for the settlement of national budget and the management of government cash. Although such conflicts can serve as the driving force behind the development of accrual-based national accounting system, they actually deferred the new system's introduction. However, with the establishment of the MOSF based on the integration of the MOFE and the MOPB in early 2008, those conflicts

were eventually resolved. Consequently, accrual based accounting was successfully introduced in the government accounting system using efficient implementation processes, such as modifying relevant laws and regulations, the establishment of the National Accounting Standards, and addressing problems inherent in the DBAS.

4.2.2. Infrastructure for the National Accounting System

Indeed, introducing an accrual-based national accounting system is very important. However, its successful settlement is even more important. In order to ensure successful settlements, an infrastructure for the national accounting system needs to be established before anything else. The lack of infrastructure for the national accounting system was the biggest obstacle in Korea, as follows.

First, it was expected that it would take a considerable period of time to train and educate information producers, who were accustomed to a cash-based accounting system, so that they can understand the accrual-based accounting system. Furthermore, there were an insufficient number of public officials who understood private sector accounting on an accrual basis. This was likely to have an adverse effect on the reliability of national financial statements, and the generation of a range of national accounting information.

Second, although the Ministry led the introduction of the new national accounting system in cooperation with private experts, it seemed difficult for MOSF to respond in a timely manner to the details of various and complex accounting events. In addition, as seen in the cases of other countries, the establishment and revision of the National Accounting Standards needed to be independent, to some degree, from the government applying them.

Third, the lack of private experts who had sufficient understanding of the new national accounting system deferred the successful settlement of the system. This is because the private experts would have to play a critical role in performing continual research and education, enhance the national accounting system, and provide consultation to the users of accounting information.

With the aim to successfully establish an accrual-based national accounting system in Korea, the government designed and implemented a three-year roadmap for the development of the national accounting system as follows.

Table 4-12 | Plans to Establish Infrastructure for the National Accounting System

Classification	Action Plans
Enhancement of the expertise of public officials in charge of accounting	• Provide a variety of online and offline training programs to help public officials in charge of accounting to understand the national accounting system and to facilitate the operation of the KFMIS • Prepare a plan to raise the morale of public officials in charge of accounting • Prepare legal and institutional systems for recruitment, so that public officials dedicated to national accounting can be recruited starting from 2012
Establishment and operations of the National Accounting Standard Center (NASC)	• Conduct professional research on national accounting • Respond to various accounting events occurred in ministries or agencies and provide relevant consultation on a timely basis • Entitle the NASC to propose the establishment or revision of standards and technical releases
Training of private experts	• Add national accounting-related subjects to the test for Certified Public Accountants • Introduce a certification system for national accounting and enhance the expertise of accounting firms in national accounting • Introduce a system to ensure that financial statements are audited or reviewed by independent auditors prior to submission of them to the MOSF, in order to enhance the reliability of national accounting information

Source: Ministry of Finance and Strategy

4.2.3. Systematic Reorganization of the National Accounting System

In practice, a number of difficulties were encountered in the process of producing national accounting information that is reliable and useful for policy decision-making. Those difficulties were generally related to the due diligence and valuation of infrastructures for their recognition as an assets, the preparation of accounting standards on how to account for pension provisions, and the reorganization of the accounting information system to generate financial statements.

Infrastructures, which are government-specific assets, have a number of potential difficulties in being recognized in financial statements. As most infrastructures require a considerable amount of time and money for their construction, it is generally difficult to determine the acquisition cost or carrying amount. In addition, it takes a considerable period of time to perform due diligence because many infrastructures were constructed

a long time ago and are located all over the country. For example, local governments in the U.S., which adopted an accrual basis accounting, had to spend a long period of time identifying infrastructures and recognizing them in financial statements. The Korean central government was also well aware of those difficulties. Although the accrual-based national accounting system was introduced in 2009, the due diligence, valuation, and recognition of all infrastructures has completed by 2011 through the three-year roadmap for the development of the national accounting system.

Similarly, there are many challenges involved in provisions for pension. This is much more than just an accounting issue. The government needs to promote effective financial operations considering the sustainability of pension programs, and streamline the structure of pension system considering the burden that will be imposed on the government. In addition, the government should design effective ways to improve the management and operation of pension assets. Although provisions for pension should be recognized under the current accounting system, such recognition has been suspended at the moment. However, accounting policies on pension provisions will be prepared by 2011, based on more researches and practical comments, and pension provisions will be recognized in financial statements accordingly.

In Korea, the KFMIS has been in operation since 2007. It generates accounting information on an accrual basis at a fund level. However, in case of combined financial statements at the ministry or agency level or a government-wide level, the submission to the National Assembly has been deferred for a grace period of two years, due to difficulties such as the elimination of complex intra-governmental transactions between funds, or between ministries or agencies. To raise the accuracy of accounting information and enhance the reliability of combined financial statements, the Korean government plans to modify relevant systems and regulations, through the three-year roadmap for the development of the national accounting system.

In addition to these initiatives, the government is developing financial analysis methodologies (e.g. a financial soundness indicator), and public relation systems targeting public officials and the public in a systematic manner, for the successful settlement of the national accounting system.

4.3. Suggestions for the Accrual-based National Accounting System

A national accounting system is considered as the most crucial policy for fiscal reforms in many advanced countries. In general, a considerable amount of time and effort is required to implement the new system. Besides Korea, countries that have already introduced

the system had similar experiences. For example, the U.S. federal government has been establishing new accounting standards on a continual basis since the beginning of the 1990s, when the first Federal Financial Accounting Standards were established. In case of the British government, the preparation of the Whole of Government Accounts (WGA) has been deferred until now.

From now on, those countries that intend to adopt an accrual-based national accounting system need to set up a long-term project for the implementation. In addition, unlike accounting systems for companies, each country has different political and administrative systems, backgrounds of fiscal reforms, and financial structures. This necessitates sufficient and careful consideration of national accounting systems specific to each country. Moreover, a new computerized system that generates practical information on national accounting should be established. The attitude of information producers and users toward the new system should also be changed to a more positive environment for a national accounting system to be successfully settled.

Based on the lessons learned from the experiences of the Korean government presented here, countries that plan to introduce an accrual-based national accounting system would need to consider the followings.

Table 4-13 | Considerations Regarding the Adoption and Implementation of an Accrual-based National Accounting System and the Experiences of Korea

Category	Considerations	Korea's Experience
Creation of an environment for the introduction of an accrued-based system and the modification of relevant laws and regulations	1. Clear-cut understanding of the existing national accounting system and a social consensus on the need for an accrual-based national accounting system. This includes a review of the linkage with fiscal reform	Became aware of the limitation of accounting information from the conventional cash-based accounting system, and raised the need for introducing the accrual-based national accounting system as part of the fiscal reform to overcome the financial crisis
Creation of an environment for the introduction of an accrued-based system and the modification of relevant laws and regulations	2. Selecting a ministry that will lead the introduction of an accrual-based national accounting system, and seeking cooperation from related agencies	Resolved conflicts between the Ministry of Planning and Budget, which governed budgets, and the Ministry of Finance and Economy, which governed settlements

Category	Considerations	Korea's Experience
Creation of an environment for the introduction of an accrued-based system and the modification of relevant laws and regulations	3. Establishing laws and regulations governing the introduction of an accrual-based national accounting system, and analyzing their relationship with the existing ones	Streamlined the legal system, such as the National Finance Act for budget and settlement and the National Accounting Act, for the preparation of financial reports
Research on the characteristics of national accounting and development of an accounting system	4. Setting up a plan to link the budget system with the accounting system	Developed an accounting system under which budgeting and accounting are linked together, so that accounting information can be automatically generated
Research on the characteristics of national accounting and development of an accounting system	5. Benchmarking best practices suitable for the fiscal structure, and making efforts to make it practicable	Benchmarked the U.S. federal government, while modifying it to serve the realities of Korean government
Research on the characteristics of national accounting and development of an accounting system	6. Drawing a social consensus on special national assets and liabilities, conducting continuous research to reflect them properly in financial statements, and making a plan to overcome practical difficulties	Provided a roadmap for the due diligence of infrastructures and the measurement of provision for pension, and continued to perform analysis and draw a social consensus from a long-term perspective
Research on the characteristics of national accounting and development of an accounting system	7. Developing and modifying a budget and accounting system suitable for the fiscal system	Developed and operated the Korean financial management information system capable of comprehensively analyzing and generating information based on its information technologies
Stable settlement of a national accounting system	8. Training experts on an accrual-based accounting system	Offered continuous education for public officials in charge of accounting, and developed a plan to recruit accounting professionals

Category	Considerations	Korea's Experience
Stable settlement of a national accounting system	9. Discussion on the establishment and operation of private professional organizations	Established the National Accounting Standard Center, a private organization, and entitled it to research, consult and develop the national accounting standards
Stable settlement of a national accounting system	10. Systematically preparing a plan to train private experts for the development of a national accounting system, and how to utilize them	Added relevant subjects to the CPA exam, set up a plan to enhance the reliability of the national accounting information, by using private experts
Stable settlement of a national accounting system	11. Taking follow-up actions to ensure the stable settlement of the system on an ongoing basis	Established a systematic roadmap for the stable settlement of national accounting system and performed an assessment of its track record on an ongoing basis

Source: Ministry of Finance and Strategy

2012 Modularization of Korea's Development Experience
Korean Experience of Financial Management Information System: Construction, Operation, and Results

Chapter 5

Digital Budget & Accounting System

Digital Budget & Accounting System

1. Outline of Digital Budget & Accounting System

1.1. Definition of Digital Budget & Accounting System

Recently, many countries are concerned about FMIS (Financial Management Information System), constructing their own FMIS systems to suit each country's different needs. Developing countries, in particular, are scrambling to construct FMIS.

The most important reason for an FMIS is that it enhances the efficiency of national finance management, and guarantees increased transparency. In a way of preventing problems related to public finance, FMIS can help overcome future problems, such as a sovereign debt crisis or a foreign exchange crisis.

An FMIS also plays a significant role in managing the ever-increasing scale of public finance and possible overriding debt. Governments recognized the limitations of simple Public Expenditure Management System (PEMS), which is managed by each country for public financial management. They realized the necessity of an integrated financial management system that reflects country-specific conditions.

An FMIS is also effective in that it manages financial information from all national fiscal processes, such as budget formation, execution, accounting and settlement, and performance management in a systemic and comprehensive manner. For these reasons, many countries are trying to design forward-looking national FMIS.

An FMIS, which systemically manages public financial management, should be considered as SOC (Social Overhead Capital) and an investment in national infrastructure, rather than a mere information system that simply handles and processes data. The cost

for constructing an FMIS should be deemed as investment rather than as an expense. This is because an integrated FMIS does not only process data, but also helps financial managers build up their capacity with innovations and improvements relating to effective administrative policies. Therefore, the FMIS should be recognized as an investment in an information system that contributes to the development of a nation.

An ideal FMIS should include an overall spectrum of financial management, including budget formation, execution, and accounting and settlement management. It should also be able to manage performance evaluation information about fiscal expenditure plans and their execution. By providing statistics and analysis, it suggests appropriate direction for financial management guides, and gives prior warnings on fiscal crisis-like situations.

An FMIS should also consider a connection system for external organizations, in order to provide comprehensive information that is intimately connected with data of all public organization regarding national fiscal management.

The Digital Budget & Accounting System (DBAS) of Republic of Korea is called by name of the Korea Financial Management Information System (KFMIS). DBAS (or dBrain) is an integrated financial management information system that the Korean government established in an in-house approach for efficient public financial management. dBrain is an acronym of "digital Brain", meaning that it can perform integrated finance management intelligently in the digital era.

DBAS is integrated finance information system to systemically manage the entire realm of finance business processes, such as national budget, accounting, settlement, and performance evaluation.

DBAS includes new laws and regulations related to finance, and can impose new fiscal policy and business process for systemic national finance management. DBAS is an integrated information system, which users can use with convenience and effective processing, based on the latest information communication technology.

DBAS is constructed for effective distribution and management of the nation's resources, which is based on financial results the government must meet in the modern era. DBAS is a finance integrated information system constructed by efforts of many public officials in finance and information management, with contributions also made by academia and industrial officials over the course of several years.

DBAS, which integrated all finance information systems, performs national finance management in a way that is very different from before. And DBAS runs contrary to the previous traditional way of handling the budget and accounting system, reflecting a revolutionary change of Korea's finance system.

Currently, DBAS is a system used by over 55,000 public officials responsible for financial matters. On a daily basis, DBAS performs over 300,000 transactions requested by more than 15,000 officials on average. Its daily transactions total approximately US$ 5.3 billion.

DBAS includes many reformist ideas related to the fiscal information management system. In particular, it reflects various finance operational requirements from nation/citizen organizations. And DBAS is constructed for fast and convenient operation/management, and manages a large quantity of finance business data in the digital era. It maximizes the efforts of finance business management related to financial transaction. This integrated information system was constructed to reflect new government budget and accounting laws, designated to meet the requirement of the resulting demand.

DBAS has following important characteristics.

Table 5-1 | Characteristic of DBAS

Characteristic	Description
Adopts new finance management ideas	• Adopts new finance management ideas--Program budget system, accrual based/double-entry bookkeeping to comply with international standards
Connects new government financial statistics	• Operates/manages/analyzes an information system, which connects and integrates with new financial statistics ranges, including financial activity in central/local government, government public organizations, state owned enterprises, etc.
Shares synthetically government finance management information	• Information system can perform, manage, and monitor in one system relevant budget business process, such as allocation, expenditures and settlements of budget requirements, from ministries responsible for programs • Not only oversees financial information management that range from collection of finance revenue (such as through budget requirement, formulation, execution, accounting, settlement, performance evaluation, etc.) sent to related systems; also, integrates information system to share information with the citizens and civic groups
Secures responsibility of transparency and finance operability in real-time	• Constructs a management system covering all national finance program to share with citizens in real time, an information system that promotes transparency and responsibility of finance operating evaluation in whole processes, from finance program decision to execution • Improves transparency of all online financial transactions for auditing purposes

Characteristic	Description
Ensures efficient financial management	• Reduces budget waste by managing all policy process systemically, and ensures efficient financial management according to public officials' abilities • Enhances efficiency of financial operation by saving time in financial management and efficient budget requests • Provides accurate and up-to-date financial information, and supports right decision-making • Easier to perform all accounting activities, like program cost computations and the preparation of financial reports using DBAS • All work related to financial management will be performed by an automated system rather than manual process
Efficient national treasury management	• Ensures efficient and transparent management of treasury with EBPP and EFT systems • Real-time monitoring of revenue and automatic transfer of funds
Transparent system with anti-corruption effects	• All payment process spending decision handled electronically • Quick automatic system eliminating manual accounting process • Transparent information system with anti-corruption effects

EBPP: Electronic Bill Presentment and Payment

EFT: Electronic Funds Transfer

Source: Ministry of Finance and Strategy

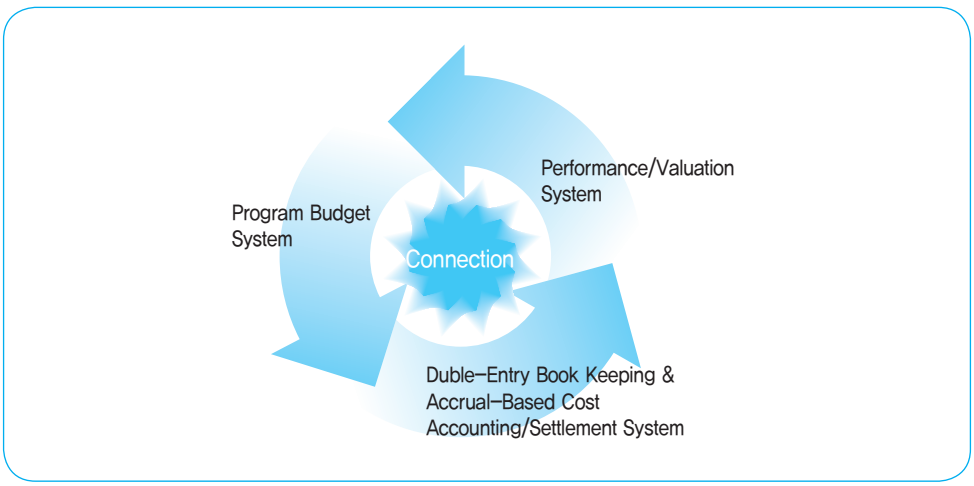
The basic idea, which is related to information, was to construct the DBAS with a Single-Sign-On (SSO), and One-Stop Service (OSS) solutions. "Single-Sign On" is a security application solution, on which diverse users can connect to many different information systems and Internet services with only one log-in. By using SSO, users could conveniently access to a diverse system only with one account. User is no longer obliged to execute new certification processing for each different information system. This system can secure and prevent dangerous elements, and improve user's convenience, as well as reducing certification management expenditures. "One-Stop Service" is idea that all data or information in any business process could share that data or information. It is an important idea related to information system construction for securing coordination of data, and promoting user convenience.

Following [Figure 5-1] "DBAS Concept Mapping" shows that finance integrated information system includes a budget system for each operation, in order to become a new national integrated finance information system. Also, it shows that the budget requirements, formulation, execution, accounting, settlements, collection of finance revenues, expenditures and performance, evaluation, etc. are all systemically operated in a network environment.

The operating result is the One-Stop Service' of DBAS, which become feedback for new budget requirements, formulation, execution, accounting and settlements.

In [Figure 5-1], the DBAS includes the integrated information system's ideology of recycling all the operating data into related unit systems.

Figure 5-1 | DBAS Concept Mapping



Source: Ministry of Finance and Strategy

1.2. The Necessity of DBAS

1.2.1. Expand the Size of Public Finance

Korea overcame diverse changes and difficulties to establish economic growth, increase its international status, and increase its national power in the last 60 years. The idea related to finance pursues the change from national growth to stable growth, and Korea is trying to perform its responsibility as a member of international society.

In order expand and change the size of public finance, many changes for finance management and the expansion of public finance is needed, for the following reasons:

- Increase size of public finance according to nation's economic development and economic growth
- Secure the efficiency of finance expenditure and expand the size of public finance expenditure, according to increase of nation's quality of life

- Increase the importance of using and managing financial information, according to expansion of the size of a nation's public finance system

1.2.2. Change of Fiscal Management Paradigm

The nation's paradigm related to fiscal management changes from: simply committed; controlled budget operation or revenue; expenditure of budget; accounting management to an increased focus on performance. To reflect these new changes, we need to change from a divisional item budget system to a divisional program budget system, and require mid-term fiscal plan budget management from budget formation to the execution of annual budget management.

Also, Korea required a change from a cash-based/single-entry bookkeeping accounting system to an accrual-based accounting/double-entry bookkeeping, which ensures the transparency of finance operations. The following are the necessary components of a finance operation paradigm:

- Increase importance of strategic resources divided based on performance management
- Necessary improvement of divisional program budget system for budget operation, based on performance management
- Necessary connection between mid-term fiscal plans and annual budgets
- Necessary adoption of accrual-based accounting/double-entry bookkeeping into the accounting system
- Necessary connection between budget management, accounting management, and performance management

1.2.3. Expand Participation of Nations or Civil Organizations

Nations or civil organizations can change the way we relate with the consciousness of national finance, along with national development. These groups were only concerned with participation in finance management as an auditing body. They participated in all processes, from budget formation of execution and settlement and performance evaluation. The following are reasons why encouraging the participation of nations or civil organization to participate:

- Need budget and accounting reforms to secure transparency
- Need to establish clear responsibilities for effective execution of finance operation
- Need to organize a secure system for all finance resources

- Expand budget audit campaigns of nations, civil organizations, and related organizations' participation

1.2.4. Reflect New Law/Regulation

Korea required an information system which reflected the changes from a cash-based/single-entry bookkeeping system to an accrual-based accounting/double-entry bookkeeping system, as well as the change from a divisional item budget system to a divisional program budget system. Followings are the items a new information system needs to reflect the changing contents, as related to finance law or accounting law:

- Reflect the national finance laws/national accounting laws that are newly enacted
- Reflect improvement systems in the government accounting system/regulation
- Reflect divisional program budget systems
- Reflect accrual-based accounting/double-entry book keeping accounting system

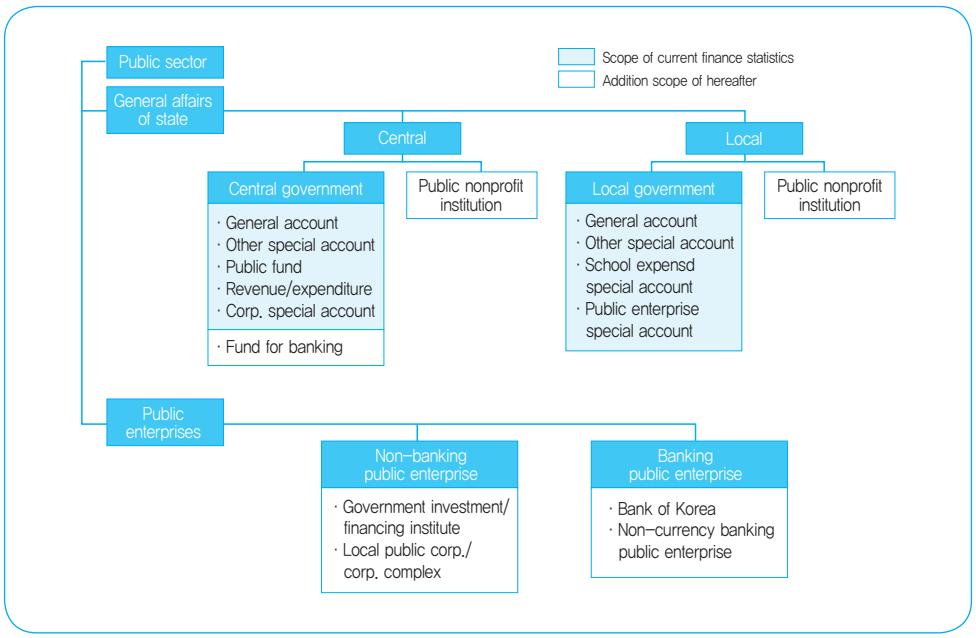
1.2.5. Require Reestablishing Finance Scope Satisfying International Standards

Korea needed to reestablish a finance scope satisfying international standards, according to suggestion of OECD and IMF. It also needed to reestablish a national finance scope, which would be narrowly defined in the current central government, and then reflect this scope to information system. [Figure 5-2] "Scope of writing the new finance statistics" expresses that a new established finance scope should be included in DBAS.

