AFRICA OPERATIONS SERVICES SERIES

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# A Handbook on Financial Management Information Systems for Government

## *A Practitioners Guide for Setting Reform Priorities, Systems Design and Implementation*

*(Based on a compilation of experiences in World Bank-financed projects)*

Ali Hashim


THE AFRICA REGION | THE WORLD BANK GROUP

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# Foreword

The World Bank projects portfolio contains a large number of projects to set up or modernize institutional structures to manage public finances in member countries. Among these are the institutions and systems for budget preparation, budget execution, accounting, fiscal reporting, customs administration, taxation, debt and cash management, and auditing. From this group, the systems for budget execution accounting and fiscal reporting which support core budget execution processes form the backbone of the information systems architecture for recording and processing all financial transactions related to the budget for any level of government. They are often referred to as Financial Management Information Systems (FMIS).

An FMIS offers several significant benefits in managing public monies more effectively, including, greater financial control, improved monitoring of the government's cash position and better planning for future requirements, better fiscal reporting, and availability of better data for budget formulation. The establishment of an effective FMIS system also contributes directly to improving transparency and accountability of a government. Implementation of FMIS therefore constitutes a crucial element of many projects designed to improve institutions and systems for economic management.

This handbook discusses some of the practical and operational issues that arise during the design, procurement and implementation of FMIS for Government. Such a handbook would be useful to the staffs of World Bank, IMF and other development institutions supporting these projects, and the country counterpart teams and their advisors who are engaged in planning and implementing them. The handbook will also be useful to contractors, consultants and in-house IT staff tasked with the implementation of the system.

The handbook is based on experience gained by the author while managing, assisting, and advising on the implementation of over twenty World Bank financed projects for the implementation of such systems over the last 30 years in countries of the former Soviet Union, Eastern Europe, Africa, the Caribbean, and South and East Asia.

**Edward Olowo-Okere**
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This handbook is based on work carried out as part of World Bank project teams from 1986 to date. The learning reflected in this paper is the result of contributions of the many World Bank team members and country counterpart teams with whom I had the opportunity to work over this period. I acknowledge their contributions. In several projects the work was done in collaboration with the IMF – FAD. I would like to acknowledge the contributions of my IMF colleagues. I would like to acknowledge the contribution of the many consultants and contractors hired by the Bank and the member countries who worked on these projects and whose work is reflected in this handbook.

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I am also particularly grateful to Mr. Eduardo Talero (former Advisor, World Bank) and Mr. Ismaila Ceesay (Lead Financial Management Specialist, World Bank) who provided detailed comments on a draft of the handbook. Mr. Cem Dener (Senior Public Sector Specialist, World Bank), and Mr. Irek Smolewski (former Senior Procurement Specialist, World Bank) reviewed previous versions of the handbook and provided comments. Mr. Farooq Khan provided comments on the Treasury diagnostic questionnaire. Mr. Bernard Myer and his team reviewed and commented on the Indonesia case study. I am extremely grateful to Mr. John Gray who painstakingly went through the draft and edited it. All these comments and advice greatly improved the content and clarity of the handbook.

I would like to thank Ms. Leah April (Senior Public Sector Specialist World Bank, Cambodia Country Office) and Mr. M. Nguyen (Senior Economist, World Bank Vietnam Country Office) for encouraging me to write this handbook.

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Smolewski, Mr. Rama Chandran, Mr. Naushad Khan, Mr. Harbaksh Sethi, Mr. Sunil Bhatacharya, Mr. D. Mishra, Mr. S. Qamrul Hasan, Ms. A. Wielogorska, Mr. Shaun Moss, Mr. Gurcharan Singh, I learned about Bank Procurement rules and their signature authority enabled me to progress on my projects. I am grateful to Mr. Eduardo Talero and Mr. Carlos Ferreira who included me in the team of specialists in their sections which provided support to Bank operational projects.

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My apologies to anybody whose name I have not listed. This omission is not deliberate but due to aging memory cells. My thanks go out to them anyway.