This content express that we have to expand the national finance statistic scope for whole public categories, from the central government's "general accounting", "corporation special accounting", "other special accounting", "public fund", "revenue/expenditure," all of which were established before DBAS.

- Reflect the accrual-based accounting/double-entry book keeping accounting system for powerful finance operations
- Require finance statistics based on accrual-based accounting
- Include whole public categories in integrated finance scope, controlled by the central government
- Finance scope discord public category

Figure 5-2 | Scope of Writing the New Finance Statistics



Source: Ministry of Finance and Strategy

1.2.6. Change of Finance Environment and Flexible Networking/ Expanding between Related Systems

Korea needed an integrated finance information system to systemically manage information related to the finance management of related organizations, and promptly reflect internal/external changes in finance management. These necessities can be organized into the following:

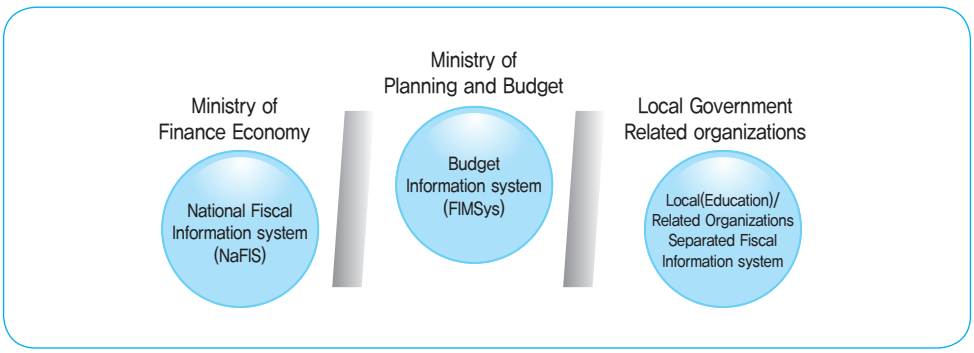
- Necessary information system to promptly adopt environment changes
- Necessary efficiency finance management through the sharing information between related organizations

The information system is required to handle a large quantity of data accurately and promptly, and promote a contingency of users to reflect these necessities.

Before DBAS, national finance management operated separately, as illustrated in [Figure 5-3] "Isolated finance management information system." To expedite the decrease in isolated finance information management, Korea needed a finance integrated information system. [Figure 5-3] "Isolated finance management information system" is an information system before DBAS construction, signifying how difficult it is to divide and manage national resources.

Isolated finance management information system is a FIMSys, which individually manage midterm finance fiscal plans, and the NaFIS, which is responsible for handling annual budget formations and single-entry bookkeeping/cash-based accounting.

Figure 5-3 | Isolated Finance Management Information System



Source: Ministry of Finance and Strategy

FIMSys was processed through three phases, and the business scopes are as follows:

- Primary business scope (Aug. 1999~Jun. 2000)
  - ◇ Develop Ministry of Planning and Budget homepage
  - ◇ Develop Ministry and Office Concerned program
  - ◇ Develop budget comprehensive information system
- Secondary business scope (Dec. 2000~Jun 2003)
  - ◇ Develop budget information management system
  - ◇ Knowledge management system
  - ◇ Electronic Document Interchange System
  - ◇ Network unit system
  - ◇ Supplement homepage
  - ◇ Develop prototype and establish finance information analysis system ISP
  - ◇ Develop budget line item code management program by year
  - ◇ Supplement and construct budget information management system, fund management system, national fiscal information system
- Tertiary business scope (Dec. 2003~Jun 2005)

◇ Promote the informatization of the finance innovation project (Top-down budgeting system, mid-term fiscal operation management, performance management)

◇ Improve the function of budget information management system, and construct the finance information analysis Database

The system composition of FIMSys consists of a budget information requisition/ management business server, an internal information management server, and a system management server. The NaFIS construction business was achieved through two phases:

• Primary business scope (Feb. 2000~Nov. 2002)

◇ Develop a general finance information system, an automatic journalizing system, a finance fund real-time revenue and expenditure system, an integrated settlement system, a finance comprehensive analysis information system, and a standard information operation system, according to result from the information strategy plans

◇ Establish an information strategy of item management, suggest ways of establishing an integrated/network unit system related to finance, educate users/operators, and support technology

• Secondary business scope (Jul. 2000~Dec. 2003)

◇ Construct an information system network handling system: finance fund real-time revenue and expenditure, network finance operation management, and accounting settlement data

◇ Develop an application system: treasury extra fund management, public capital management funds, public funds operation plans, and financial merchandise management

◇ Construct a base system: hardware, operation and common use software, network category, secure management, and infrastructure

◇ Write demo financial statements

◇ Develop cyber education and contents

The system compositions of the NaFIS are as follows: a standard finance code information server, a finance EBPP transmission server, electronic fund transfer servers, finance organization transfer servers, and an integrated settlement server. Although there are difficulties with establishing an integrated national finance management system, the FIMSys and NaFIS are separately operated. Based on these information systems, DBAS constructed the integrated finance information system currently in use. The followings are reason why integrated finance information systems are preferred:

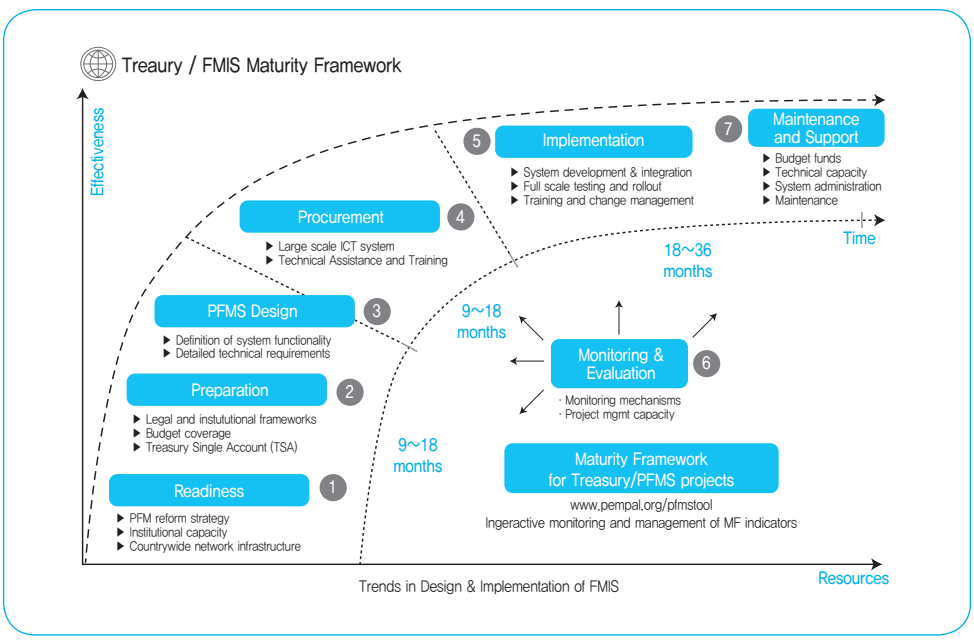
- Requires and information systems that promptly adopt changes in the finance management environment
- Necessary to integrate the finance management information system, which operates separately and independently
- Necessary information system to supply finance management information for all nations

To consider these necessities, Korea built DBAS for a national level of integrated finance information management.

1.3. DBAS Propulsion Passage

Following [Figure 5-4] "Treasury/FMIS maturity framework" is a maturity framework, which is suggested by the World Bank when constructing a FMIS system. In terms of framework, it expresses compellingly the whole processing from readiness, preparation, PFMS design, procurement, implementation, and maintenance & support. It also gives an approximate estimation of the constructing period.

Figure 5-4 | Treasury/FMIS Maturity Framework



FMIS: Financial Management Information System
ICT: Information & Communication Technology
PFMS: Public Financial Management System
Source: Ministry of Finance and Strategy

DBAS, as it is used today, was constructed in the same schedule as <Table 5-2> "KFMIS propulsion passage", which shows that this processing progressed similarly to that of [Figure 5-4] Treasury/FMIS maturity flame work, as suggested by the World Bank.

Table 5-2 | KFMIS Propulsion Passage

Year	Processing content
Apr. 2004	• Decide to construct finance information system at national agenda conference
May. 2004	• Organize propel group, advisory committee and set up the processing system
Jul. 2004	• Choose main propel assignments such as adopt program budget system, accrual-based accounting
Jul. 2004~Dec. 2004	• Determine BSP for system construction • (KFMIS master plan establishment)
Feb. 2005~Sep. 2005	• Perform BPR/ISP for system construction
Oct. 2005~Oct. 2006	• System construction finish
Nov. 2006~Dec. 2006	• System test and educate user
After 2007	• System settle and maintenance(Operate)

BSP: Business Strategic Planning
BPR: Business Process Re-engineering
ISP: Information Strategic Planning
Source: Ministry of Finance and Strategy

In April 2004, DBAS was designated the new finance information system, promoted as a nation agenda, to efficiently manage the entirety of national finance at the Nation Agenda Conference. As a part of this decision, Korea organized the "Digital Budget & Accounting Renovation Office," with public officials who are in related departments, such as the Ministry of Finance and Economy, the Ministry of Planning and Budget, the Ministry of Government Administration and Home Affairs, and the Ministry of National Defense. The office also included certified public accountants and IT (Information Technology) experts, all of whom met in May 2004. And Digital Budget & Accounting Renovation Office was placed under the Ministry of Strategy and Finance as a "Fiscal Management Cooperation Office" in January 2011.

The early Digital Budget & Accounting Renovation Office organized advisory committees with accounting, economic, management, IT, academia, and civilian experts, to align the processing system. Digital Budget & Accounting Renovation Office held workshops in cooperation with the World Bank about finance information system construction, extracted

interests from related individuals, and established the means by which to construct the new information system. As such, Korea collected relevant data regarding finance information systems in the USA, England, Austria, etc.; Korea has also visited relevant countries to observe and formulate case studies.

Korea prepared DBAS construction through these systemic processes, and decided to adopt a program budget system and an accrual-based accounting/double-entry bookkeeping accounting system, as a main project to precede other detail projects at a later time. And based on these processes, Korea uses BSP (Business Strategy Planning) that establish entire master plans related to DBAS construction, from July to December 2004, a period of six months.

During this period, we can analyze Korea's current condition as it related to finance management, as well as the necessity of new finance management and laws and regulations. Also, an entire plan for constructing a new information system is available.

Results from Korea's BSP suggest that the adoption of ERP (Enterprise Resource Planning) was important to Korea's finance information system reforms. However, DBAS construction experts do not necessarily agree with this proposition. The Digital Budget & Accounting Renovation Office considered that an in-house system was preferred, because it would be the better way to develop a proper finance information system in Korea. From February to September 2005, an eight month period, Korea redesigned the budget/accounting business process for system construction, and program budget construction settings for all central government administration organizations, and performed the ISP (Information Strategic Planning) to develop a finance information system with redesigned standard contents.

In particular, Korea performed analysis and investigation into the advantages and disadvantages of ERP adoption. Korea also looked for way to develop an information system that used the ISP process as an in-house system.

Korea concluded that an in-house system construction method was a better option than the adoption of ERP, as many foreign countries did. Korea then chose a system integration company for developing the in-house system. Korea finished the information system in October 2006.

During this period, Korea modified related laws and regulations, along with developing the information system. In particular, new contracting information systems, reusing hardware from previous budget and accounting managing systems, were assembled to mitigate the effects of migrating to the new systems.

It is very difficult to construct a large-scale information system only in one year. With the efforts and participation of many concerned individuals, the DBAS was, however, constructed in about 12 months. Between November and December 2006, Korea operated demo versions, and user education for DBAS, making the system ready for use by 2007. Of course, the demo operation duration was very short, when taken into account the scale of the information system, as it was impossible to provide education to about 80,000 financial business and related public officials.

However, the implementation of DBAS, new finance information system would be delayed for one year, since January 2007 marked the beginning of the new fiscal year. Korea therefore educated and trained public information officials and information system-related professionals with the demo version during two months. As a result, DBAS has been operated with stability and high performance since its initial installation in January 2007.

Indeed, DBAS could not have come together in such a short period of time, without the enthusiastic participation of public information and other professionals during the development phase.

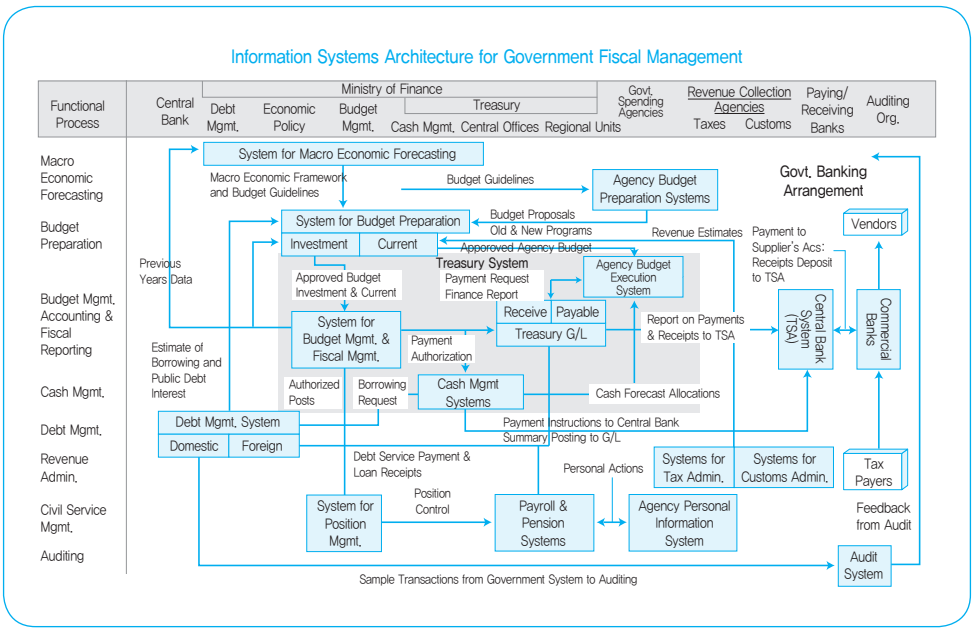
1.4. Compare DBAS and Foreign Country Finance Information System

Advanced countries are not the only ones who operate a finance management system. The key difference between advanced countries and developing countries is the system with which they operate their national finances. However, all nations expand the size of their public finances as reflections of chances in the international finance environment, perform transparency exercises to accurately execute finance management information, and report the results to national and international organizations.

Therefore, countries construct information system to address problems and shortcomings in their finance management; international organizations like the World Bank continually provide consultation and support for constructing new finance information systems.

Ali Hashim and Bill Allan suggest that a framework and composition elements for a basic integrated finance system at the national level of finance management be adopted, like [Figure 5-5] “Integrated finance system framework of World Bank” in the World Bank’s “Treasury Reference Model.” Therefore, many integrated finance information systems are based on this framework.

Figure 5-5 | Integrated Finance System Framework of World Bank



Source: Ministry of Finance and Strategy

Of course, Korea's DBAS truly reflects an integrated finance system framework, as suggested by the World Bank's guidelines. In particular, DBAS considers all state-of-the-art information technology, and implements them in an in-house system manner, without external help. It is one of the leading finance integrated information systems made by using only internal technology. DBAS is the only information system to constructed and planed systemically in the world.

[Figure 5-6] "FMIS cycle of World Bank" briefly expresses the relationship between composition elements in information systems for national finance management, as suggested by Cem Dener of the World Bank.

In [Figure 5-6], the Cem Dener's FMIS cycle includes whole processes, from development to execution of policy that need finance, budget, accounting, settlement, and audit in an information system. This idea is similar to DBAS in Korea, in that they are both connected and used to a unit system related to all data, and that the performance result has to be recycled during the subsequent budget formation.

Dener defines FMIS in the following statement:

• *FMIS = Budget Management + Treasury Management (+ Other Management)*

The composition elements of FMIS are consisted of "budget preparation," executed budget "finance system," and can be included as selected composition elements in "other system," and "surround system."

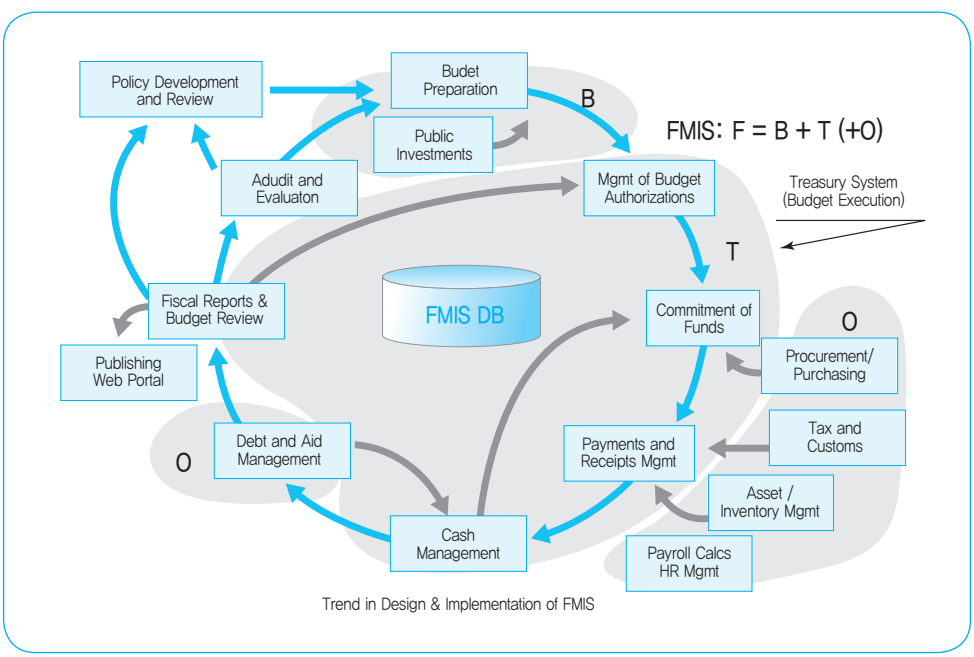
★ *Essential composition element*

- Budget preparation: unit system considered cooperated investment
- Finance system: the unit system that perform budget authority management, fund execution management, revenue/expenditure (treasury management), cash management, finance report & budget execution review

★ *Selected composition element*

- Other system: the unit system of procurement/purchase management, tax/customs duties management, state assets/properties management, human resource/salary management, and debt/aid management
- Surround system: the unit system for review/policy development included in budget preparation, audit/evaluation, writing finance performance result reports, and open information

Figure 5-6 | FMIS Cycle of World Bank

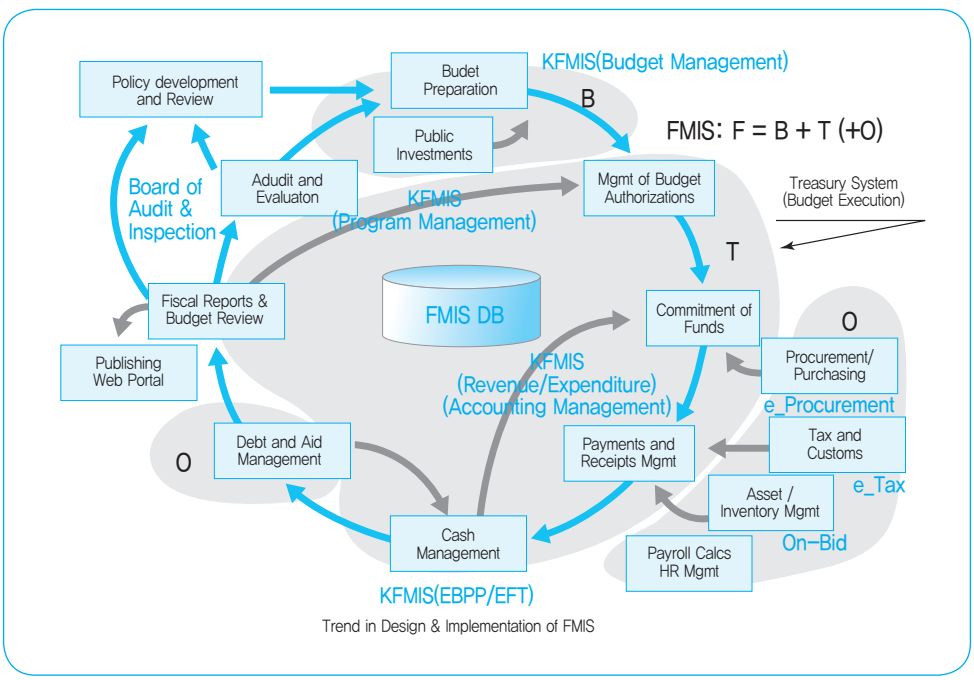


Source: Trends in Design and Implementation of FMIS (Manila, Philippines. June, 2010)

Many countries currently construct information system shown in [Figure 5-6] FMIS cycle of World Bank, suggested by Dener, for finance management.

[Figure 5-7] "FMIS cycle of Korea" is an illustration of Korea's integrated finance management system, as a basis of comparison to [Figure 5-6] "FMIS cycle of World Bank". As expressed in [Figure 5-7], DBAS' external network system is similar to the contents from the FMIS cycle, as suggested by the World Bank. In particular, EFT and EBPP for operating "cash management" included in DBAS is one of the most compelling electronic approval & payment system in the world.

Figure 5-7 | FMIS Cycle of Korea



Source: Ministry of Finance and Strategy

Dener designs FMIS construction model, recently system construction way, like [Figure 5-8] "Web Based PFMS Model."

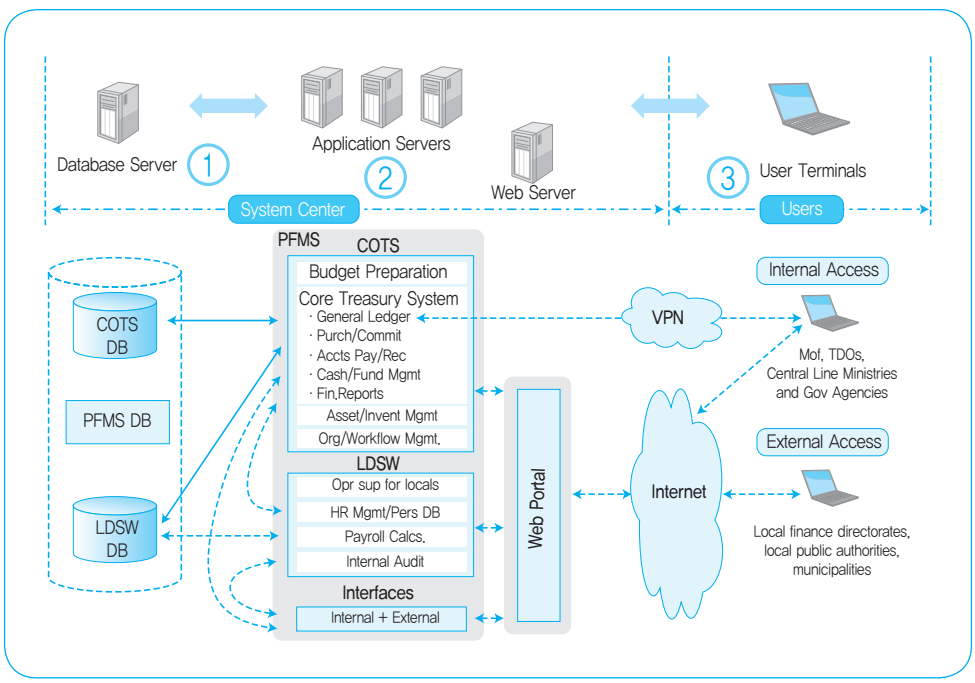
Locally Developed S/W (LDSW) systems for integration with DBAS were consisted of only locally-grown technology. It is different than concept of the FIMS module, a web-based Commercial-Off-The-Shelf (COTS) system, recommended by Dener. The COTS system can be defined as computer software or hardware that are sold, leased or transferred as finished goods.. It does not use a commercialized standard database, but rather database

environments autonomously designed and constructed. It does not use modify application programs that reflect user requirements, but uses its own application development programs as a user requirement as well.

The DBAS, as currently utilized, includes all FMIS cycle features, as suggested by Dener. In addition, DBAS includes EFT and EBPP, using an e_Payment platform. And DBAS is an integrated information system using ideas from the web-based FIMS and internal networks, for simultaneous data security management.

Many foreign countries' information systems, sometimes called finance integrated information systems, are not developed within their national borders. Most use ERP, which is packaged form of development, or a COTS system. They customize finance package form of information systems, which internationally develop and sell ERP system software, like ORACLE's Application and SAP's R3.

Figure 5-8 | Web Based PFMS Model



VPN: Virtual Private Network
COTS: Commercial-Off-The-Shelf
LDSW: Locally Developed Software
Source: Ministry of Finance and Strategy

Some countries modify some parts of the programs themselves, because of their standards or methods for budget/accounting modules are different from the ERP system. As a result, they develop special programs by connecting with the ERP system for their special situations. The advantages of adopting an ERP system in cases such as these is that the new finance management system can be readily deployed. However, these countries still need to change their current processes. By customizing, change in application program software can possibly impropriate part of their business.

How to change the ERP system in certain permitted situations present an even greater disadvantage, in spite of the ease with which it can be adopted. In fact, most countries did not have many difficulties in the early stages of ERP adoption, since they were customized with package suppliers. When in operation, however, these systems can become highly unstable without the vendor's help. To modify supplied application programs in the ERP system, high costs are often involved, since it requires the vendor to send assistance.

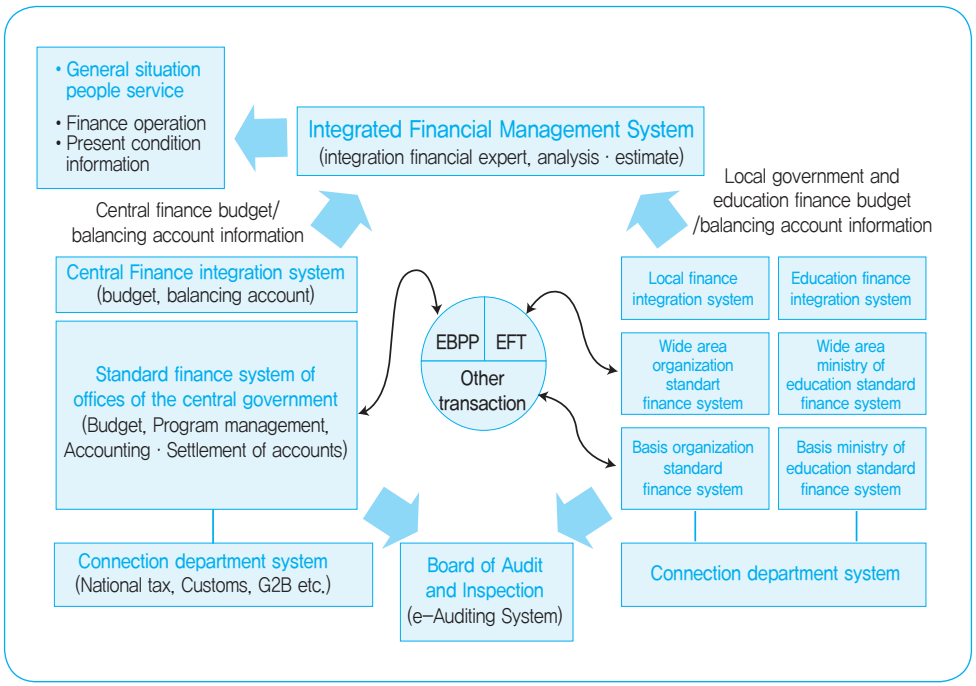
For this reason, most developing countries did not seek to modify the existing ERP systems for their individual needs. Unfortunately, this led to not being able to use the ERP system at all. Currently, the United States and many European countries used budget/accounting management modules of the ERP system with customization. Austria and New Zealand are the only countries using budget management modules that were autonomously developed, along with accounting management modules used to customize the ERP systems accounting module.

2. Function of Digital Budget & Accounting System

2.1. Composition of Digital Budget & Accounting System

The composition of the DBAS integrated finance management system is illustrated like [Figure 5-9] "Composition of integrated finance management system."DBAS dictates that all information related to national finance be systemically connected, and makes public information about finance management & financial conditions available to citizens through the adoption of transparent finance management. DBAS manages "local government finance information system," "educational finance information system," and related organizations not included in DBAS's "Central finance information system."

Figure 5-9 | Composition of Integrated Finance Management System



G2B: Government-To-Business

Source: Ministry of Finance and Strategy

DBAS is used by public officials and management. Public officials actively utilize the finance business items and finance analyses of the central and local government bodies, while the managers operate and manage DBAS. Finance policy decision makers include all finance business treasurers in government.

DBAS includes civil organizations, and they audit the entire process of national finance management from all related organizations. These data include finance information, and nation priorities, and budget formation to finance execution and accounting settlements. This process is illustrated in <Table 5-3> “DBAS user.”

Table 5-3 | "DBAS User"

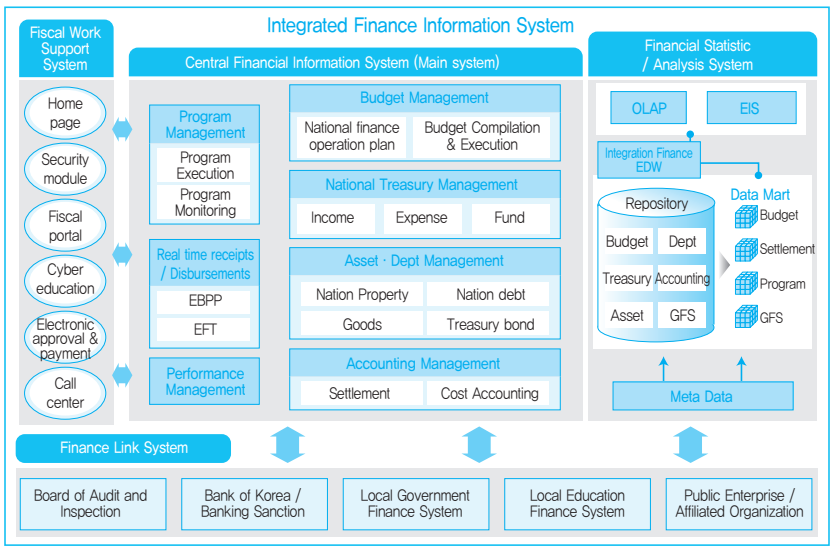
Classification	Definition	Composition
Business treasurer	• As a public official who takes budget & settlement works, program manager and public official who perform budget formation, budget execution	• Set finance plan • Perform finance business
Information analyst	• Public official who analyzes past and current finance data, and offers information which could apply to policy	• Finance analysis
Policy analyst	• Management public official including minister/ vice minister who makes policy decisions	• Finance policy decision • Evaluate finance execution
Committee (Congress)	• The organization that audits and manages the finance information performed by administration organization as a legislative body	• Audit finance management
Related organization	• All organizations including local government and state owned enterprises/affiliated organizations that need finance information	• Perform finance business
Civil organization	• All civil organizations that participate or audit national finance activities	• Audit finance management • Participate finance plan • Use finance information
Citizen	• General nation who needs finance information	• Use finance information

Source: Ministry of Finance and Strategy

The DBAS main system is a "central finance information system" that manages all financial information in a systematic way.

"Program Supporting System," which connects DBAS with diverse users, are consisted of the "statistic/analysis system," which provide many statistical information related to finance management to users, and the "finance link system", which connect information from DBAS and external organization for sharing and use. [Figure 5-10] "DBAS Composition" briefly illustrates the entire composition and the relationships of each composition element in DBAS, as currently constructed and operated.

Figure 5-10 | DBAS Composition



OLAP: On-Line Analysis Processing
EIS: Executive Information System
EDW: Enterprise Data Warehouse
GFS: Government Finance System
Source: Ministry of Finance and Strategy

2.1.1. Central Finance Information System

The central finance information system performs finance business processes as a core part of DBAS. The central finance information system consists of "Program Management," which manages information to performing program budget management, "Budget Management," which manages budget information from finance operation plans to budget execution, "National Treasury Management," which manage all revenue and expenditures related to finance, "Asset/Debt Management," which perform national asset and national debt/liability management, "Accounting Management," which perform accounting business handling, settlement and cost management, "Real-time receipts/Disbursement," which have close relationship with "National treasury management" to perform integrated notification, collection and national treasury management.

This could be arranged like <Table 5-4> "Composition of central finance information system." The "National treasury management" gets into "Accounts management" and operates with "Real-time receipts/Disbursement" in the current operating system.

Table 5-4 | Central Finance Information System

Classification	Definition	Composition
Program Management	• Each ministry program in charge of people realize program(Policy program), unit program, detail program and related all program's registration, execution, monitoring, performance evaluation, and ending process lifecycle management for integrated handling	• Program Registration • Program Execution • Program Monitoring • Program Performance Evaluation • Program End
Budget Management	• A national budget business integrated handling system that processes everything from the finance program management unit system and the total program cost management, budget requirement, allocation, budget change • Perform a midterm program plan establishment, annual budget requirement, fund operation plan establishment, budget formation, conformation, allocation, change function, by reflecting budget structure that can be estimated	• Midterm Program Plan Establishment • Budget allocation Budget Formation • Finance Execution • Preliminary Feasibility • The Total Program Cost Management • BTL/BTO • Finance Program • Performance Management
National Treasury Management	• Composed of collection decisions, receipts, excess/error receipt returns, revenue end, and automatically connects the information such as debtor's information and notification/ receipt information, reflect performance through cause and real-time monitoring of expenditure management	• Revenue • Expenditure • Fund
Asset/Debt Management	• Prepare assets, and perform all asset management on how to handle function (acquirement, disposal, depreciation, construction of asset management) • Compose possible finance program management, budget management, accounting management related to cost management	• National Property • State Assets and Properties • Bond • Debt
Accounting Management	• Perform national integrated accounting information management and business handling, and consider user convenience to implement automation business handling of automatic journal entries • Including affiliated organizations and local government, possible to use same information through an integrated management of finance information management analysis system and internal/external data network	• General Ledger • Settlement • Cost

Classification	Definition	Composition
Real-time receipts/ Disbursement	• Handling electronic transfer in real-time for revenue/expenditure business efficient handling finance fund, and handling data transmission by generalizing finance related organizations and finance organization network distribution channels	• Integrated Notification/ Collection • National Treasury Transfer(Electronic Fund Transfer)
Performance Management	• Improvement of program execution and performance assessment for efficient financial management	• Performance plans • Performance reporting • Self-evaluation • In-depth evaluation • Performance status monitoring

Source: Ministry of Finance and Strategy

The central finance information system composition module, as expressed in <Table 5-4> "the Composition of Central Finance Information System," has operated with an active integrated concept, with continual improvements.

2.1.2. Finance Work Support System

The "Finance work support system" is a unit system that supports the convenient use of an information system for DBAS's diverse types of users. It includes "Cyber Education," which performs all DBAS education, and "Homepage," which helps external users use the information system. It also includes "Electronic Transaction" business and "User Management," which perform diverse transactions, handling connections to the electronic transaction system.

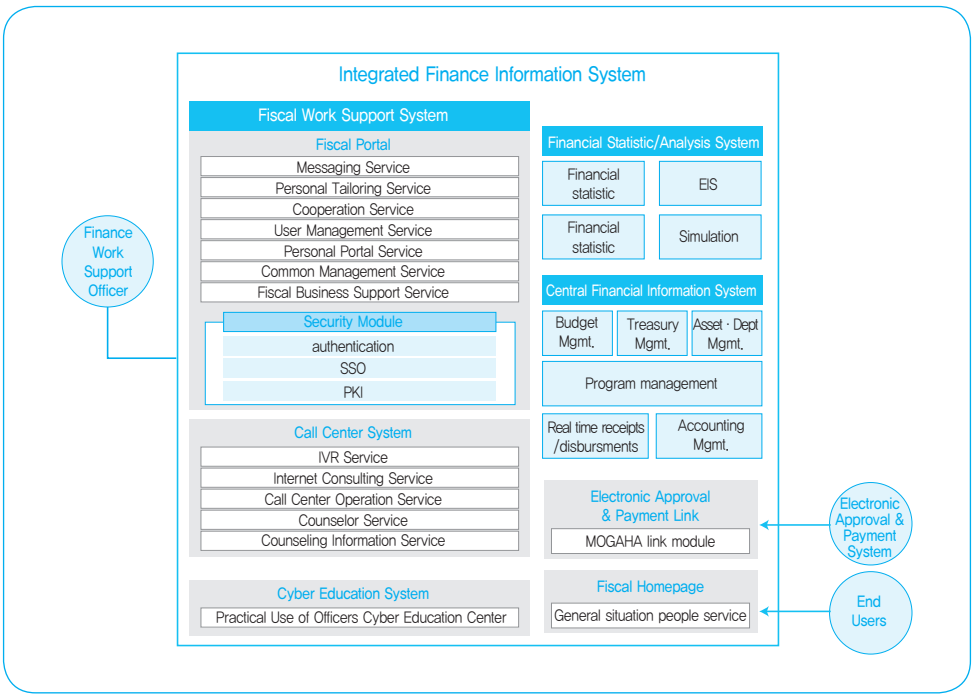
It includes "Finance Portal," which performs finance information provided services, and "Call Center" operation, which report suggestions and problems related to DBAS.

Because the "Finance work support system" is unit system that provides important information related to national finance, this portion deals primarily with security issues.

"Single-Sign On" is a security application solution, on which diverse users who use different business transactions can connect to many different information systems or diverse internet services with only one log-in. Encode receive/transmit data by using public key, composed with encryption and decoding keys, and use PKI (Public Key Infrastructure), which provides user authentication through digital certification. This is a diverse security module that promotes simultaneously security and convenience for users.

The [Figure 5-11] is "Finance work support system composition" which operated in DBAS.

Figure 5-11 | Finance Work Support System Composition



IVR (Interactive Voice Response)

Source: Ministry of Finance and Strategy

The related content with Finance work support system could be organized like <Table 5-5> "Finance work support system composition."

Table 5-5 | Finance Work Support System Composition

Classification	Definition	Composition
Homepage	• A connection program designed to provide information such as finance program management information, budget and settlement information, finance standard to external users, and includes general people service, as well as "Cyber space of finance learning"	• DBAS Introduction • National Finance Situation Information • Central Finance Information • Finance Statistics Analysis Information
Security Module	• Helps users utilize the system with convenience and safety, and compose secure management for information with a built-in security module	• Authentic • SSO • PKI

Classification	Definition	Composition
Finance Portal	• Includes program that performs integrated verification management, and composes programs that provide finance management integrated information	• User Management Service • Message Service • Individual customized Service • Actual Work Site Operation Information Service • Common/Portal Management Service • Finance Business Service
Cyber Education	• Related to performing online education programs relating to the use of DBAS	• Public Servant Cyber Education Center
Electronic Transaction	• A supporting system to perform diverse transactions by using "On-nara System" which is relay module handling electronic document transactions from the Ministry of Public Administration and Security	• Electronic Transaction System
Call-Center	• Improve user's convenience related DBAS, and compose with system improvement programs through suggestions and problem management	• IVR Service • Internet Counsel Service • Counsel Information Management • Call Center Operation Management

Source: Ministry of Finance and Strategy

a. Homepage

The DBAS homepage is written as [Figure 5-12] "Homepage of DBAS, "including its business supporting system. The URL of DBAS is "http://www.digitalbrain.go.kr/. "

The homepage not only supplies budge and settlement information in finance management, but also consolidated budget balances to manage the finances of the nation as a whole. It also establishes main finance management standards and guidelines related to a number of different financial situations.

The homepage is also composed with an SSO concept, automatically connecting homepages from different related organizations, as well as a site to store new information.

Figure 5-12 | DBAS Homepage

Source: Ministry of Finance and Strategy

b. Secure Module

Korea maintains strict security standards for its national finance information. As such, Korea developed an integrated security management system which features data security, application security, system security, network security, and interface security. Korea manages security modules that promote safe and convenient security management, by using advanced security management methods and programs. In particular, it has built a highly-functional integrated infrastructure for finance transaction, thereby galvanizing a number of different security technologies with effective countermeasure systems for each IT security category.

Table 5-6 | Security Module Construction Structure

Classification	Description
Multi-Layered Security	• Construct security system division of IT layer/stage-network. system, application, data security strength • Accept constructed network security solution and policy • Construct previous/after management audit system of system/ database about internal user/outsourcing enterprise support/ developer
Embedded Security	• Construct security requirement as an embedded style from early stage of system development/construction, not Add-on methods • Apply Secure Coding Guide • Apply to choose region's security policy/level of network
Integrated/ Activeness Security	• Integrate management of this type/diverse security equipment • Secure fast/active correspond system through collection/analysis/ correspond process of diverse security equipment • Realize real-time analysis and active security systems • Apply the expansion of integrated center ESM modules in government
Reflect Trade-Off Security	• Construct infrastructure reflecting IT stage security revised rate • Define possible amount and establish additional security system features

ESM: Enterprise Security Management

Source: Ministry of Finance and Strategy

Following <Table 5-7> "Main composition and function of security module" are the contents relating to security management in the DBAS.

Table 5-7 | Main Composition and Function of Security Module

Composition element (Technology measure)	Function
Firewall/VPN	• Accept constructed firewall composition document, extension the number of users/businesses according to increasing • Strength security of transmission section about external organization connection/interlock channel-duplication composition of public network/finance network
Set Network Equipment Security	• Effective resource composition through QoS function and DDoS attack prevention function • Same subnet through VACL function, prevent worm transfers in the broadcasting area

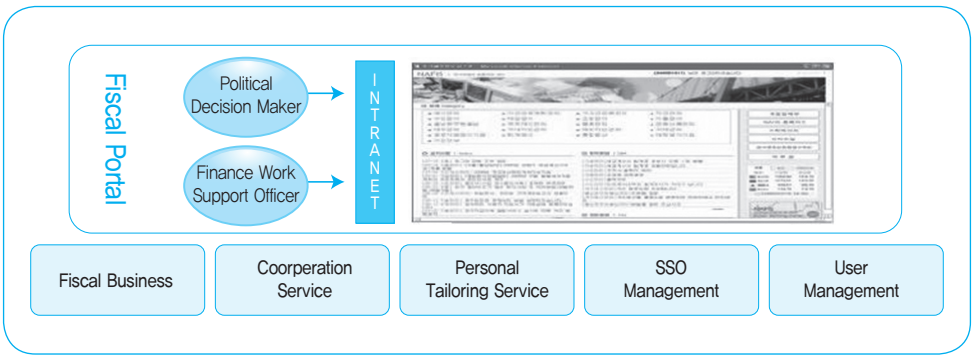
Composition element (Technology measure)	Function
Server Security	• Adopt system security tools for the main server and its DMZ section, strengthen the security of integrated finance information systems and develop an access control system
Apps. PKI/SSO	• Realize screen control functions for each user, minimize access and prohibit inquiries/access important finance information/individual information • Supply PKI/SSO to be used to develop applications in the future for digital budget/accounting system
Data Security	• Integrity security/prevent falsification of log data • Find illegal trespassing attempts and detect internal user's system misuse • Previous/after audit and record about database access
Weakness Checking Toll	• Accept current diagnosis of policy/plan
Integrated Security Control System	• Integrated analysis with a firewall and trespassing detection at every server to be secured • Apply government's integrated center ESM expansion to activation

QoS: Quality of Service
DDoS: Distributed Denial of Service
VACL: VLAN Access Control List
VLAN: Virtual Local Area Network
DMZ: De-Militarized Zone
Source: Ministry of Finance and Strategy

c. Finance Portal

A finance portal is a unit module that manages application programs related financial management, as expressed in [Figure 5-13] "Business Supporting System Composition." The goal of any finance portal is to efficiently share and use require information for business transactions and the information collection of integrated finance information system. Finance portals consider the efficiency of information transfers, and organize standard interfaces for integrated systems. The finance portal is connected though an intranet with verification, and allows policy decision makers and public servants to make day-to-day decisions

Figure 5-13 | Finance Portal System Composition List



Source: Ministry of Finance and Strategy

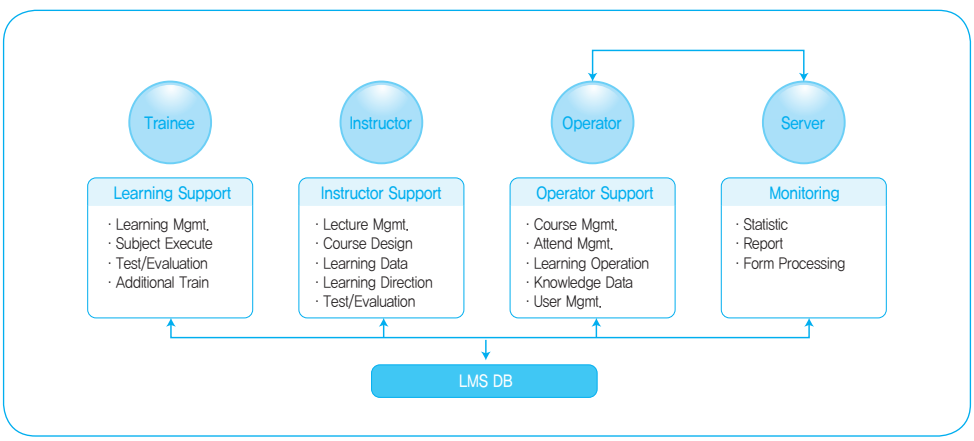
The finance portal in the DBAS supplies a web-based integrated environment with a variety of different operations and functions, all from a stable interface.<Figure 5-13> "Finance portal system composition list" briefly illustrates the key features of this finance portal.

d. Cyber Education

The Learn Management System, for DBAS education and training, is a unit module that executed over the web. Cyber education consists of Learning Support, Instructor Support, Operator Support, and Monitoring, which help participants learn more about support and optimum operation as an automated learning management service.