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# About the Author

Ali Hashim is a former World Bank Staff member who retired from the World Bank as Lead Treasury Systems Specialist, Public Financial Management Cluster, Poverty Reduction and Economic Management Unit (PREM), Europe and Central Asia Region (ECA).

During his tenure at the Bank he has prepared, appraised and supervised World Bank projects in several member countries including Cambodia, Ghana, Hungary, Indonesia, Jamaica, Kazakhstan, Liberia, Maldives, Nepal, Pakistan, Russia, Turkey, and Ukraine Zambia, and involving the design development and implementation of Government Fiscal Management Information Systems.

In these projects, he has been closely associated in the review and the development of proposals for:

- The structure of the Government economic management agencies responsible for government budgeting and accounting and their functional relationships with line ministries / agencies;
- The legal framework that underpins their functions and provides the legal basis for the proper management of public funds;
- The budget classification structures and associated charts of accounts required for a modern budget system;
- Government banking arrangements, including proposals for the consolidation of government accounts into a Treasury Single Account at the Central Bank;
- Setting up appropriate institutional arrangements for processing payment and receipt transactions;
- Setting up appropriate information systems and technology to support these systems.
- Coordinating and integrating the functional requirements for treasury systems proposed by the IMF/FAD in the project design, and
- Coordinating with other donor agencies to secure financing for project components.

He has authored several papers on the design, development and implementation of projects for setting up institutions and information systems for government fiscal management. These include The Treasury Reference Model, co-authored with Bill Allan, Senior Economist IMF/FAD, and The Treasury Diagnostic Tool-kit—co-authored with Allister Moon, World Bank Lead Economist.

Prior to joining the Bank he was a senior manager in Pakistan's State Owned Enterprise Sector. He has a Ph.D. and a D.I.C from the Imperial College of Science and Technology, London, U.K. and completed a post-doctoral fellowship at the National Research Council, Ottawa, Canada.

After retirement from the Bank, he now works as an independent consultant on Treasury/IFMIS projects, and is based in the Washington, D.C. Metro area. Email: alihashim1941@yahoo.com

# Abbreviations

| | |
|---|---|
| ADB | Asian Development Bank |
| ADETEF | Technical assistance agency of the French Government |
| AGP | Auditor General Pakistan |
| AP | Accounts Payable |
| BA | Budget Allocation |
| BCS | Budget Classification Structure |
| BI | Business Intelligence |
| BPR | Business Process Re-Engineering |
| CF | Consolidated Fund |
| COA | Chart of Account |
| COFOG | Classification of Functions of Government |
| CoP | Community of Practice |
| COTS | Commercial Of The Shelf Software |
| CTO | Chief Technical Officer |
| DANIDA | Department of International Development Denmark |
| DAO | District Accounting Office (Pakistan) |
| DDO | Drawing and Disbursement officer |
| DG | Director General |
| DGST | Director General State Treasury |
| DFID | Department for International Development (UK) |
| DMD | Debt Management Department |
| DRC | Disaster Recovery Centre |
| DTCO | District Treasury Controller's Office (NEPAL) |
| EA | Enterprise Architecture |
| EBF | Extra Budgetary Funds |
| EBS | Oracle E-business Suite |
| ERP | Enterprise Resource Planning |
| EU | European Union |
| FA | Financial Accounting |
| FABS | Financial Accountability and Budget System in Pakistan |
| FCGO | Financial Controller General's Organization (NEPAL) |
| FMIS | Financial Management Information System |
| FTAS | Federal Treasury Application Software |
| GDP | Gross Domestic Product |
| GFM | Government Fiscal Management |
| GFMIS | Government Fiscal Management Information System |
| GFMRAP | Government Financial Management and Revenue Administration Program |
| GFS | Government Finance Statistics |
| GL | General Ledger |
| GOI | Government of Indonesia |
| GOM | Government of Maldives |
| GON | Government of Nepal |