Courses consist of text, video, animation, audio and images, as illustrated in the chart below.

Figure 5-14 | Cyber Education System Composition List



Source: Ministry of Finance and Strategy

e. Electronic Transaction

An integrated finance system should serve business needs requiring electronic transactions, and defines which businesses need such transactions. The finance system also organizes businesses to process electronic transactions with optimum efficiency. It also allows users to use the search and print features, giving access to all transactions from drafts to approval through electronic images.

In particular, the DBAS electronic transaction modules were not newly developed/rather, it was used as a relay module for the previous Ministry of Government Administration and Home Affairs. The module saves information relating to development costs and development periods.

f. Call-center

The call center a unit module for improving understanding of the DBAS for a wide variety of users. It also develops solutions for managing problems and aggregates suggestions, including those related to law and regulations. Essentially, the call center uses problems and suggestions to improve the DBAS itself.

The call center includes the IVR (Interactive Voice Response), Internet support, and much more. All support information and operation management information from the call center is saved and managed with the support staff's name, which is then used for future DBAS development.

2.1.3 Statistic/Analysis System

The finance statistics and analysis system generates consolidated budget reports based on cash-based accounting, following standards recommended by the IMF GFS report in 1986. It also supplies statistic information based on accrual-based accounting/double-entry bookkeeping, which fits into the GFS statistic written standard of 2001. It is a unit system that supplies transparent and high quality finance information for integrated national finance management, as well as diverse integrated statistics and analysis data by using information communication technology with typical/atypical searching methods.

The core of the finance statistic/analysis system and the integrated finance EDW construction way arranges and integrates finance information, which is saved in a safe location.

And it is possible to access to accurate information quickly and construct analysis system of finance information to supplying management information that supports decision makers. Through this function, it supports efficient decision making and systemic finance analysis, which expedites national finance operation and management.

The characteristic of the finance statistics/analysis system of DBAS, as currently constructed and operated, comprise of the following:

① Supply differentiated analysis information to users, such as finance situation information, processing of program and operation performance information, etc., to divisional decision makers such as the president, minister/vice minister, assistant minister/director general/section chief, the person in charge, et al. Supply customized information to related organizations, civil organizations, and citizens.

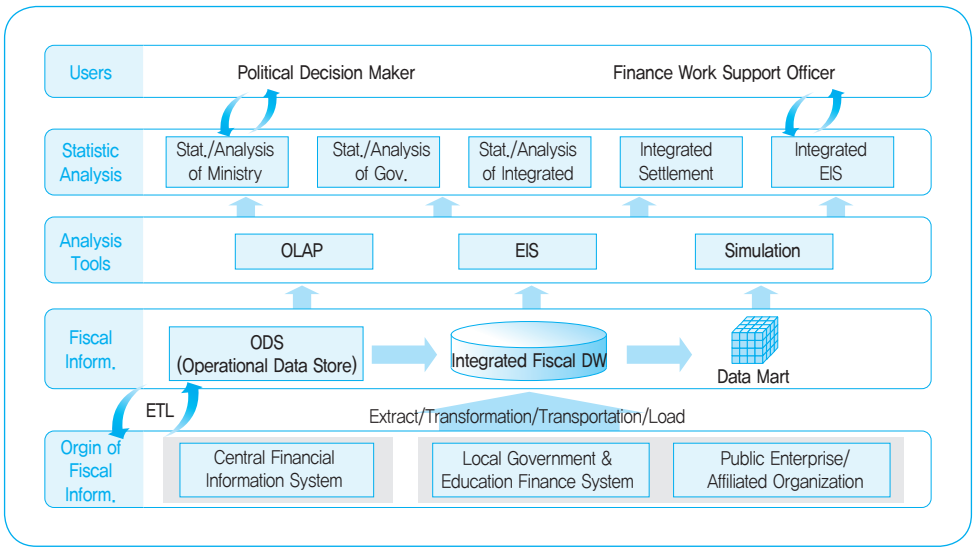
② Supply diverse analysis information as divisional of item, such as statistics/analysis ranges (by program, accounting, ministry, etc.), recognition of standards (budget standards, accrual-based standards, etc.), profit accounts standards (total revenue, total asset, net asset, etc.), profit types (total operation profit, net operation profit, etc.), period classifications (month, quarter, semi-annual, annual, multi-annual, etc.), and account methods (value amount standards, ration standards, time standards, personnel standards, etc.).

③ Supply a multi-dimensional analysis function through system support: extract/transform/load (ETL) data from the central finance information system and other related systems, saving and sending original data in an integrated finance EDW. Also supply multi-dimensional analysis functions through integrated application program systems for statistics and analysis management.

④ Supply finance indicators, analysis and prediction information, classifying finance indicators for supplying public service, dutiful indicators that representing value of the public service, management indicators representing citizen's public service satisfaction, and indicator analysis information by topic area (budget systems, accounting systems, performance/finance program managements, and finance statistics).

[Figure 5-15] "Goal of finance statistic/analysis image" shows the various relationships within the finance statistic/analysis system.

Figure 5-15 | Goal of Finance Statistic/Analysis Image

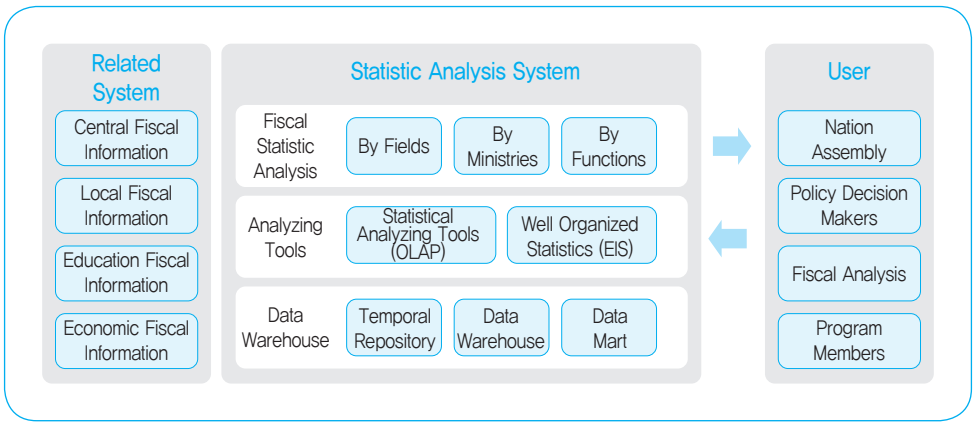


Source: Ministry of Finance and Strategy

In the finance statistic/analysis system illustrated in [Figure 5-15], EDW system extracts/transforms/loads from the "Central Finance Information system", "Local Government & Education Finance System", "Public Enterprise/Affiliated Organization", and "Other statistic related information" are integrated as finance information.

Information from the integrated finance EDW system, composed by these steps, send to users a diverse form of statistics/analysis, by using diverse analysis tools for OLAP, EIS, and Simulation. [Figure 5-16] "System composition of integrated finance EDW" expresses entire composition of finance static/analysis system in the DBAS.

Figure 5-16 | System Composition of Integrated Finance EDW



Source: Ministry of Finance and Strategy

The side effects of using the finance statistic/analysis system, as included in the DBAS, are the following:

1) Analysis and forecasts of finance information from an integrated point of view

2) Improved accuracy and speed of government finance policy decision making

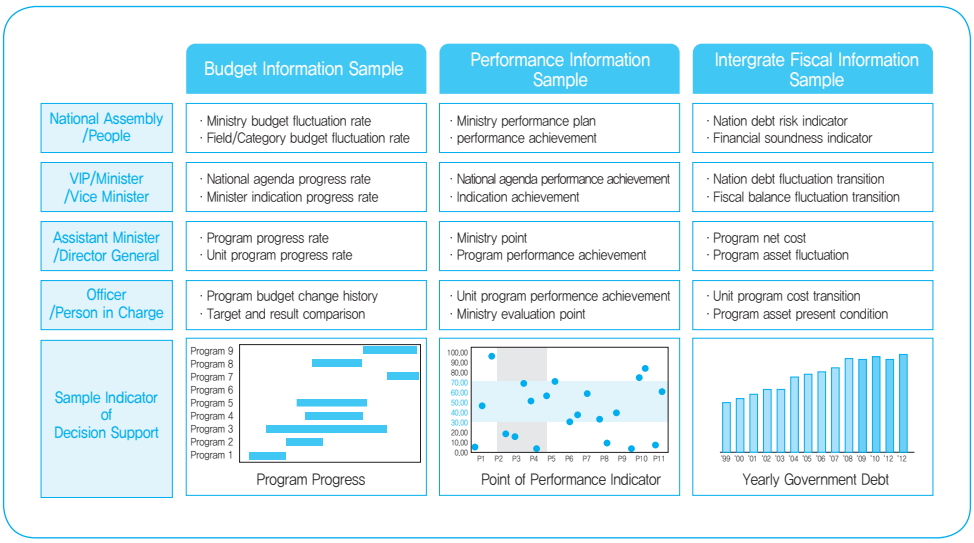
3) Consideration finance management ability

4) Management of effective finance resources

5) Improve transparency for government finances

[Figure 5-17] "Statistic/analysis information sample to provide to divisional of user" expresses a sample of statistic/analysis information provided to DBAS users.

Figure 5-17 | Statistic/Analysis Information Sample



Source: Ministry of Finance and Strategy

2.1.4. Finance Link System

The finance link system covers the finance institution network and the links that make the transfer of information possible. The finance link system, as currently included and used in the DBAS, not only connects to the information system for finance management data, but also can utilize the networks for finance regulation. The purposes of the finance link system are as follows:

① Consistent finance management system development: maintain consistency of the central government and local government's program budget institution management, and apply unified public accounting standards

② Determine the finance resources and finance performance periods: conduct analysis related performance and spending resources related to finance activities; conduct activities to determine national debt, asset, and liability in proper time.

③ Generalized information management: generalize information of finance data produced in each organization

④ Joint use of business support information: use information produced in related business, and use one-stop of produced data through efficiency of business process

⑤ Compute finance statistics corresponding to international standards: compute statistic information guides such as range and report standards; report format as suggested in the GFS manual of IMF.

This link allows organizations and ministries to use the finance information system independently, and to operate the finance management system. These can include organizations that have their own self collection systems, an organization connected to external information, affiliated organizations and state-owned enterprises.

This could be organized like <Table 5-8> "Finance link target organization and link information."

Table 5-8 | Finance Link Target Organization and Link Information

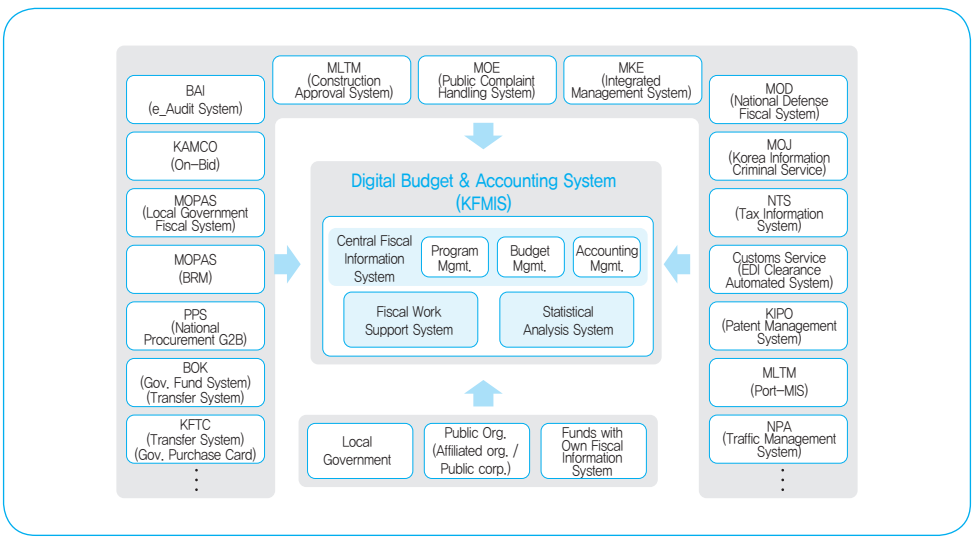
Classification	Finance link target organization	Link information
Central Government	• Use Self-Finance information system (Ministry of National Defense) • Use Self-Finance program management system (Ministry of Construction and Transportation) • Use Self-Finance information system Fund (national pension fund, credit guarantee fund)	• Revenue/Expenditure/Fund • Asset/Liability • Budget/Settlement • GFS Statistic Information
Local Government	• Local finance • Local education finance	• Finance Operation Plan • Notification and EBPP Receipt Information • Subsidy Budget/Execution/ Expenditure • GFS Statistic Information
Self-Generated Revenues System Possess Organization	• Large Collection Organization (National Tax Service, Customs Duties Center, Public Procurement Service, Intellectual Property Office)	• Notification/Bond • EBPP Receipt Information
External Information Network Organization	• Board of Audit and Inspection, Korea Bank, Ministry of Public Administration and Security, Supreme Court, Public Procurement Service, Finance Organization	• National Treasury related Information • Asset • Government Purchase Card Related Information • Procurement/Contract Information(G2B) • GFS statistic information

Classification	Finance link target organization	Link information
Affiliated organization/ State owned enterprise	• Affiliated organization/state owned enterprise included in finance statistic written scope	• Asset/Debt • Budget/Settlement • GFS statistic information

Source: Ministry of Finance and Strategy

[Figure 5-18] "External finance link system composition" is an illustration of the contents related organizations that are operated by, and connected to, the DBAS.

Figure 5-18 | External Finance Link System Composition



On-Bid: On-line Bid
BRM: Business Reference Model
TIS: Tax Information System
G2B: Government to Business
Source: Ministry of Finance and Strategy

2.2. The Composition of Central Finance Information System

The central finance information system is an integrated information system that allows one-stop connections to all national finance business processes, like finance plan establishment, budget formation and execution, fund/asset/liability management as the DBAS's core. According to the unit, the components in the central finance information system share information between related systems, and automatically executes duties

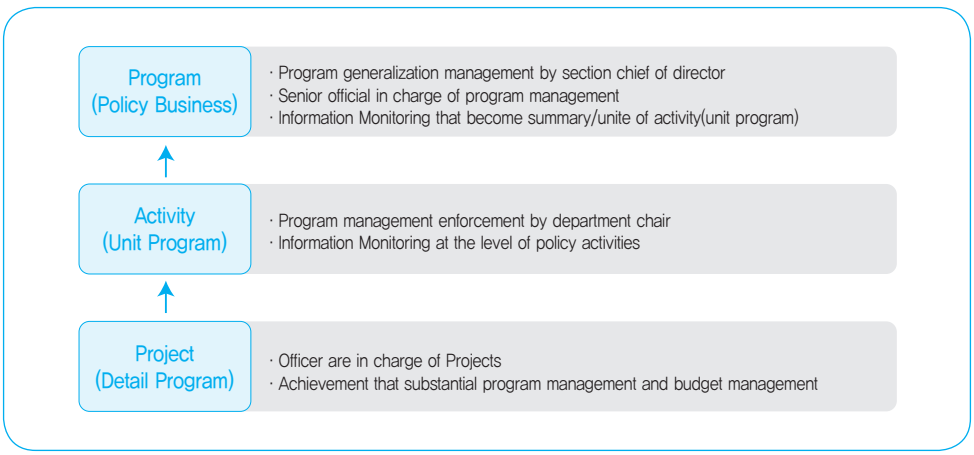
without having to re-enter information. And Information is produced by the business processing systemically stored and managed for supplying various finance information as a part of the program, such as account line item and information management.

2.2.1. Program Management

The Program Management unit system manages the whole life cycle of all government programs, from produce to end.. Program Management handles a variety of different processes, such as registration, formation, execution, and end.

The type of programs included are policy programs that connects “activities” to accomplish the policy goal, and these activities connects to “projects” to realize the policy goal. It houses the execution program unit for the finance management program, and is also related to mid-term expenditure frameworks and the formulation of the annual budget. The finance program management stratification could be organized as seen in <Figure 5-19> “Program management level.”

Figure 5-19 | Program Management Level

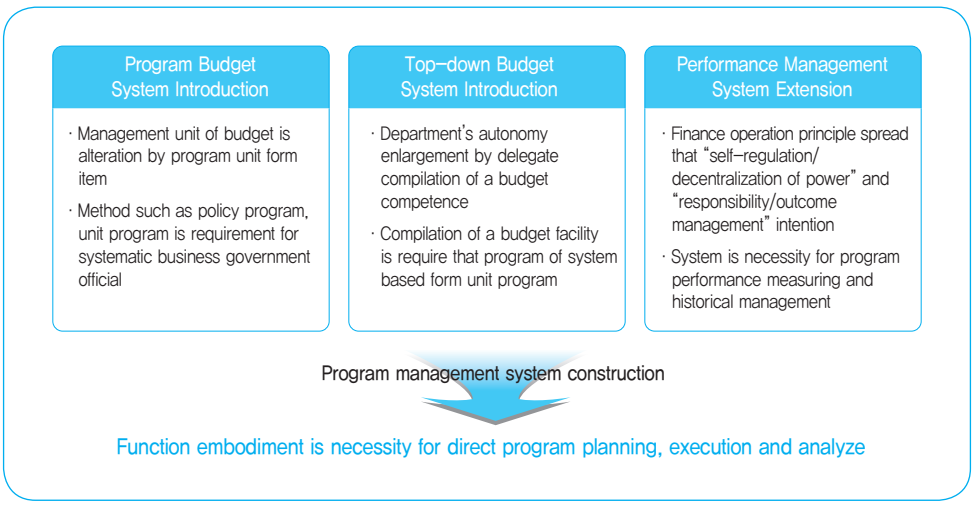


Source: Ministry of Finance and Strategy

Through the development of Program Management information system, Korea applied changes to the program budget plan as a part of fiscal reform, and adopted a top-down budget plan. And based on this, Korea could make a foundation to support a performance management program in a practical way. [Figure 5-20] “Necessity of Program Management system” does a good job of explaining why we need finance program management in the DBAS.

The Program Management unit system provides information to help in making finance policy decisions, and allows Korea to manage the entire program process.

Figure 5-20 | Necessity of Program Management System



Source: Ministry of Finance and Strategy

The reasons for placing significant efforts to develop a finance program management system, as an integrated DBAS, are as follows:

1) Easily apply new policies for changed budget/accounting plans

2) Maximize performance not only as a unit program, but also for cash flow plans, in addition to improving convenience, accuracy and management accountability.

3) Effectively manage asset/liability/cost/performance etc., as a part of the program

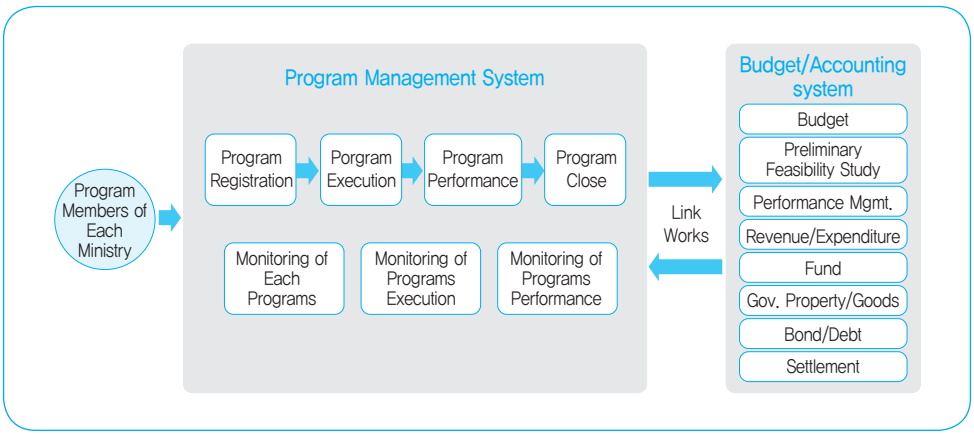
4) Quick handling of program, and improve management ability to do informatization of what was formerly labor-intensive

The finance program management system has the capabilities to monitor execution records in real-time when connected to the budget and accounting system, as illustrated in [Figure 5-21] "Program management system composition."

The monitoring function signified one of the most important contents in the system. That, of course, is that it is possible to run and execute divisional programs.

[Figure 5-22] "Program management system connection" briefly expresses that the finance program management unit system, or the operating unit system in the DBAS, can use a variety of methods to connect vital finance information.

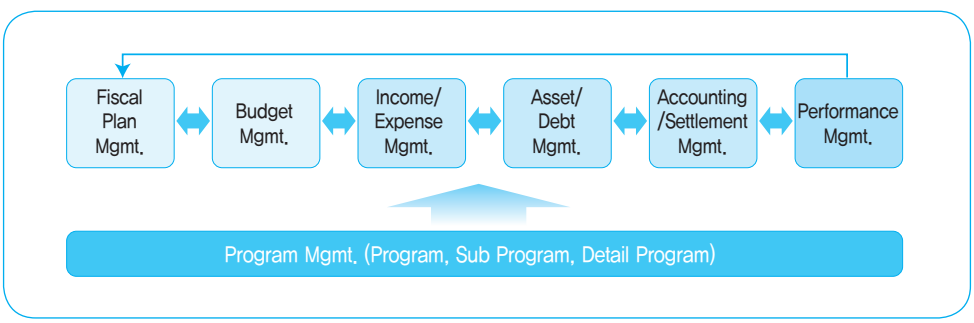
Figure 5-21 | Program Management System Composition



Source: Ministry of Finance and Strategy

As express in [Figure 5-22], it is possible to operate "program," "unit program," and "detail program" as a part of "fiscal plan management," "budget management," "revenue/expenditure (treasury management)," "asset/debt management," "accounting/settlement management," and "performance management" in the unit system. Therefore, the finance program management unit system should use used to access the whole unit system as an integrated finance information system. Finally, the finance program management an important unit system that promotes flexible operating and network access between different organizations, as well as efficient data in the DBAS.

Figure 5-22 | Program Management System Connection



Source: Ministry of Finance and Strategy

To understand the finance program management in the DBAS, one needs to understand Korea's classification system, which divides government businesses into 16 fields and 69 parts.

The DBAS uses a business function classification, a code system to classify all business performed by Korea's central government. The function classification system is used for its convenience in dealing with the number of projects, as well as easily identifying the national budget and any accounting activities.

Table 5-9 | Function Classification of Central Government

Field	Category	Description	Field	Category	Description	Field	Category	Description
010		**General Public Administration**		063	Sports	**110**		**Industry, Small and Medium EnterPrise & Energy**
	011	Legislation & Election Administration		064	Cultural Properties		111	Suppoert for Industry Finance
	012	Govemment Administration		065	General Culture & Tourism		112	Suppoert for Industrial Technology
	013	Local Administration & Finance Support	**070**		**Environment**		113	Trade & Investment Attraction
	014	Financial Affairs & Finance		071	Water and Sewage & Water Quality		114	Promotion & Upgrade of Industry
	015	General Resources Management		072	ScaraPPed Material		115	Development of Energy & Resources
	016	General Administration		073	Atmosphere		116	General Industry & Small and Medium Enterprise
020		**Public Order and Safety**		074	Nature	**120**		**Traffic and Physical Distribution**
	021	Court & Court of Constitution		075	Marine Enviroment		121	Road
	022	Justice & Prosecution		076	General Enviroment		122	Railroad
	023	Ploice	**080**		**Social Welfare**		123	City Railroad
	024	Coast Police		081	Basic Livelihood Guarantee		124	Marine Transportation & Ports
	025	Disaster Management		082	Support For the Underprivileged		125	Aviation & Airport
030		**Unification & Foreign Affairs**		083	Public Pension		126	Distribution & Others
	031	Unification		084	childcare, Family & Women	**130**		**Communication**
	032	Foregn Affairs & Trade		085	Old Aged & Youth Person		131	Broad ationg and Communications

Field	Category	Description	Field	Category	Description	Field	Category	Description
040		**National Defense**		086	Labor		132	Postal Service
	041	Military Force Operation		087	Patriots & Veterans Affairs	**140**		**National Land & Reginal Development**
	042	Military Force Preservation		088	Housing		141	Water Resources
	043	National Defense Improvement		089	General Social Welfare		142	Region & City
	044	Military Affairs Administration	**090**		**Health**		143	Industrial Complex
050		**Education**		091	Healthcare	**150**		**Science & Technology**
	051	Infant & Primary/ Secondary School Education		092	Health Insurance		151	Technolygy Development
	052	Higher Education		093	Food & Drug Safety		152	Support for Science & Technology Research
	053	Lifelong & Vocational Education	**100**		**Agriculture & Marine**		153	General Science & Technology
	054	General Education		101	Agriculture & Farming Village	**160**		**Reserve Funds**
060		**Culture & Tourism**		102	Forstry & Mountain Village		161	Reserve Funds
	061	Culture & Arts		103	Marine Products & Marine Village			
	062	Tourism		104	Food Industry			

Source: Ministry of Finance and Strategy

In the classification system, "Areas" mean categories of large functions that the central government performs. Each ministry is in charge of one or two areas. For instance, the Korean Ministry of Education, Science and Technology is in charge of the Education area and the Science & Technology area.

"Sector" is a detailed category of a spending area. Each ministry covers a number of sectors. For example, the Education area is divided into four sectors: Infant, Primary, Secondary Education, Higher Education, Life Long Education, and General Education.

The DBAS allows all national programs to be monitored, by using this integrated classification system, thereby contributing to the simplification of finance program management. By combining the expenditure annual budget with the classification features, it makes it easy to connect annual budgets to mid- and long-term plans.

The availability of this system is not only extended to the central government, its ministries, government-affiliated organizations and state-owned enterprises. It is also available to local governments, their affiliated organizations, state-owned enterprises, and education authorities.

The function classification system in the DBAS was a change from the previous section-subsection-item system of previous "central government program budget structure" to field/category/program structure system of divisional program budget structure with government budget function reformation. A principle needs to be established as a divisional of each program, and decide whether the unit program needs to implemented in an integrated/simplified way, and, of course, establish classifications for the DBAS.

The functional composition of finance program management unit system that manages and analyzes performances, such as program registration and budget and fund execution related to program and asset debt from a result included and used in the DBAS.

<Table 5-10> "Function composition of program management unit system" is one example of how this system can be set-up.

Table 5-10 | Function Composition of Program Management Unit System

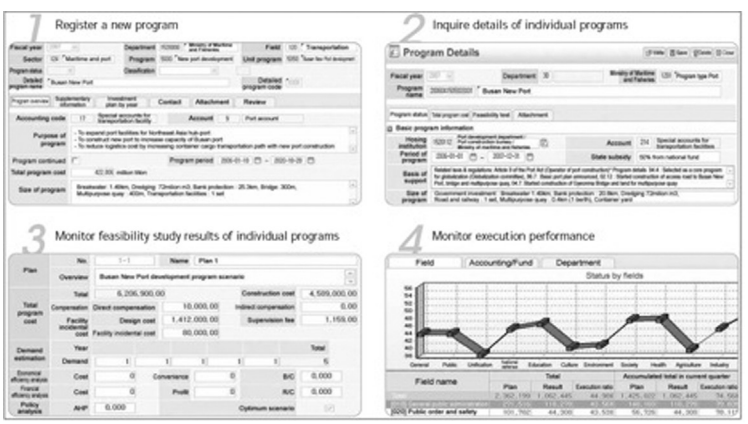
Classification	Summary
Program registration	• Administrates new programs (program, unit program, detail program) with the target of improving finance management, and change content of administrated programs • Manage data related to programs • Manage and use background information about all program revision and deletion of continuing programs in the program budget management system
Program execution	• Set the budget needed for programs, including mid-term fiscal cost summary of a program, and administrate/modify/supplement diverse information, such as program performance management • Perform all normal execution business related to finances, such that mid-term fiscal plan and annual budget requirement and budget distribution/change and cash flow plan including each expenditure request • Enter and search all execution information about real-time in real time, and use to supply monthly national fiscal information system to related organizations

Classification	Summary
Program monitoring	• Manage, including all ended program, currently performing programs about performance goal, finance execution present condition, probability of program processing comparing to original purpose of program administration an all be delivered in real time • Perform systemically program performance evaluations, and program inspections of execution point of view and program processing management
Program performance evaluation	• Figure out how much has been accomplished in terms of policy goals, to analyze the finance execution present condition of the programs that use finance • Supply performance evaluations to related government and civil organization, including program officials • Summary performance reports on program goals, compared to results, and then find reason of gap between goal and result, solutions, post actions, and recommendations
Program end	• Report ending about program performance during program performance period, and summary result of processed programs and request/approval of program end

Source: Ministry of Finance and Strategy

[Figure 5-23] "Program management example screen" is an example of program administrations that perform finance program management monitoring by using the finance program management unit system.

Figure 5-23 | Program Management Example Screen

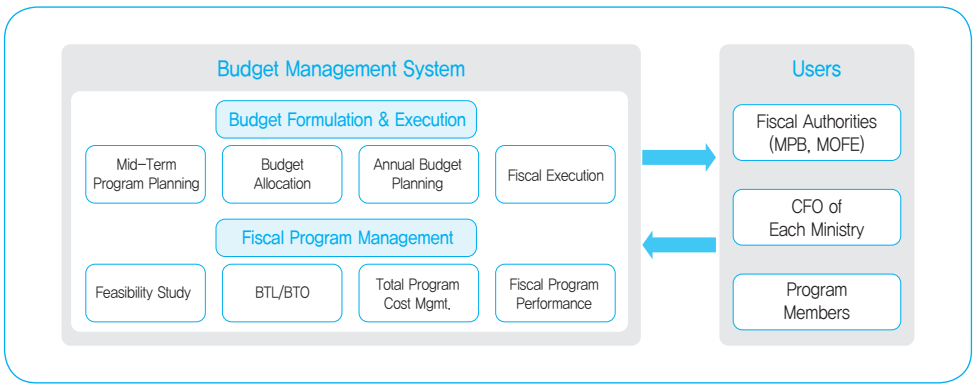


Source: Ministry of Finance and Strategy

2.2.2. Budget Management

The budget management unit system is a systemically managing unit system to use the divisional program budget management information system by considering expenditure limitations from the national treasury management. It could be divided into budget formation and execution management, as illustrated in [Figure 5-24] "Budget management unit system composition," and the finance management program management portion.

Figure 5-24 | Budget Management Unit System Composition



Source: Ministry of Finance and Strategy

As expressed in <Figure 5-24>, "Budget formulation & execution" consist of "mid-term program plan establishment," which manages national fiscal management plan, while" budget allocation" allocates decided budget into the programs, the "annual budget formation" submits required budgets in the current year on behalf of ministries, and the finances the approved activities.

Also, "Fiscal program management" includes the "feasibility study," which reviews the appropriateness of a given fiscal program, the "BTL/BTO," which manages subsidies programs, the "total program cost mgmt.," which manages total scale of program, and the "fiscal program performance management," which evaluates the results of finance programs connected to the budget.

The DBAS budget management unit system includes the concept of program budget regulation. The purposes of using these program budget regulations are that they connect policy and budget, budget and performance of budget execution, ultimately clarifying the relationship between policy and performance. To successfully operate the program budget, regulations need to set up following installation of the core elements system:

① Establish programs related to policy: strength connection between midterm and annual budget to establish Top-Down way of program related to policy

② Design program structure to maximize policy performance: design appropriate program structure to execute policy, and form an agreement in regards to responsibility and authority program structure

③ Clear definition of program performance: manage unit performance standard, and connect to performance management through accurate evaluation

The roles of program in program budget management regulation are as follows:

① Financial resource allocation unit: use this unit to decide field/category resource allocation when establishing national fiscal management plans as a basic unit, to support easy to administrate top-down budget formation, by using set limitations of expenditures for the ministry and basic unit of ministry coordination.

② Easy to review by the National Assembly: National Assembly reviews the budget, and for determining set programs as legislation subjects, and then use that as basic unit of a budget review

③ Unit of performance management: use budget execution situation monitoring of each ministry and basic unit of performance management

④ Basis of information calculation: Use core contents of the reformation budget document and budget/settlement information as a basic unit of program

<Table 5-11> "Budget management unit system function composition" briefly explains the functions that are included in the budget management system.

Table 5-11 | Budget Management Unit System Function Composition

Classification	Summary
Midterm program plan establishment	• Review the program's investment priority and the period for which the budget is needed, in mid/long term point of view • Establish midterm/long-term program budget plans for overcoming problem of annual budget formation method, by considering consistency and efficiency of resource distribution • Connect the midterm finance plan and strategy plan with the performance plan, by establishing a finance operation plan for 3 years, including the next fiscal year's budget proposal • Compose annual budget formation connected with performance management, improving management ability of finance operation
Budget allocation	• After establishing each program budget, divide budget according to revenue/expenditure budget, national debt bearing act

Classification	Summary
Annual budget formation	• Consider midterm program plan in current year's budgetary requirements for divisional programs • Process business such as resource divisions, budget requirements, budget review control, budget document write
Fiscal execution management	• Manage and monitor budget system, execute according to execution plan • Perform budget limitation control, execution performance management, subsidies fund management
Preliminary feasibility study	• Increase efficiency of finance investment and discourage launch of large scale new programs through an inadequate due diligence process, priority investment order, proper investment period, resource procurement method of large scale developing programs
BTL/BTO	• About infrastructure, civil construct infrastructure based on private-invested law, that the government hired and used during the operation period, and will pays as a BTL program; following infrastructure development, the title transfer to nation or local government, and recognize management operation authority in a fixed period • Program enforcement person operates facility to return investment cost, and which method of BTO program management to use
Manages the total program cost	• Perform to manage and control the total program cost of large scale programs, using national finance, according to national finance act
Finance program performance management	• Manage to connect all finance program performance from midterm program plans, budget allocation/formation, finance execution, BTL/BTO, and total program cost management

Source: Ministry of Finance and Strategy

The advantages of an efficient constructing budget management unit system, as a DBAS unit module, are as follows:

① Enhanced effectiveness of macroeconomic prospects, to perform macroeconomic prospects before setting national fiscal management plan guidelines

② Devoted improvements in budget management, because it is easier to manage the budget formation process, and allows users to submit budget document to committees in a more expedient manner

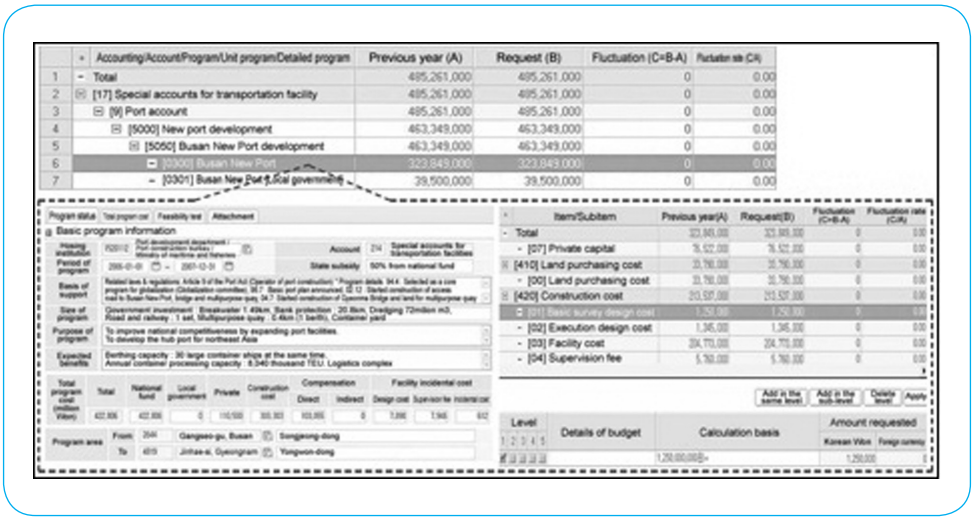
③ Possible to perform quick analyses, reviews, and feedback regarding management/audit of budget execution using the information system

④ Clarify the role of the program, unit program, making it easy to support national fiscal management plans and annual budget formation

⑤ Manage execution list in real time, and generalize monitoring item about budget execution

⑥ Easy to monitor performance management of results, from budget formation and budget execution

Figure 5-25 | Budget Formation Sample Screen



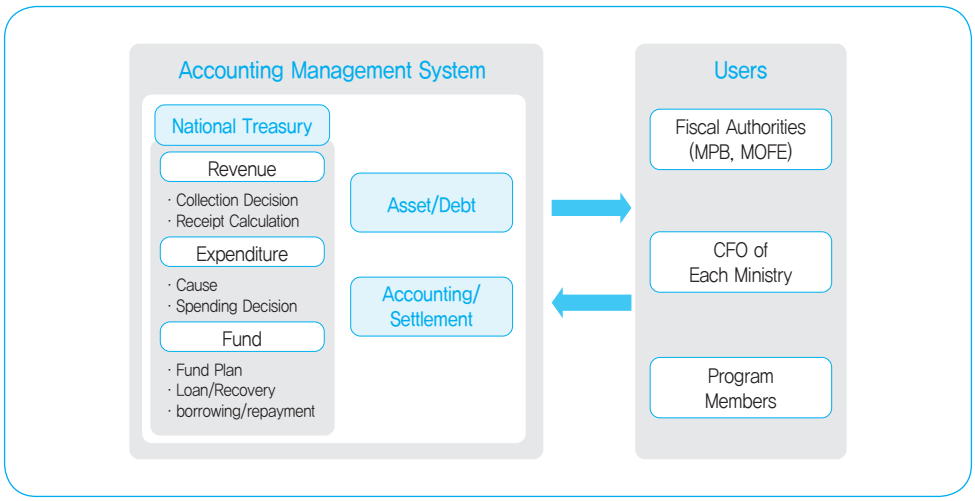
Source: Ministry of Finance and Strategy

[Figure 5-25] "Budget formation sample screen" is a sample screen for budget formation in the budget management unit system.

2.2.3. National Treasury Management

The National treasury management unit system is a part of an accounting management system; it has a close relationship with real-time national treasury management. The elements included in national treasury management are the "Revenue," which processes" collection decision" and "receipt calculation"; "Expenditure," which deals with "cause and spending decision"; and "Fund," which handles" fund plan," "loan/recovery," and "borrowing/repayment."

Figure 5-26 | National Treasury Management Unit System Composition



Source: Ministry of Finance and Strategy

<Table 5-12> "National treasury management unit system composition" is responsible for business functions, such as "Revenue," "Expenditure," and "Fund," all key components for national treasury management.

Table 5-12 | National Treasury Management Unit System Composition

Classification	Summary
Revenue	• Composition of collection plan, declaration management, notification management, receipt management, collection management • Includes integrated notification and receipt, return over/under collection, calculate(revenue closed) from collection decision • Except earmarked taxes revenue and general accounting, which account for most of tax revenues • Consists of special accounts, most of it consisted of non-tax revenues (tax revenue from Ministry of Construction and Transportation, Ministry of Agriculture and Forestry), internal taxes customs duties, etc.
Expenditure	• Manage spending cause activity, national debt management and bearing act, including spending decisions • Reflect not only improvement, but also situational problems through real-time management, including all spending information • Perform spending processing upgrades through expenditure and related considerations

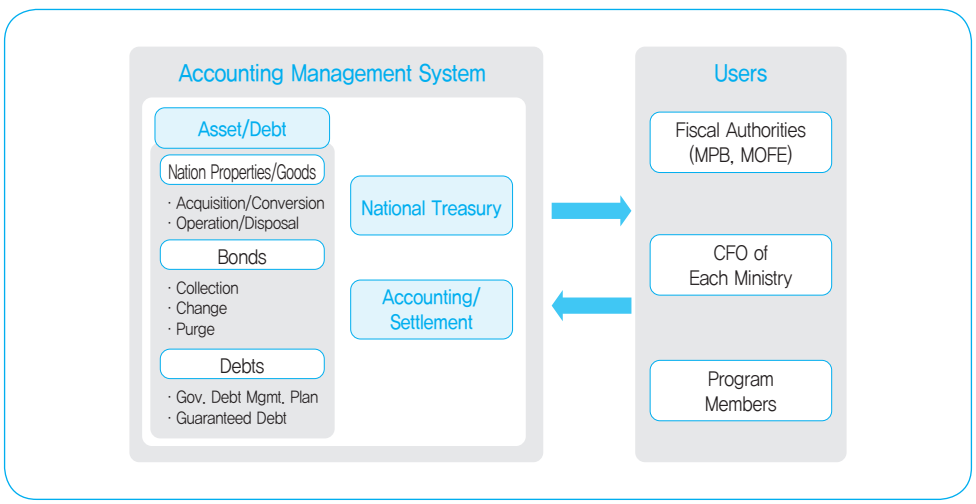
Classification	Summary
Fund	• Manage information including fund(execution) plan, borrowing/ repayment management, loan/recovery management, surplus assets operating management • Make effective funding plans for procurement, adjustment of fund demand and supply between accounting, to operating surplus assets proactively, controlling fund plan, and then reflect improved fund plan regulations through a simplified fund plan process • Decrease large business amount by providing fund share information

Source: Ministry of Finance and Strategy

2.2.4. Asset/Debt Management

The Asset/Debt management unit system consist of the "Nation properties/Goods" of national asset, which manages "acquisition/conversion"; "operation/disposal";"Bond," which is processes "collection"; "change"; "purge" of bond; and "Debt," which deals with "Gov. Debt mgmt. plan," as well as "guaranteed debt".

Figure 5-27 | Asset/Debt Management Unit System Composition



Source: Ministry of Finance and Strategy

<Table 5-13> "Asset/Debt management unit system composition" performs business functions related to "Nation properties/Goods," which operates under the national treasury management unit system "Bond" and "Debt."

Table 5-13 | Asset/Debt Management Unit System Composition

Classification	Summary
Nation properties/ Goods	• Unify acquisition/contract business by G2B, and connect information with the finance integrated information system • Manage all connection disposal/contract business by improving On-Bid system function • Perform acquisition/use/manage process of national asset(national tangible/intangible assets) • Perform asset management for cash owed by the government, marketable securities, other bonds, and national assets
Bond	• Manage issue/recovery management, change management, and purge management of national bonds • Systematically manage bond issue/recovery and situations by range and type, recognition standards and evaluation standards by the national bond management law
Debt	• Manage guaranteed liability management information included in the management plan for treasury debt • Perform systematically any policy relating to nation debt such as liabilities, loans, national debt bearing acts, and guaranteed liabilities, which has reporting obligations to a relevant committee per the budget and accounts act

On-Bid: Electronic asset processing system

Source: Ministry of Finance and Strategy

2.2.5. Accounting Management

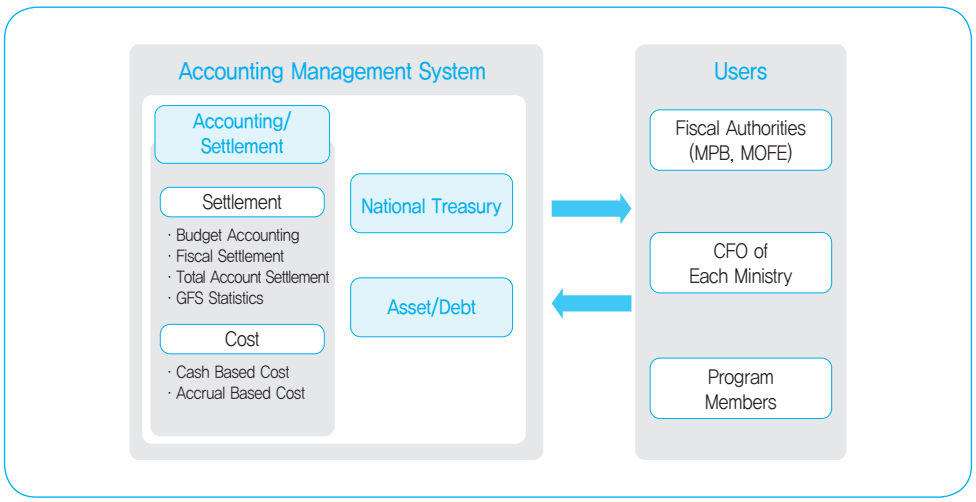
The accounting management system in the DBAS as it is currently operated is an integrated information system which not only abides by national accounting laws and government accounting standards, but also takes into account cost, insurance, loans, and private sector accounting standards. In particular, the accounting management system is able to control and enable finance management in real-time, or at the moment when a finance fund execution and finance transactions occur. It is an information system that incorporates the accrual-based accounting/double-entry bookkeeping accounting system.