| | |
|---|---|
| GOP | Government of Pakistan |
| HR | Human Resource |
| IBRD | International Bank for Reconstruction and Development |
| ICB | International Competitive Bidding |
| ICT | Information and Communication Technologies |
| IDA | International Development Association |
| IGF | Internally Generated Funds |
| IFMIS | Integrated Financial Management Information System |
| IMF | International Monetary Fund |
| ICR | Implementation Completion Report |
| IT | Information Technology |
| IV&V | Independent Verification and Validation |
| KPPN | Kantor Pelayanan Perbendaharaan Negara-District level Treasury office in Indonesia |
| LAN | Local Area Network |
| MIS | Management Information Systems |
| MMA | Maldives Monetary Authority |
| MOF | Ministry of Finance |
| MTBF | Medium Term Budgetary Framework |
| MTEF | Medium Term Expenditure Framework |
| NRB | Nepal Reserve Bank |
| OLAP | Online Analytical Processing |
| PAD | Project Appraisal Document |
| PEFA | Public Expenditure and Financial Accountability |
| PEM | Public Expenditure Management |
| PEMNA | Public Expenditure Management Network in Asia |
| PFM | Public Financial Management |
| PFMRP | Public Financial Management Reform Program in Vietnam |
| PHRD | Policy and Human Resource Development |
| PIFRA | Project to Improve Financial Reporting in Pakistan |
| PIU | Project Implementation Unit |
| PM | Project Management |
| PMO | Project Management Office |
| PMU | Project Management Unit |
| SAI | Supreme Audit Institution |
| SAKTI | An application to support SPAN(IFMIS) in Indonesia |
| SAL | Structural Adjustment Lending |
| SDLC | Software Development Life Cycle |
| SOE | State Owned Enterprise |
| SPAN | FMIS in Indonesia |
| SU | Spending Unit |
| TA | Technical Assistance |
| TABMIS | FMIS in Vietnam |
| TLS | Treasury Ledger System |
| TGL | Treasury General Ledger |
| TOR | Terms of Reference |

| | |
|---|---|
| T-Bills | Treasury Bills |
| TSA | Treasury Single Account |
| UAT | User Acceptance Testing |
| USAID | United States Agency for International Development |
| VSAT | Very Small Aperture Terminal |
| WAN | Wide Area Network |
| WB | World Bank |
| ZBA | Zero Balance Account |

# I. Introduction

Over the last two decades, the major multilateral organizations such as the World Bank, the IMF, the Asian Development Bank, African Development Bank, the Inter-American Development Bank, the European Union (EU) and the European Bank for Reconstruction and Development (EBRD), and several Bilateral development organizations such as the United Kingdom's Department for International Development (DFID), the United States Agency for International Development (USAID), the Danish International Development Agency (DANIDA), and the German Organization for Technical Cooperation (GTZ, now GIZ) have been involved in a number of initiatives to modernize the policies, institutional structures and systems required to manage public finances in member countries. Automation of Government Financial Management (GFM) Systems is one of the core elements of the reform program since ready availability of timely and accurate information is critical to the management of government finances and public funds; and it may simply not be possible to obtain the information required for economic management in a timely manner without some degree of automation, in view of the large transaction volumes involved and their dispersal across multiple sites around the country.

These systems are also referred to as Integrated Financial Management Information Systems (IFMIS). Broadly speaking, they consist of a set of computer programs, databases, associated processes, procedures and technology platforms that enable government finance and accounting staff to carry out their day-to-day operational tasks. These tasks include originating, receiving, recording, processing transactions related to budget authority, requests for financial resources, payment of bills, loan and grants, assessments of taxes, duties and other levies, recording receipts and managing deposits in government bank accounts.

As these transactions are processed, the information collected in the system databases enables government finance managers to plan, prepare and approve budgets, approve payments, monitor and report on financial resources collected, available and expended. It also facilitates developing appropriate resource allocation and borrowing strategies. Government auditors have access to this transactional data to audit government operations.

As described later in this handbook, IFMIS consists of a number of modules which support the different functional processes associated with Government Fiscal Management (GFM). These include modules for macroeconomic forecasting, budget preparation, budget execution (including cash management, accounting and fiscal reporting), managing the size of the civil service establishment and its payroll and pensions, debt management, tax administration and auditing.