This system performs automatic journalizing of all accounting transactions occurring at diverse basic business processes, such as spending, national property, and the use of credit management in the accounting system. It is composed so that the person in charge can effectively control the journalizing process.

The automatic journalizing transaction calculates the cost of each relevant program, which can be used in performance management, and it automatically writes ledgers/ subsidies ledgers (general ledger, trial balance).

[Figure 5-28] "Accounting Management System Composition" expresses the composition of the current accounting management system

Figure 5-28 | Accounting Management System Composition



Source: Ministry of Finance and Strategy

"Accounting management" consists of "Settlement," which handles "budget accounting"; "fiscal settlement"; "total account settlement"; "GFS statics"; and "Cost," which manages "cash based cost" and "accrual based cost." <Table 5-14> "Accounting management system function composition" briefly explains functions included in the accounting management system.

Table 5-14 | Accounting Management System Function Composition

Classification	Summary
Settlement	• Manage integrated information relating to budget settlement management, finance settle management, and total account settlement, including automatic journalizing • Supply settlement function of automatic journalizing for all accounts records, such as asset, debt, equity, revenue, and expense. Systematization information management item is related to divisional of account subject, and handles the automatic journalizing of settlement coordination reports • Supply total account settlement information by division for finance reporting

Classification	Summary
Cost	• Manage information of accrual-based cost and cash-based cost of finance programs • Automatic journalizing of transactions; general ledger real-time management and cost management of information supply; and cost calculation for purchases/ production cost/sales cost • Perform with product goods cost/period cost, and actuarial cost/standard cost which mainly used in management accounting

Source: Ministry of Finance and Strategy

2.2.6. Real-time Receipts/Disbursements System

The real-time receipts/disbursements management system deals with electronic transfers that promote the efficiency of revenue/expenditure functions in the central finance information system process. It is a real-time revenue and expenditure management system for finance funds, using data transmission network and generalizing connection to establish distribution channels in finance related organizations. The real-time national treasury management system connects to diverse users through business support systems, and supports convenience and efficiency for managing the national treasury. The characteristics of the real-time national treasury management system, as included in the DBAS, are as follows:

① Increase transparency for finance through electronic processing of fund without manpower requirements

② Receipt of finance revenue in real-time from electronic notifications/the EBPP system

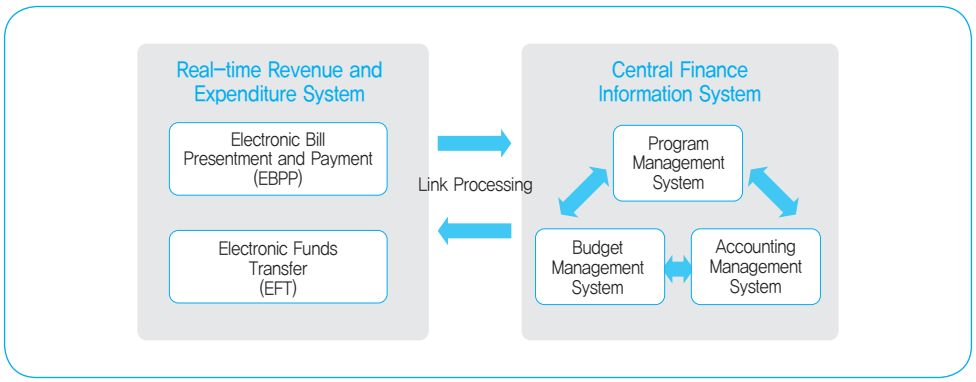
③ Connect the financial network with DBAS, construct and manage the management of electronic notifications/EBPP and automatic receipts/an automatic comparison feature

④ Mange all finance fund expenditures in real-time through electronic funds transfers (EFT) and government purchase cards

⑤ Direct electronic transfer for all expenditure (payment) to creditor's bank account by connecting the DBAS and the Bank of Korea Wire/general finance network

⑥ Manage government purchase card statement in real-time networked with a credit card company

Figure 5-29 | Real-time Receipts/Disbursements Unit System Composition



Source: Ministry of Finance and Strategy

[Figure5-29] "Real-time receipts/disbursements unit system composition" shows that the real-time national treasury management system is composed, "EBPP" and "EFT," handling national treasury transfers, followed by activities from businesses networked with the central finance information system. Also, the real-time national treasury management system is not only for the person in charge of each ministry, but also for financial organizations. <Table 5-15> "Real-time receipts/disbursements unit system composition" is briefly highlights functions that are included in the real-time national treasury management system.

Table 5-15 | Real-time Receipts/Disbursements Unit System Composition

Classification	Summary
Electronic Bill Presentment and Payment (EBPP)	• Construct an integrated payment notification function for revenue/collection notification information, by generalizing the notification number system and notification format • Network receipt statement of Korea Bank in real-time, expand notification/receipt of local finance
Electronic Funds Transfer (EFT)	• Manage all electronic funds for the central and local governments, including fund related account information and transfer information • Manage electronic fund transfer experts • Achieve function of electronic fund transfers as a part of information expenditure that promotes revenue and expenditure information for public servants on a daily basis, with an ability to understand different situations for expenditure and provide revenue situations in real-time

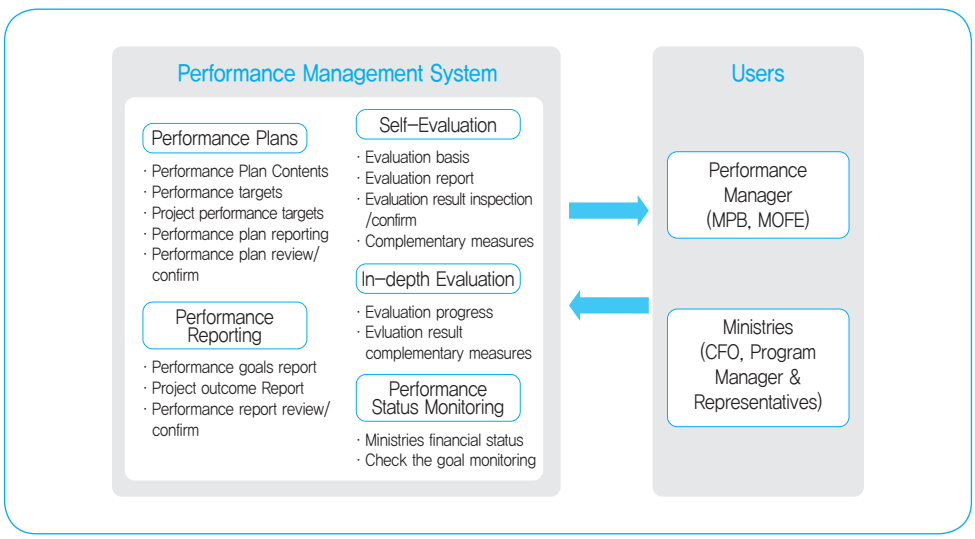
Source: Ministry of Finance and Strategy

2.2.7. Performance Management

The performance management unit system in the DBAS evaluates whether the result of settlement of accounts was used for the purpose of divisional accounting management. It also draws up improvements to make financial management more efficient.

The performance evaluation results are re-cycled for new budget formulation and future budget formulation standards.

Figure 5-30 | Performance Management Unit System Composition



Source: Ministry of Finance and Strategy

[Figure 5-30] "Performance management unit system composition" expresses the composition of performance management system, as currently operated.

Following the procedures offered by Korea's performance management system, users can automatically fulfill their requirements for establishing a performance management institution.

- A major reference for the Budget office or CFOs in line ministries
- After years of operation, the system provides a useful source for setting up and evaluation of performance goal

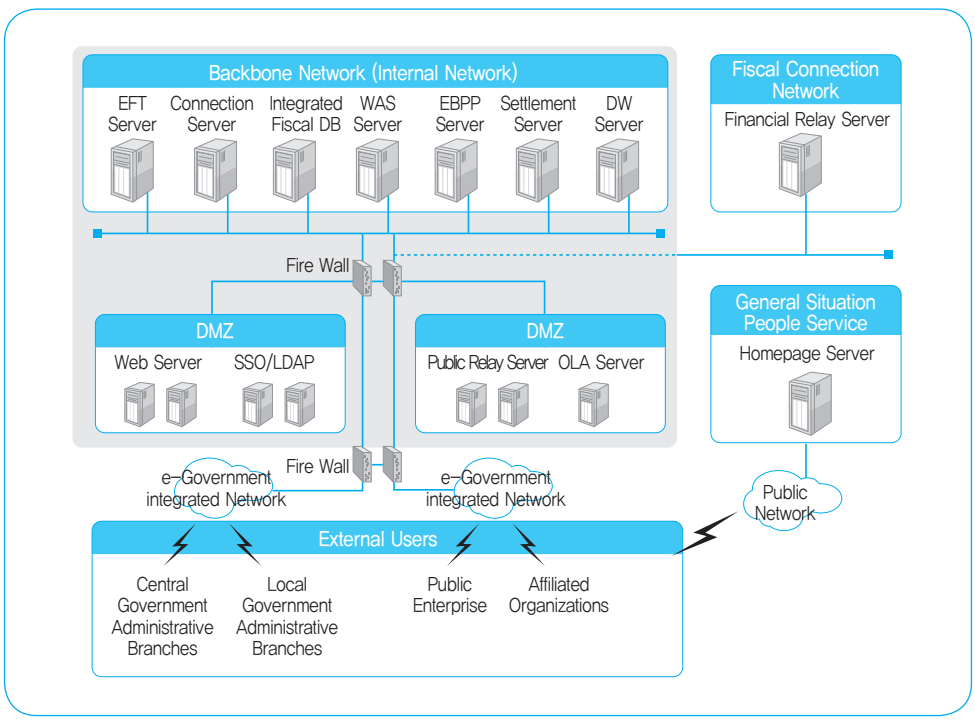
2.3. Information System Construction and Operation Environment of DBAS

2.3.1. Information System (H/W, S/W) Construction Environment

Approximately 400 H/W components are connected systematically when the DBAS is being operated actively. Its hardware configuration could be organized by following [Figure 5-31] "DBAS hardware infrastructure composition image." As expressed in the picture, the basic hardware composition is "Backbone Network (Internal network),"connected and available through many servers.

Also, the "Financial connection network," closely related and operated with the "Real-revenue and expenditure management system," manages the "Financial relay server."It is also composed with the "External user network" which connected "Internal network and "External user" through "firewall", and "general situation people service" hardware, which mange "Homage server" for supply finance information to general nations.

Figure 5-31 | DBAS Hardware Infrastructure Composition Image



WAS: Web Application Server
LDAP: Lightweight Directory Access Protocol
Source: Ministry of Finance and Strategy

As expressed in [Figure 5-31], DBAS hardware composition could be divided into four "network," as considering information characteristics and methods, information approach authority and management, each composition could be organized as the following <Table 5-16> "DBAS hardware composition content" illustrates.

Table 5-16 | DBAS Hardware Composition Content

Classification	Summary	Composition equipment
Backbone network (Internal network)	• Save all data related to finance; and main part of DBAS managed	• Electronic transfer Server • Network Server • integrated finance DB • WAS Server • EBPP Server • Settlement Server • DW Server
DMZ	• Firewall composition which achieves safe and secure management of Local Area Network	• Web Server • SSO/LDAP • Public transmission Server • OLAP Server
Financial relay server	• Mange network with finance information network include real-time revenue/expenditure management handling	• Financial transmission Server
General situation people service	• Support to use finance information by external organizations, civil organizations or nations	• Homepage Server

Source: Ministry of Finance and Strategy

This hardware construction is composed of data security, user's accessibility and counter plan of system error. It constructs a secure system for inter- and intra-connections; it allows only verified users for access, and requires that all connections must be directed through the firewall.

To improve the main server's fusibility, it operates counter plan systems or equipment designed to automatically sense system error. In particular, with the exception of "General situation people network," which manages "Homepage server," connection to all information is made possible thorough "Electronic information integrated network," which is the government information network. By using "Electronic information integrated network," which promotes safety, all data related to national finance are managed in a secure environment. Only "General situation people network" uses "Public network" for supplying information to nations.

The hardware used and operated in the DBAS reused much of the equipment used in previous budget or accounting management systems. Government integrated data processing centers to conduct integrated equipment management. By doing so, it decreased hardware costs for information system construction, and it aimed for minimum maintenance costs.

<Table 5-17> "DBAS software composition contents" briefly organizes hardware equipment in the DBAS, Operating system at inside of equipment, software and Database management system and important application software and other software.

Table 5-17 | DBAS Software Composition Contents

Classification	Name of Equipment	Hardware	Operating System & DBMS	Application S/W & Other S/W
Backbone Network (Internal network)	EFT Server	HP RP7400	HP-UX 11i Oracle 10G(RAC)	EFT S/W EAI(BizStore Indigo)
	Network Server	SUN V880	Solaris 8	EAI
	Integrated finance DB	IBM P595	IBM AIX 5.0 Oracle 10G(RAC)	DBAS SW
	WAS Server	IBM P570	HP-UX 11i	DBAS SW(JSP) Reporting Tool (Rexpert 2.0)
	EBPP Server	IBM P570	IBM AIX 5.0 Oracle 10G(RAC)	EBPP S/W EAI
	Settlement Server	IBM P570	IBM AIX 5.0 Oracle 10G(RAC)	Settlement Batch SW
	DW Server	IBM P570	IBM AIX 5.0 Sybase IQ 1.2.6	ETL(DataStage V7.6)
	Fire Wall			

Classification	Name of Equipment	Hardware	Operating System & DBMS	Application S/W & Other S/W
DMZ	Web Server	IBM P550	IBM AIX 5.0	DBAS SW(JSP) PKI Verification
	SSO/LDAP	HP RP7410	HP-UX 11i	LDAP
	Public Relay Server	SUN V880	Solaris 8	EAI
	OLAP Server	IBM X260	Windows Server 2003 MS SQL Server 2005	OLAP(MSTR)
Financial Relay Server	Finance Relay Server	SUN V880	Solaris 8 Oracle 10G(RAC)	EAI
General situation people service	Homepage Server	HP RP7400	HP-UX 11i Oracle 10G(RAC)	
	Public Network			100M BPS 1 line
	e-Government integrated network			1G BPS 2 lines

EAI: Enterprise Application Integration
EJB: Enterprise Java Beans
BPS: Byte Per Second
Source: Ministry of Finance and Strategy

All application programs are web-based application program, constructed by using software expressed in <Table 5-17>. And the developing language for DBAS's application programs uses Java with object-oriented programming. The most difficult problem with this decision was that there were not many developers who could use Java's language well. Therefore, Korea conducted extensive training for promoting developers to become more familiar with the Java language. They need large amount of efforts and time until skilled developers learned through this process.

However, even with the training, the developers shared a common lack of understanding of the finance business, making it difficult to develop actual application programs. It is difficult to promote developers because application expertise needs on-site experience. The public servant of the Budget & Accounting Renovation Office(BARO), with cooperation from Korea's IT industry as well as many related people have initiated various efforts to train Java developers, in terms of business functionality and laws/regulations.

Next difficulty was the absolute lack of a development period. The BARO develops information systems and performs demo operations of the finance integrated information system, in addition to educating public servants who should use information systems every 18 months. Although a short development period, the main reason for Korea's successful implementation was because of the shared efforts between public servants and the IT industry, the latter of who took on the burdens of developing the information system through integration. It didn't operate in an integrated way, possibly because the FIMSys and NaFIS were already in active operation.

Some of the other problems that plagued Korea during its development of an information system included DBAS advertisement efforts to draw interest from related organizations, including key committees. Even now, there exist many difficulties from indifference in certain organizations about adapting to new system introductions, even though some affect laws and regulations relevant to them. However, as many related people will solve these problems in the future, it is for certain that all related and concerned organizations will have to have an active voice in the construction of the information system.

The last problem was public servant's finance education. Targeted at many finance related public servants to teach them about new laws and regulations, the government needed to come up with a plan to come up with a curriculum and a training center. To solve this program, the BARO actively performs "Internet education," so many public servants and related people can learn in a short amount of time.

The BARO continuously operates call-centers, related to information system, to promote the continuous improvements to the finance integrated information system, to reflect users' requests and to alleviate the inconvenience element for users.

2.3.2. Information System Operation Environment

DBAS maintenance operates through outsourcing. Outsourcing concentrates all resources for strategic partnerships with the most important and best-of-breed solutions, with core capability qualifications. This strategy is essentially used to improve cooperation and organization.

Current DBAS outsourcing takes charge of a civilian consignment operation organization, which is chosen from competition under the management and audit guidelines of the DBAS. The organization can be composed as follows:

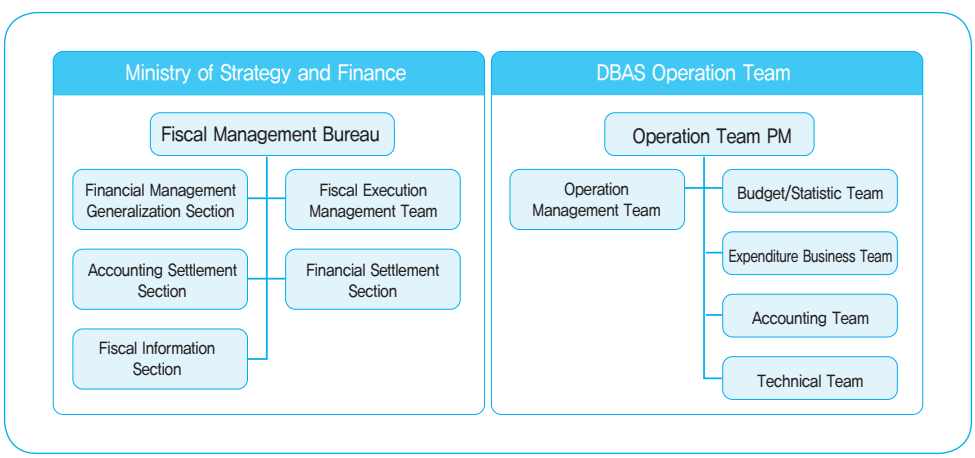
- Digital Budget & Accounting Renovation Office (public servant): 14 persons
- Entrusted operating cooperation: About 140 persons (include Call-center 30 persons)

Of course, there are many side effects as doing outsourcing. The reasons why perform outsourcing are followings:

- By using professional cooperation, concentrated business resources about main business, and strength core ability
- Reduced cost to make slim and flexible large organization for operating maintenance
- Secure professionalism of business being served
- Use external professional organizations that have advanced technology
- The disadvantages of outsourcing are as follows:
- The leaking of private information or core technology
- Bad quality product and delayed delivery date
- Decreased service and/or technical ability

The DBAS continually performs management of cooperation to take charge of optimum maintenance, by considering the advantages and disadvantages listed above. And they establish diverse security management policies to prevent the leaking of private information. [Figure 5-32] "DBAS Operation Organization" is a content diagram of DBAS operation and organization, as it is currently being operated.

Figure 5-32 | DBAS Operation Organization



Source: Ministry of Finance and Strategy

The business in charge of operating organizations in the DBAS is illustrated in <Table 5-18>"DBAS operation organization in business charge."

Table 5-18 | DBAS Operation Organization in Business Charge

Classification		Business in charge
Fiscal Management Bureau		• Manage information plan and technology standard of DBAS • Manage and audit the information resource responsibility and application system(not disorder/errorless) • Prove the adjustment data, and support new finance institution operation • Establish function improvement plan, and review possibility of function improvement • Perform highest function and review possibility of user handling error correction • Establish user education plan and performance, discuss business related organization
DBAS Operation Team (Entrusted operation corporation)	Operation team PM	• Comprehensive management about all operation
	Operation management team	• QAO, claim management, report management, administration support, connection business
	Budget/Statistic team	• Budget, program information management • EIS, GFS, OLAP, finance statistics DB construction, ...
	Expenditure Business team	• Spending, procurement national asset/goods, accounting settlement, etc.
	Accounting team	• Revenue/electronic bill presentment and payment, EBPP/EFT, fund, bond/debt, etc.
	Technical team	• Standard information, portal, electronic approval & payment system network, homepage, ITSM • Server/network, system S/W, common module, P/G change, external network, security management, etc.
	Call center	• Call center operation

QAO: Quality Assurance Officer

ITSM: Information Technology Service Management

Source: Ministry of Finance and Strategy

2.4. DBAS Construction Fault and Solution

During the process of DBAS construction, many ministries competed to take the lead., resulting in many problems. Ultimately, the structure was organized by Ministry of Planning and Budget, which is also responsible for designating the DBAS leader and fiscal planning team leader. Meanwhile, the Ministry of Finance and Economy is responsible for the Finance Institution Team.

In February 208, prior to the Ministry of Planning and Budget and Ministry of Finance and Economy being integrated into the Ministry of Strategy and Finance, there were operational difficulties between the two ministries.

The Ministry of Planning and Budget held jurisdiction over the national finance act, and Ministry of Finance was responsible for the national accounting act, but due to a lack of conformity between the two acts, problems inevitably arose.

In addition, there were conflicts about information sharing responsibilities between the Ministry of Finance and Economy that, with its demands for fiscal information, and the Ministry of Planning and Budget, which actually operates information.

The Ministry of Public Administration and Security and the Ministry of Education, Science and Technology were against connection of a local government finance information system and the educational finance information system, as well as the central finance information system, which required a fiscal management connection.

But eventually in 2008, the local government finance information system was linked, and in 2009, the educational finance information system was linked.

When Korea constructed the NaFIS in 2002, there were many conflicts about role of module construction for connecting the DBAS and 'e-Procurement' system, the procurement management information system operated by the Public Procurement Service.

However, Korea developed the DBAS by successfully coordinating ministries' opinions, with strong support from the Presidential Committee on Government Innovation & Decentralization, as well as BARO leadership.

The DBAS construction team has resolved the existing difficulties, such as inadequate integration, ministry selfishness, fault of connection, fault of development, and the fault of adoption, all of which are examined below.

a. Fault of Integration

There are many difficulties involved in the development of a central finance information system that is aiming to integrate the fiscal management process. There exists the difficulty of integration between the budget management system of the Ministry of Planning and

Budget, operating independently and separately and adjusted the national finance act, with the accounting management system of the Ministry of Finance and Economy that adjusted the national accounting act. And difficulty of integration occurred because of unconformity between two acts, such as budget differences between structure of budget line items and accounting line items.

b. Ministry Selfishness

Integrated DBAS as a solution to managing integrated fiscal information about the country presented a new bureaucratic layer to ministry leaders that undermined their autonomy and authority.

c. Fault of Connection

There exist many difficulties to connect all related organizations to an integrated system with fiscal management capabilities. In particular, local governments and the Ministry of Education, Science and Technology was opposed to the connection issue for a variety of different reasons, such as their desire for an autonomous local and education system. In addition, there were many difficulties to connect an information system already constructed as a diverse hardware environment in an integrated architecture.

d. Fault of Development

Some ministries displayed a lack of full cooperation during the development process, and did not pay attention. Poor process design, an SI constructed system, could cause very large amount of loss because it forces reconstruction.

e. Fault of Adaptation

There was a resistance due to public officers' fatigue from fiscal innovation, and antipathy from ministries about financial transparency. The biggest problem was that public officers' difficulties in adopting system and use and the understanding of the new way of doing things after the adoption of information systems. The big problem was a lack of an absolute education period.

The solution can be summarized as <Table 5-19> "DBAS construction fault and solution".

Table 5-19 | DBAS Construction Fault and Solution

Construction fault	Solution
Fault of integration	• The mapping of budget line item and accounting line item(COA) • Establish budget, accounting structure of program(business) base
Ministry selfishness	• Adjust as Ministry of Planning and Budget manage mediation for both ministries and Ministry of Finance and Economy sent some workers to control
Fault of connection	• To respect autonomy ideology, maintained local government finance and educational finance system separately • Control as DBAS provide national subsidies business and overall local government finance
Fault of development	• Lead ministry public officers' active participation about process design
Fault of adoption	• Improve justification of innovation • Education as according to new institution and information system adoption • Continuous education training and opinion collection • Open a variety education course - Collective training: use public officials training institute - Regular education: construct cyber education center - Radio Training: produce and distribute video data

Source: Ministry of Finance and Strategy

2.5. DBAS Construction Effects and Spread Possibility

2.5.1. Effect of DBAS Construction

The national fiscal management plan's expected impact from the DBAS was successful implementation of new financial system as a national fiscal management plan, with a top-down structure budgeting system, performance management system, program-based budget system and accrual-based/double-entry book keeping accounting system.

The followings are the expected impacts from the aspect of securing the transparency of national finance by establishing DBAS:

- Improve efficiency and ability to manage national fiscal management
- Efficient budget management removing fiscal waste
- Identifying public category fiscal activity's accurate present state
- Support rational decision for finance related policy

• Financial reliability increased and transparent information offers

• Future-oriented financial management support

• Provide the base for successful enforcement of the new fiscal policy

- National fiscal management plan

- Top-down structure budgeting system

- Program-based budget system

- Accrual-based/Double-entry book keeping based accounting system

- Performance management system

<Table 5-20> "Objective and expected effect of DBAS" simply indicates the purpose and effect of DBAS construction.

Table 5-20 | Objective and Expected Effect of DBAS

Objective		Expected effect
Well organized and transparency country household		• Easy to understand accurate status of public category fiscal activity
		• Eliminate fiscal waste factor
		• Support rational decision of fiscal management related policy
		• Support base that can take a root of new fiscal institution
Improved satisfactory level	Citizens	• Expand people monitoring and participation about finance • Improve business performance, reduce waste, and saving nation tax
	National Assembly	• Easy to analysis performance, budget, performance business content, performance department related to government policy activity
	Central ministry	• Easy and efficiently perform national fiscal management plan, budget formation, fiscal execution, settlement • Increase business performance and responsibility of ministry officials as life-cycle management of business
	Fiscal manager	• Format budget rationally, based on accumulated information • Increase evaluation, analysis, prediction ability of fiscal activity, and more systemically manage fiscal danger
	Policy deciders	• Making correct fiscal policy decisions • Monitor a forwarding situation of a main national program and result

Source: Ministry of Finance and Strategy

Citizens can easily identify information about fiscal activities such as budget scale, executive performance, and evaluation performance results in each fiscal activity, and there is a clear improvement in usability through online services. Through fiscal information disclosures on homepages, it enhances transparency, and convenience for real-time inquiry, receipt, and online billing services. Through people monitoring and active fiscal participation, it improves business performance and saves national tax by reducing budget waste. Through real-time fund revenue and expenditure functions, citizen or corporation who provides products and services to their government could get payment in five days, whereas it had usually taken 15 days. In the past, before claiming the payment in order to verify government and local tax payment, people had to visit the tax office and national tax service and get a certificate issued to them. However, the DBAS has connected with related organization systems, especially government for citizen (G4C) of Ministry of public administration and security and public information network. Citizens can now immediately check certifications of tax payment through the DBAS.

The National Assembly executes budget and settlement in the center of business policy and performance management unit program. As a result, it is easier to review budgets and settlements. It is easy to analyze government departments' activities, such as the performance department, the performance business content, budget and performance.

It discloses the performance of key business executions, budget/settlement information and budget available/private information through OLAP in the National Assembly of open information site.

Each central ministry can efficiently and easily perform the establishment of a national fiscal management plan, budget formation and fiscal execution, and settlements. Also, since the business' life-cycle is managed, the ministry officers' increased responsibility will improve the business performance, as the business' progress is able to be managed more conveniently.

Fiscal managers can compile the budget, based on the preliminary feasibility, execution, performance information and more. Also, it can increase the fiscal activity's evaluation · analysis and prediction ability, allowing a more systematic management of fiscal risk.

Policy decision makers monitor the national program's promotion situation and performance, using quick and accurate information provided by the consolidated finance information system. It can also immediately apply to the content of the policy decision maker's new decision in real-time. So it not only allows making correct policy decisions, but also prevents fiscal waste.

Because the "e-audit system" of board of audit and inspection provided all information of DBAS in accounting case by case, it was capable of effective auditing about government

business. And each ministries officer of audit in charge was possible to search for expenditure through OLAP.

The development effect can be examined from a variety of points of view, and the alert function is important throughout the statistics system. The alert function was designed for fiscal risk management and information management.

In point of policy-makers view, it can be reasoned that the following would be the top priorities: 1) national fiscal management efficiency and risk management ability improvement, 2) identify accurate fiscal status, 3) rational decisions on fiscal management policies.

To improve the EBPP, one should be able to determine the status of revenue payments in real-time. When Korea operated the NaFIS, the EBPP existed, but there were no notices of its inquiry receipt function and the existence information connection function.. As a result, only about 10% of revenue statuses has been identified.

Also, it did not connect with local governments' fiscal information during the NaFIS operating period. As a result, Korea could not identify fiscal execution information, including subsidies, in real time. However, it could identify execution status on about 8,000 detail businesses and actual execution result of 5,800 key businesses, through its connection to the subsidies execution system in the DBAS.

NaFIS had managed expenditure results on a case by case basis, but through DBAS, it managed execution status by program/unit business/detail business and offices of the central government. To do so, it was able to identify and manage fiscal management information about all business from the government in a more convenient way..

DBAS is a system for managing national fiscal information, and the benefits of its implementation would affect policy decision makers and program officers.

Modules of all central finance information systems and fiscal information of related organization system classified accumulated, based on government program standards. Therefore, program officers can promote their business more efficiently through program processing checking and all fiscal information that occurred during program processing.

For example, a program government official inserts contract content, amount, conditions that procure through then DBAS, then e-procurement of Public Procurement Service will have received that information, as well as the process bid.

Also, if private providers claim billing, then the billing will have been forwarded to the program officials.

Program officials transfer billing amounts through the DBAS, which will be deposited into a bank account of the provider through the Bank of Korea and the Korea financial telecommunications & clearings institute.

All of this process information is being stored in the DBAS database, saved as government program information.

Another example, a government program official requests for the sale of national property; this information will have been connected with KAMCO, which executes the consignment of national property management and disposal.

According to requested information from KAMCO, they bid and won the sale of national property. The result of sales information is sent to the back to the DBAS.

Thus, information about national property management and current amount is accumulated in the DBAS database in real time.

Direct users of the DBAS are policy decision makers. Because information about national fiscal total amounts often reflect on policy decision makers through statistical systems and monitoring mechanisms, it is often easier for decision makers to enhance their fiscal risk management and revenue expenditure management capabilities.

Transparency has been enhanced, by implementing internal control through the system. Fund authority is separated by a variety of different accounting public officers, such as the program official, financial officer, expenditure officer, contract officer, and national property officer, who all participated in the development stages.

To construct the IFMIS and an integrated finance management system, it required the following costs:

- Cost for analyzing the current distribution system environment and setting future directions (BSP, BPR)
- Cost to persuade and collect opinions from related organizations
- System construction cost
- Initial cost for adopting a new system for fiscal business officials

The analysis on the existing distribution system environmental and integration plan were performed by the digital Budget & Accounting Renovation Office and its BSP services for professional consulting. BARO continuously consulted with department officers operating existing system, and collected feedback about the new system.

After setting the direction for connecting to, and integrating with, the existing system, BPR established guidelines for improving the existing business process.

Likewise, BARO employees consulted with all program officials, followed by a request for analysis to their consultants..

Digital budget accounting system has seen active participation.

DBAS construction has been participated into 3,600 M/M, with a one month average 225 people, until the period between October 2005 and December 2006, and spent 35.1 billion Won (32 Million US$) on software development, and 20 billion Won (18 Million US$) on hardware acquisitions and development.

DBAS currently has 55,000 users, so we think that it is relatively an effective construction model, when compared building and operating costs in developed countries.

The BSP · BPR · ISP cost for DBAS construction has been approximately 2 billion Won (1.8 Million US$), with a total 62.3 billion Won (56.6 Million US$) for development costs during the t period between October 2005 and December 2006. It does not include labor fees for the digital Budget & Accounting Renovation Office public officials. Current maintenance costs require 13 billion Won (12 Million US$) a year.

All of this budget has been funded through the national budget, and human resources is processed through the authority of the Committee on Government Innovation and Decentralization.

The most suitable company has been chosen through a bidding process between private companies and companies responsible for developing the system.

The expected results of the DBAS construction initiative can be considered a qualitative expected effect, which is described above, along with the quantitative cost saving effect.

It is difficult to identify all cost reduction effects, but it can be a considered administrative cost saving effect and a revenue increase effect, as shown in the following.

a. Administrative Costs Reduction

The administrative cost reduction effect shows 120 billion Won (110 million US$) in a year as the reduction effect, through DBAS construction.

- Business Automation to streamline the bank's general accounting authorities and payment labor costs
- Reduce labor cost of general accounting authority and treasury receipt bank about 79 billion Won/year due to business automation and simplification (Front-line financial authorities: 54 billion Won/year, receipt banks 25 billion Won/year)
- Simplify receipt data, postage costs, reporting documents, ledger: 41 billion Won/year
- Simplify receipt data shipping, the various documents: 25 billion Won/year
- Simplify bill, treasury checks issued cost 16 billion Won/year)

b. Increase Fiscal Revenue

The fiscal revenue increase effect shows a reduction of about 105.2 billion Won (96 Million US$) a year through DBAS construction.

- Treasury reserve fund operating revenue: 100 billion Won/year
  100 billion Won payment plan with general accounting revenue 2012
  (6.4 trillion Won exclude borrowing costs as operate national funds in 2011)
- Government purchase card cash-back: 520 billion Won <card estimated> × 1% = 5.2 billion Won

2.5.2. Spreading Potentialities

DBAS has been stabilized since 2007, and has been operating smoothly with a reasonable operating cost.

DBAS key process flow of system was created through public officials' participation and consultation, allowing the changes to be managed as truly integrated national information, and thereby improving the overall fiscal management environment.

The work to improve the national integrated fiscal information is continuously performed.

A sophisticated system even in 2008, improvements were implemented in 2011, and information about each project budget/financial information in connection with the performance management system was built during this time.

System improvements were incorporated in 2008, and Korea built a performance management system for connecting performance information and budget/accounting information about each program in 2011.

And to realize the goal of establishing national property prices, a revaluation function has been added.

Before 2004, Korea did not show significant differences from the established infrastructure currently found in developing countries.

The success factors were various improvements made to the administrative process through the implementation of policies encouraging rather than IT-based environment.

The deployment of a high-speed information network and IT industry development also had important roles in DBAS development and its operating processes, but were not absolutely necessary.

Now all over the world, with the SI market developed, the technology is sufficient to implement a system that public officials can use to help them make important decisions.

Also, the DBAS itself consists of modules, so it could be expanded or reduced in accordance with each country's individual needs, and valuable additional functions can be added as well.

By adopting an expenditure management systems and EFT (Electronic Funds Transfer) module, information that occurred during expenditure process was created and accumulated. And by adopting revenue management systems and EBPP (Electronic Bill Presentment and Payment), notice-payment-revenue information could be integrated and managed.

DBAS is not a simple information system. DBAS is a concept that manages the nation's integrated fiscal information, a concept that can be introduced in any country. Because of these advantages, the international community is more interested in Korea's DBAS. World Bank (WB), International Development Bank (IDB), Asia Development Bank (ADB) is focused on DBAS and it has been acknowledged as best practice. And the Republic of Korea continuously assists countries that request DBAS construction know-how.

Since 2009, about 15 developing countries visited Korea to tour the system every year, and have been consulted about the possible adoption of the DBAS system.

Ghana in 2010, and Indonesia/Philippines in 2011 promoted knowledge sharing programs (KSP) and transferred the experience of DBAS construction/operation.

KSP is policy consulting program that shares Korea's developing experience to other countries.

DBAS is a locally developed software (LDSW) system, so there are differences between commercial off-the shelf (COTS) items. However, the FMIS senior specialist of WB has evaluated DBAS as "One of the most advanced IFMIS system in the world," when he visited Korea in October 2010, suggesting that that this is a very good system developed using its own national technology.

Between September 27th to 29th, 2011, WB PEMPAL invited seminars, and at the March 10, 2011 WB FMIS Seminar, many participating countries took at keen interest in the DBAS. Countries such as Russia/Kazakhstan/Turkey requested Korea's cooperation in this regard.

And recently, Ecuador dispatched engineers to the Republic of Korea for DBAS adoption.

DBAS is a complex system that reflects the fiscal institution and its processes.

Generally, fiscal processes are commonly shared with all countries, so developing countries can be adopt the DBAS.

Local government fiscal information system, education fiscal information system, national defense finance information system are constructed by bench marking the DBAS basic model.

DBAS can be quickly adapted to environmental and fiscal institution changes, because it is self-developed software.

In fact, DBAS construct performance management system in 2011, and it was able to immediately change systems, according to national property institution and road name address system changes.

If other countries are interested in adopting DBAS through KSP of Korea, they can conveniently access many knowledge and experience related with building and running an integrated fiscal information system.

3. Integrated Finance Information System Construction Proposal for Developing Country

DBAS, as it is constructed and used in Korea, is a self-development-based in-house system, developed through cooperation between many public servants, the people involved in industry and academia, and IT (Information Technology) experts. Most importantly, it is an integrated information system, which constructed to systematically process duties, from formulation of law/regulations to BSP, SPR/ISP and system construction.

This is a systematically constructed information system that solves many problems relating to information system construction and processing, with cooperation between finance business manager and IT (Information Technology) experts.

For example, the suggested results following the business strategy plan project recommended the package form of a COTS system (ERP system) construction to the LDSW system (In-house system) construction, a self-development method. However, many public servants and IT experts who already have an experience that perform national budget management information system and finance management information system construction business figure out other countries' situation of finance information system, and analysis problems. We finally decided to develop LDSW system besides the COTS system.

Because we find that many countries that use form of COTS system have difficulties to change and manage a package form of integrated information system, by rapidly reflecting internal business changes or external environment changes. Of course, the form of COTS system has many advantages and disadvantages, construct and maintenance information system like form of COTS system method not only need more entire construction cost including early investment cost, but also need more entire maintenance performing cost comparing to develop and maintenance LDSW system.

Moreover, one of the most critical reasons is that it is difficult to deal with flexibly from policy and business process change of government, and Korea's national finance information system might be subordinate to specific software providers.

Therefore, Korea formed a nation finance integrated information system as a form of In-house which could reduce cost, and not be subordinate to specific software providers in Korea.

<Table 5-21>, "LDSW System VS COTS system Comparing" is an organized table by comparing advantage/disadvantage of LDSW system which developed and used in Korea with a package form of ERP system

Table 5-21 | LDSW System VS ERP System Comparing

Item	LDSW system (DBAS)	COTS system (ERP system)
Basic concept of construction	• It is not an information system to manage, connecting many resources in the pursuit of benefits. It emphasizes and optimizes the concept of accuracy business process, fairness, transparency, convenience for national finance management	• It is a management concept to planning and managing the resources like produce, sales, distribution, and human resources. It focuses on only for maximizing company's benefit, not for national level of project
Business innovation	• It could be a construct optimization system that reflect requests without changing the organization's own business process • Also, it does not need to change organizations and programs	• Review the advanced work process, which already have many experiences • Decomposition of the value chain to innovating program structure • Decomposition the improvement of management quality/quantity or efficiency in whole contents • For those decompositions need change of organization for program
Management innovation	• Internal system construction prefers increasing program performance management ability to faithfully performing regulation and process to management innovation	• It integrates work to consistently processing program related to the entire company • It effectively understands work processing of organization/ individual to setting up the management optimization • Lastly, it aims to optimize management in the entire work processing cycle

Item	LDSW system (DBAS)	COTS system (ERP system)
Beginning cost	• The cost reduced comparing to commercialized package, and determined cost of increase/ decrease as it needed	• It need much early cost comparing to the LDSW system because it need all composition elements related to early information system construction
Change management	• It easily adjusts to change of environment, and extremely reduce the system reflection costs comparing to commercialized packages	• It is hard to adjusting to change of environment, and need more the system reflection cost comparing to LDSW system

Source: Ministry of Finance and Strategy

The biggest difference is that the Korean government is the main body that is operating and managing the information system. In other words, it is not the suppliers, who supply the ERP system that is the main body of the information system, but the finance information system related people who actually utilize and manage the information system. Of course, when inducing the ERP system, we induce a specific package and customize it for utilization to match the users' demands.

During this process, we actively urge the relevant people to participate, by trying to draw on their interests. However, it is a custom for the ERP system suppliers to not provide the most fundamental source programs regarding the construction of the information system.

Thus, we once again need the support of the suppliers, who supply the ERP system, to apply a new change.

But, when constructing the information system using internal resources, it is a huge advantage that they can reutilize all the fundamental programs related to the information system, since it is their property.

Next, they can easily use the internal system constructed to fit their processes, not performing operations with a fixed process like ERP. In addition, it is easier to perform changes in the system than ERP packages, if a system change is necessary due to the environment and legislation changes. The construction of the information system and the operating cost can also be reduced by self-inventing and self-operating, rather than inducing the ERP package.

The COTS system requires a vast amount of money to initially construct the information system, with additional costs for maintenance than the maintenance costs of an internal system. Specifically, any countries who adopt the DBAS through KSP of Korea will find

an easy way to acquire much information about its finance integrated information system construction, and experiences from lesson learned during its implementation.

<Table 5-22> "Advantage of DBAS introduction" is a table outlining the advantages of sharing DBAS construction experience from the Republic of Korea, when constructing an integrated DBAS.

Table 5-22 | Advantage of DBAS Introduction

Advantage	Explanation
Propel information consulting and education	• Suggest solution and review validity of BPR/ISP such as clearly introduce infrastructure (H/W, S/W, Network, IT professional, etc.) related with Korea's developed information system for integrated fiscal information system process direction by considering adopted countries reality, and establish mission and strategy goal of meet fiscal institution innovation, draw strategy element definition and innovation subject for achieving strategy goal, suggest propel strategy to minimize risk
Learn many experience related to system construction as performing jointly	• Can be accumulated practical experience and knowledge as processing project, in cooperation with experts who had experience and knowledge from already performed all process related with DBAS construction and planning
Receive advanced technology to minimize confusion and trial and error	• Can obtain information about processes related with, business performance, information construction, and handling ability as possible level of self management. It is because they will receive practical experience that way of implementation of information system including legal/ institutional aspects, not uncertain information system
Reduce cost of information system construction and management	• Not only reduced initial cost of information system construction, but also significantly reduce maintenance costs
Possible to develop information system step by step	• Introduce step-by-step and systematic development as possible to construct a phased integrated budget, accounting system construction by analyzing information status as considering business status, resource status

Advantage	Explanation
Acquire opportunity and contribution accumulation of technology related with information system	• As processing information system construction project with the Republic of Korea's experts, who classified as information/communication technology strength country, not only can be received technology knowledge, but also expect help for technology development of information/ communication technology field • Can be utilized for achieving competitive advantage as received technology and experience related with information system
Suggest plan for improving ability of human resource who participating information system construction	• Suggest optimum direction of information system construction as introduce advantage/disadvantage about internal system development and using package for constructing integrated fiscal information system in the perspective of the adopted country
Deliver guidelines for the development of cost-effective and straightforward tools	• Recommend proper construction environment for adopted country's state, and provide knowledge and information for constructing highly affordable information system (provided economic and high utilization of the tools rather than the expensive utility of multinational corporations)
Access to maximize Reusability of existing information resources	• Suggest ways to use basic infrastructure such as hardware, software, network which are currently being used in adopted country, and suggest solutions about ways to use existing data that are currently managed

Source: Ministry of Finance and Strategy

Of course, package form of ERP systems has many advantages and disadvantages. However, the method that performs maintenance, and constructs information system as form of ERP system is not only required as a higher construction cost including initial investment cost, but also required much more maintenance performing costs.