In practice, projects for the implementation of such systems focus on a subset of modules from the above list. This often leads to confusion as to whether a given project can be termed an IFMIS

project or a more restrictive term needs to be used to define its scope.[1] In order to avoid this confusion, this handbook will focus on the systems modules, their functionality and characteristics and interfaces with the other modules instead of debating on the nomenclature to be used for specific combinations of modules. The requirement for integration between modules and what it entails will also be described in greater detail. However, as is the general practice and for simplicity, the term IFMIS would be used to denote the various combinations mentioned above.

Successful implementation of IFMIS systems requires a clear understanding of several aspects such as: (i) the basic rationale for implementing such systems, (ii) the policy prerequisites that need to be addressed before systems implementation can commence; (iii) the key characteristics of Government fiscal management processes and transactions, (iv) their scope and functionality, (v) the design considerations that need to be kept in mind to meet to meet diverse stakeholder requirements and (vi) several considerations related to the technology to be employed, its deployment, and the expertise and capacity required for its procurement, operation and maintenance.

A handbook that could serve as a practitioner's guide and addresses some of the practical and operational issues that arise during the design, procurement and implementation of IFMIS for governments would be useful to World Bank, IMF and other development institution staff supporting these projects as well as the country counterpart teams and their advisors who are engaged in planning and implementing them. The handbook should also be useful to contractors, consultants and in-house IT staff tasked with the implementation of the system.

This handbook tries to fulfill this need and to provide information related to the entire systems life cycle, including the setting of reform priorities, designing systems functionality and architecture, and during systems implementation and ongoing operation and maintenance. In doing so, the author draws on his experience gained while managing, assisting, and advising on the implementation of World Bank financed projects for the implementation of such systems over the last 30 years in countries of the former Soviet Union, Eastern Europe, the Caribbean, South and East Asia, and Africa.

The handbook discusses the policy prerequisites, scope and functionality of these systems in detail. It describes the steps and issues involved in systems design, procurement and implementation. This includes project management structures required, the main activities involved in systems implementation, the type of technology architecture that needs to be deployed to implement the systems and what technology choices need to be made, the main cost drivers and how long can systems implementation be expected to take, and the critical success factors that determine successful outcomes. The handbook also highlights key failure points in the design, implementation and maintenance of these systems. Here it discusses issues related to systems design, procurement, choice of technology and architectures, and availability of technical expertise. Any of these can be problematic during project execution and ongoing systems maintenance and operation and the handbook suggests appropriate risk mitigation strategies.

One of the many areas which contribute to less than satisfactory outcomes of such projects is that the background and language used by the various participants in the design process is very different. In order for the IT professional who will need to be involved in the IFMIS design and its implementation from a program/project management perspective, it is necessary that the basic business concepts and their rationale be clearly explained for them to be able to accomplish

[1] Dener, Dorotinsky and Watkins (2011) use the term FMIS to distinguish projects that focus on budget preparation and core budget execution systems; the term Treasury/FMIS to distinguish Treasury projects which deal primarily with budget execution and restrict the term IFMIS to define those projects that include more than these core modules with the added requirement that the systems modules share databases.

the task at hand. This explanation may be unnecessary for the MOF staff, but it is extremely important for the systems professional for the accomplishment of his or her task. The economists, accountants, and financial managers who are the primary users of the system, use textual information to convey their requirements and ideas. The information systems specialists make more use of schematic presentations to depict their understanding of the situation. An attempt has therefore been made in the handbook to illustrate all major concepts by making ample use of diagrams and schematic presentation so that this language barrier is crossed to facilitate better understanding of the requirements all around.

The World Bank maintains a database of all IFMIS initiatives in which the Bank has been involved.[2] Dener *et al* (2011) have used this database to compile very useful statistics on various aspects of IFMIS projects financed by the Bank, such as cost, time for processing and completion, and their geographical distribution.