And most importantly, one of the reasons is that it is difficult to perform flexible responses to changing of the business processes and government policy. Also, it is concerned that Korea's national financial information system might be subordinate to specific software providers.

Therefore, Korea decided to construct national integrated financial information system as form of In-house system for reducing cost and assuring autonomy.

Key function of unit system that provided by ERP system and DBAS can be summarized as <Table 5-23> "Key functional comparison of a unit system".

Table 5-23 | Key Functional Comparison of a Unit System

Unit system	Key function	ERP System	DBAS
Budget management	• National fiscal management plan, budget formation, execution management	○	○
Business management	• Lifecycle management of fiscal business		○
Revenue management	• Collection decision/notice/receipt management of fiscal revenue	○	○
EBPP	• In real-time collection decision of fiscal revenue		○
Expenditure management	• Act causing expenditure/spending decision management of fiscal expenditure	○	○
EFT	• Transfer fiscal fund in real-time		○
Fund management	• Income and expenditure management of fiscal fund	○	○
Nation treasury management	• Acquisition/conversion/using management of government property total plan		○
Nation credit management	• State credit status management		○
National debt management	• Status management, settlement of nation debt		○
Procurement management	Contract management		○
Accounting management	Automatic journalizing, ledger management	○	○
Cost management	Total cost and net cost management of fiscal business		○
Settlement management	Budget settlement, fiscal settlement		○
Fund management	Public funds operation plan, accounting, settlement management		○
Performance management	Performance goal management, autonomy/in-depth evaluate management		○
Integrated finance management	Consolidated budget balance, integrated finance report management	○	○
Finance analysis	Data Warehouse based EIS, OLAP		○

Unit system	Key function	ERP System	DBAS
Standard information management	Budget subject, account subject, organization/ accounting code	○	○
Cyber education	Method of system, schedule management		○
Asset management	Fiscal assets management	○	
Purchase confirm management	Purchase and confirm	○	
Credit unpaid amount	Account receivable	○	
General ledger	General ledger of all account	○	○

Source: Ministry of Finance and Strategy

4. Conclusion

The Government of the Republic of Korea built an advanced and modern IFMIS by updating the traditional PEMS, which had been in use for the prior 50 years.

Korea's Digital Budget & Accounting System (DBAS), and Integrated Financial Management Information System (IFMIS), was built with a big-bang approach rather than a phased one.

Adopting a completely new fiscal management system such as the DBAS could have provoked resistance.

However, the Korean government was committed to laying the groundwork for a future-oriented, forward-looking country, and managed to overcome many obstacles. As a result, it was able to construct an advanced IFMIS.

Korean government continues to seek further innovations to our fiscal system, improve the DBAS and develop it as a global best practice.

Again the benefits and contributions of the DBAS can be summarized as follows:

- Improve efficiency and ability to manage national fiscal management
- Efficient budget management preventing financial waste
- Monitoring current status of financial activities of the public sector

- Support rational decision for finance related policy
- Enhanced credibility in public finance and transparent information
- Support future-oriented financial management
- Provide the bases for successful implementation of the new fiscal policy
  - National fiscal management plan
  - Top-down structure budgeting system
  - Program-based budget system
  - Accrual-based/Double-entry book keeping based accounting system
  - Performance management system

The benefits brought from DBAS construction and operations have spread to even the National Assembly and citizens, beyond administrative officials.

Citizens are now able to identify public financial information in an easier and more transparent way for activities that include budget size, execution performance, result of performance evaluation, and congress easy to review budget and settlement, and analyze budget and performance, performance program content, performance department as activity of government policy.

Central ministries can efficiently and easily perform national fiscal management plans, budget formation and fiscal execution, and settlements.

In the meantime, central budget organizations can prepare reasonable budgets, based on feasibility of the business, execution, and performance information.

Another advantage of the system is that it has enabled improved evaluation, analysis, and prediction ability.

Chief financial officers can manage fiscal risks more systematically, and policy makers can reflect information provided through the DBAS in their decision making process.

2012 Modularization of Korea's Development Experience
Korean Experience of Financial Management Information System: Construction, Operation, and Results

Chapter 6

Summary and Recommendations for Developing Countries

1. Evaluation and Recommendation of Korean Reform of Budgetary System
2. Evaluation and Recommendations from Korean Reform of Government Cash Management System
3. Evaluation and Recommendations from Korean Reform of National Accounting System
4. Evaluation and Recommendations from Korean Development of Fiscal Management Information System, DBAS
5. Concluding Remark

Summary and Recommendations for Developing Countries

The Korean government has recently reformed its PEMS in a big-bang manner, changing many processes and practices relating to budget formulation, execution, and treasury management, with a new accounting system. As a result of such reforms, Korean PEMS has been transformed into to a modern performance-oriented system, supported by a state-of-the-art DBAS, or a financial information management system.

This book has so far explained the contents and features of how Korea reformed its PEMS, along with special descriptions about the background of reforms. The transition was, however, not without obstacles. Korea wants to share its knowledge of overcoming such difficulties with other countries, especially the developing countries (DC).

1. Evaluation and Recommendation of Korean Reform of Budgetary System

1.1. Evaluation of New Budgetary System

The Korean government changed the old traditional budgetary system into a new modern one. As a result of budgetary reforms, the NPMF, the Korean mid-term expenditure framework, was introduced, along with top-down budgeting. The structure of the national budget was changed from line-item-based to program-based. Performance Goal Management System and Self Assessment of Fiscal Programs were developed in the path toward performance-orientation.

1.1.1. Korean Top-down Budgeting

As the Korean government adopted the top-down budgeting system, visible changes were found immediately. Line ministries reduced the amount of budget requests. More important thing other than this tangible change was that both the line ministries and the central budget office were now compelled to adapt to a new environment of using public resources. New systems such as NPMF, top-down budgeting, PGMS and SAFP require a new set of rules in the budget games, henceforth based on performance.

Partial changes in many of budget systems are less effective, for they are interrelated. The top-down budgeting is awkward without a mid-term expenditure framework. The top-down budgeting is crippled without a well-developed performance evaluation system.

1.1.2. NPMF

Among all the new budgetary systems Korea introduced, NPMF is evaluated as the most effective one. It brings out positive changes as follows:

First, the Korean government is able to set up national priorities with views over longer-term.

Second, line ministries become more cautious when they set up ministerial planning, for projects not listed in NPMF will have a difficult time obtaining budget allocation.

Third, the process of making the NPMF requires a lot of discussions by which strategic allocation of financial resources are fully reviewed, promoting more deliberated policy decisions.

Fourth, NPMF targets economic stabilization for longer terms, not only for a single year.

1.1.3. Performance Management

As for performance evaluations, the SAFP has a direct effect on connecting budget with performance. A project evaluated as "unsatisfactory" by SAFP loses allocation by a certain percentage from the previous fiscal year. It certainly is a negative incentive system, but it surely works to make spending ministries take greater concern about their performance.

Compared to SAFP, new systems like Performance Plan, Performance Report, and program budgeting are indirect effects in the improvement of performance. They might be slow measures to enhance performance, but they are solid foundation of improving results of financial resources.

1.1.4. Program Budget

The Korean government reorganized its budget structure into a program-based one. It enhanced the transparency of financial resources. It is also expected to increase the efficiency of the management of public resources by producing information about costs for each program. Program works like a cost-center.

1.2. Lessons and Recommendations from Korean Budget Reform

1.2.1. Consensus Building Required for the Introduction of Top-down Budgeting

The New Public Management movement in 1990s brought the idea of operating government like private firms. One of them is the top-down budgeting, by which private firms strategically allocated their budgets.

Like Korea and many other advanced countries, the DC can also introduce the top-down budgeting system. But the introduction does not guarantee that the new system will function as intended.

With regards to the introduction of the top-down budgeting, Korean experience emphasizes the importance of the consensus building process. One way of obtaining consensus among many parties is to carry out initiatives through studies on best practices. Best practices themselves contain much wisdom to attract many minds. Consultation with world-renowned experts will be helpful for the same reason. A series of pilot operations would be recommended. The Korean government launched pilot operations for four agencies before a full introduction of the top-down budgeting. Pilot tests worked very well in two ways. First, as the pilot operation went well, skepticism was decreased about the new system. Second, it told us there were many things needed for fine tuning adjustments.

The Korean experience of reforming the budgeting system into a top-down one is that government should maintain a firm stance in the change, but it should also seek to earn support from as many people as possible.

1.2.2. Mid-term Expenditure Framework Flexible to Contingencies

Socio-economic and international environments are much more volatile for DCs than for advanced countries. It is desirable for an MTEF to be implemented as it is planned, but DCs are often contingent upon the changes in financial environments, such as unexpected changes in currency exchange rate, price of importing commodities including grains, foreign aid, and so on.

There might be two ways to handle such volatility. One way is to set up an MTEF in a rolling manner like the Korean NFMP, a five-year rolling plan. By rolling, DCs can flexibly adjust to the mid-term plan and its various contingencies. The other way is to employ a financial management information system with a simulation function. DBAS, the information system that Korea developed in-house, is equipped with such a function, projecting different conclusions according to the changes in future scenarios.

1.2.3. Effectiveness of Performance Evaluation

Many DC have their own performance evaluation systems, but they usually have difficulties in connecting performance evaluation with budget formulation.

The Korean government has a negative incentive system for performance evaluation, as mentioned before. As for the DC, this kind of negative feedback system might be more effective than the positive incentives, because of scarcity in the public resources.

Another recommendation for DCs is an ex ante measure to enhance performance. Korean government operates the Preliminary Feasibility Test. Every large project should pass the Test to obtain budget resources. Most performance evaluation systems developed by advanced countries are ex post in themselves. But the Korean Preliminary Feasibility Test is a prerequisite to ensure future performance of projects. The Korean government recommends DCs to adopt this preemptive Test than the usual ex post evaluation.

1.2.4. Utilization of Program Budgeting

Program budgeting per se has many virtues, but they have not been fully utilized so far. The Korean government has recently begun to study how to utilize the program budgeting benefits. The analysis is under study now. Sooner or later, program structures are going to work as a cost center, and thereby becoming leverage to promote performance-based budgeting.

2. Evaluation and Recommendations from Korean Reform of Government Cash Management System

2.1. Evaluation

Korea has introduced the active cash management system very rapidly and it seems to have entered the last phase for Mike Williams (2004). This rapid development is significantly thanks to the well functioning IT infrastructures of both the government and the private sectors. In particular, the Korean experiences show that partial computerization of the cash

management system is not recommended, because it cannot remove the inefficiencies, heavy costs and the possibilities of theft problems. Although the Korean local governments had started the computerization of the tax collection process in 1990's, incidents of tax revenue theft seems to disappear only in 2000's when the whole process had became transparent by computerization.

2.2. Lessons and Recommendation

2.2.1. Cooperation Needed in the Process of Computerization

The electronic automization of receipt and payment system has also drawbacks and threats. It makes the job of cash managers faster and more convenient, but the complex codes and electronic procedures do not allow them to understand the whole process.

2.2.2. Security Matters

The computerization of the whole process makes security issues much more important. The recent episodes about Wikileaks provide a good example of the importance of security.

2.2.3. Incentive System

Providing incentives to various governmental entities to supply realistic cash plans is a higher-level task. There are always uncertainties in making projections: agencies' in-year plans may change; contracts are not signed when expected; invoices are not received as anticipated, etc. However, when moving towards the active cash management, a carrot and stick approach may be necessary.

2.2.4. High Level of Coordination

Daily cash management requires very frequent coordination between the cash manager, the government debt manager, and the monetary authorities. Coordination is especially important when government cash managers become active in financial markets, since the treasury authority's actions affect commercial bank liquidity, which the central bank aims to control through monetary policy instruments. In advancing to more sophisticated cash management systems, the distinct responsibilities of cash managers, public debt managers, and the monetary authorities may have to be delineated more clearly, in updated memoranda of understandings.

3. Evaluation and Recommendations from Korean Reform of National Accounting System

3.1. Evaluation

Korea's reform of its national accounting system is characterized by the following three features.

Firstly, the national accounting system has benchmarked the U.S. federal financial accounting standards and forms of financial statements. The characteristics of the Korean government, meanwhile, have also been fully reflected in the new accounting system.

Secondly, some argue that Korea should adopt an accrual budgeting system after introducing accrual accounting. Only a few, however, agree with this argument. As a result, Korea is now using a dual system: the cash-based accounting for budgeting, and the accrual-based accounting for settlement. The fact that budgeting and accounting have different systems may cause a lot of confusion in practice. In order to address these problems, DBAS, Korean finance management information system, is designed to handle the two different systems automatically and interchangeably.

Thirdly, along with the introduction of the accrual-based national accounting system, all relevant legislation and systems have been modified accordingly.

3.2. Lessons and Recommendation

The process of implementing the national accounting system in Korea has not always progressed smoothly. Like other countries that have adopted the accrual-based national accounting system, the Korean government has also experienced lots of difficulties. Based on the lessons learned from the experiences of the Korean government, countries planning to introduce an accrual-based national accounting system are recommended to consider the following.

3.2.1. Trigger Needed to Change Accounting System

It is very important to create an environment for changing the national accounting system. It is hardly possible to change it easily, even though the existing accounting system may have many problems. As mentioned before, Korea suffered an unprecedented currency crisis that galvanized people into enacting fundamental changes in the administration of government. The first impetus for Korean government to change the national accounting system was the fact that the accrual accounting would provide better information in alerting the country of its next national crisis.

Most DCs are susceptible to a national economic crisis, so that they might need a better accounting system to accompany any reform efforts. Korea elected to adopt a new accounting system after the crisis, but it is more desirable for DCs to enhance their accounting system proactively.

3.2.2. Ministerial Conflicts

Once Korea decided to adopt accrual accounting, the next issue was who would take the exclusive authority for its introduction. Before 2008, two ministries, then the Ministry of Planning and Budgeting (MPB), and Ministry of Finance and Economy (MOFE), competed against each other to earn this authority. MPB enacted the National Finance Act, while MOFE enacted the National Accounting Act. Both acts are related to the new accrual accounting. The conflict was not resolved until the two ministries were merged into one, the Ministry of Strategy and Finance, in 2008.

Some DCs might have separate ministries involved in the national accounting systems, such as a ministry of budgeting, a ministry of finance, and/or an auditing office. They might cooperate in the stage of the introduction of a new accounting system, but they would compete for taking control over the new system. Conflict resolution over this kind of a problem needs the wisdom of Solomon, for there's no golden rule applicable to all countries all the time.

3.2.3. Accounting should be Link to Budgeting

Although the Korean government uses the dual system, the accounting system should be closely linked to the budgeting system in some shape or form. To solve this problem, the Korean government employs a conversion table that turns information based on cash account, to information based on accrual accounting.

It is very hard to convert the cash-based information to the accrual data, if done manually. However, Korea developed DBAS, the Korean FMIS, to handle this job automatically and accurately, at the speed of the digital era. DCs are also recommended to use FMIS, regardless of whether they want to use a dual system like Korea. Without FMIS, accounting might become a tedious job, and lead to inferior financial indicators guiding a country.

3.2.4. Country-specific Modifications

Any accounting system should be universal on one hand, but it should also reflect the special circumstances every country faces. There is a great deal of variety among countries, though they may all use the accrual accounting as their national accounting systems. Some adopted IPSAS, some use an American style system, and others have developed their own modified systems.

To find its accounting system, Korean government established the National Accounting Standard Center. The Center will provide research, consultation, and the development of proper accounting standards.

Korea's new national accounting system referred to American standards, but added important adjustments and modifications. Like Korea, DCs are recommended to modify standards, while keeping the universal rules. Korea wants to help DCs to find country-specific and proper accounting standards.

3.2.5. Valuation of National Assets

Government is no private company, so it has special kind of assets that a private company does not. It is very hard to assign a value to infrastructures, heritages, public facilities and pensions. Korean government is still struggling with this problem, but has a roadmap to find ways to provide a valuation with some degree of consensus among experts.

DCs might face a similar problem. Korea's experience recommends that they build a taskforce team to handle this problem. A roadmap is certainly worthy of a recommendation.

3.2.6. Human Resources Required for Accounting Skills

When the Korean government introduced the new accrual accounting system, only a small percentage of all public officials had enough accounting skills. To secure human resources, the Korean government provided education and training for public officials, while recruiting experts from the private sector. Applicants who wanted Korean CPA could take an exam related to government accounting. And Korea set up a plan of supplying skillful man-power in the long term period.

4. Evaluation and Recommendations from Korean Development of Fiscal Management Information System, DBAS

4.1. Evaluation

Digital Budget & Accounting System (DBAS) is an integrated financial management information system developed by the Korean government. It is often called as "dBrain" for "digital Brain," signifying an intelligent, integrated finance management system in the digital era.

It encompasses all the fiscal activities of Korean government from budget formulation, execution, reporting and auditing. For most countries using PFMIS, budget systems are

separated from the treasury system. FMISs of central government are not directly linked to those of local governments. Korean DBAS seamlessly handles treasury activities, as well as budget formulation in one system, truly worthy of praise for highly-integrated concept. Benefit of being integrated is to utilize national financial resources, strategically based on national priorities.

Dener, a senior expert in public finance management department in the World Bank, evaluates DBAS as follows, after an extensive examination of it:

"Republic of Korea's DBAS is one of the most developed finance management information systems which I ever seen...DBAS is one of the most integrated and unique financial information systems in the world." (2010)

DBAS is an essential tool for innovating the Korean PEMS. About 77,000 financial managers who deal with all the revenues and expenditures are using DBAS everyday. It seamlessly handles about 200,000 transactions for 3.6 trillion Korean Won (equivalent to about 3 billion US dollars), on the average, every day.

<Main Features of DBAS>

- Adopts new financial management ideas
- Covers new range of government finance
- Shares synthetically government finance management information
- Secures responsibility of transparency and finance operability in real time
- Makes financial management more efficient
- Makes national treasury management more efficient
- Establishes clean system which eliminates possibilities of corruption in the public sector

4.2. Lessons and Recommendations

4.2.1. Keeping Maintenance Costs Low

When developing its public financial information system, Korea decided to pursue in-house development way, rather than in an off-the-shelf way. In-house development has advantages of keeping maintenance cost low. It is also convenient to update the system according to the changes in laws, rules, and policies. Korea recommends DCs to develop their own FMIS rather than to customize ready-to-use-software.

The off-the-shelf software seems to be reasonable at a glance. But the time and efforts needed for customization to an individual country are considerable. It is often found that a

DC has difficulty in updating the system to the politico-economic changes. Without enough manpower knowledgeable about the system operations, a DC should be subject to the software provider for any requests whatsoever. Korea recommends DCs to develop their own FMIS to get out of this cycle.

4.2.2. Gradual Construction of FMIS

Public FMIS is most desirable when it is integrative, from budget formulation to execution and to settlement. To be truly integrative, however, it is required that the technological environment like networks, servers, terminals, and many other hardware, are ready and available. For most DCs, they are not readily equipped with those IT infrastructures.

Korea's DBAS was not made in a short period. Korea has long developed FMIS with the growth of IT infrastructure. In 1990s, Korea developed a spreadsheet-based system for execution management. In the early 2000s, Korea had more advanced system called NAFIS, which had the function of an electronic billing system. It is not until 2008 that Korea had a state-of-the-art FMIS.

Each DC is different in its IT infrastructure, and in their demands for financial information management. Some DCs might need a full-fledged FMIS, while other DCs might demand electronic receipts and/or payments only. Korea's DBAS is consisted of many modules, from budget formulation to financial statements. That means a DC has a choice to adopt any one or more modules built in DBAS upon its individual needs.

5. Concluding Remark

Korea has reformed its financial management system with a big-bang approach. Almost every possible change is carried over, from budgeting to execution, to cash management and accounting system, and to a new state-of-the-art financial management information system.

Korea wants to share its experiences from its reform movement with DCs, not because the new systems are perfect or near perfect, but because Korea is still struggling with many fiscal problems. Financial management of government might be on-going reforms that go on forever. Korea wants to be a partner with DCs, sharing its success stories as well as unforeseen obstacles. This is the main purpose of publishing this book. Korea was a DC for a long time; as such, Korea may have valuable lessons for DCs the advanced ones.

Korean FMIS, or dBrain is highly evaluated by other countries. It is a candidate for the 2013 UN Public Service Awards later this year.

Anderson, P., Jessen, L., Lienert, I., James Roaf, Arranz, M. R., & Stella, P. (2009). Improving the Management of the Republic of Indonesia's Balance Sheet. Jakarta: IMF and World Bank

Beadle, T. (2008). Integration of Government Cash and Debt Management. Walstreet System: Accessed at www.wallstreetsystems.com.

Horcher, K. A. (2006). Essentials of Managing Treasury. John Wiley & Sons, Inc.

Lienert, I. (2008). Cash Management. International Monetary Fund, Public Financial Management Technical Guidance Note No.51.

Lienert, I. (2009). Modernizing Cash Management. IMF Technical Notes and Manuals (Washington: International Monetary Fund).

Ministry of Strategy and Finance. (2011). Financial Reform and the Financial Management Information System of Korea. (Seoul, Korea).

Pattanayak, S. (2004). Government Cash Management Framework and Associated Banking Arrangements. International Monetary Fund: Accessed from: blog-pfm.imf.org/files/cash-management.pptx.

Sailendra, P., & Israel, F. (2010). Treasury Single Account: Concept, Design and Implementation Issues. IMF Working Paper, WP/10/143.

Storkey, I. (2003). Government Cash and Treasury Management Reform. Asian Development Bank, Governance Brief, Issue 7-2003.

The US Financial Management Service. (2002). Cash Management Made Easy. Washington-DC: The US Department of the Treasury's Financial Management Service.

Williams, M. (2004). Government Cash Management: Good and Bad Practice. Available via Internet: http://www.mj-w.net/cac_gov_cash.html.

Williams, M. (2009). Government Cash Management: International Practice. Oxford Policy Management Working Paper 2009 - 01.

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