This compilation also lists factors which have been cited in Bank project documentation—Project Appraisal Documents (PADs) and Implementation Completion Reports (ICRs)—as being important for project outcomes and the most frequently encountered problems. The handbook uses and cites the results of the Dener *et al.* study in support of observations made, as appropriate.

Some important considerations which limit the information presented in the handbook need to be mentioned at the very outset.

1. First, this is not intended to be a handbook on wider public financial management (PFM) policy reform and related issues. The discussion of wider PFM policy issues contained in this handbook is limited to a description of those aspects which are necessary for systems implementation. The handbook gives a summary of the key features of the most widely practiced public expenditure management techniques and methodologies which have been recommended for use by the IMF and the Bank, along with the implementation of these systems and the operational issues encountered in the implementation of these models. The handbook does not go into a full discussion of alternative models that may be in use in some countries, or into a discussion of the pros and cons of the alternatives. A fuller discussion of the wider policy issues can be found in for example, reports and publications co-authored and edited by Malcolm Holmes,[3] Rino Schiavo-Campo,[4] Richard Allen,[5] and others.

2. Another important point is that treasury models presented in this handbook are not intended to be a universal blueprint for treasury development. They are best viewed as a description of the actual practice in the field in many client countries where the World Bank has assisted in either setting up treasury systems *ab initio*, as in the case of transition economies, or in repairing the institutional structures and systems in other developing economies, where these deficiencies had resulted in significant leakages in government financial resources.

The handbook presents a model in which an important early step is establishment of a network of centrally managed treasury offices and the implementation of centralized control over all

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[2] As of January 2014, the Bank's FMIS database contains details of a total of 121 projects with components which support such systems in 65 countries. Seventy-six projects have been completed, 34 are currently ongoing, and 11 are in the preparation stage. FMIS CoP News and events; January 2014.

[3] Malcolm Holmes. 1998. Public Expenditure Management Handbook. PREM. World Bank Report.

[4] Salvatore Schiavo-Campo and Daniel Tommasi. 1999. Managing Government Expenditure. Asian Development Bank Report.

[5] Richard Allen and Daniel Tommasi. 2001, Managing Public Expenditure – A Reference Book for Transition Economies. OECD-SIGMA Report..

government financial resources and all payments and receipts. In more advanced environments with both advanced telecommunication networks and reasonable high level of management capacity at the line agency level, it may be possible to implement treasury systems with a less extensive treasury network infrastructure and with the payment function delegated to the spending agencies.

The scale and type of treasury control required, and its potential for subsequent streamlining in line with the capacity of line agency is an important issue for later stages in the sequence of treasury development. However, for the majority of the Bank's client countries, the models presented in the handbook have found to be of direct relevance. An attempt to leapfrog prematurely to more advanced models could have adverse effects on the objectives of the treasury development program.

3. A traditional cash-based approach underpins the handbook. It needs to be noted that the approach to the topic is from the traditional government (mostly central and regional/ provincial) cash-based budgeting, appropriation, control, accounting and reporting system. This differentiates it from alternative views on the IFMIS, its chart of accounts, the required modules, sequencing, integration, etc., when such a system is implemented on an accrual accounting basis.

Implementation of accrual based accounting standards (IPSAS) and systems would also serve basic cash-based budgeting, control and reporting requirements, and would also be able to deliver much better information for financial management. The presentation in this handbook is limited to cash-based systems in view of the fact that most client country governments are still struggling with implementing such systems and the corresponding experiences described in this handbook relate to countries where such an approach has been adopted. This also conforms to the advice of experts such as Allen Schick and Jack Diamond—discussed in later chapters of the handbook—who recommend that initial implementation should be kept simple and be designed to solve first order problems. The handbook would perhaps be of more use to countries, of which there are still many in Africa and Asia, who are engaged in the implementation of basic cash based systems.

Also, in this context it is important to recognize that the IFMIS as presented in this handbook needs to be viewed as a system that reports on the central or provincial government transactions. It is not intended as the only system for whole of government consolidations. The consolidated financial reporting entity in most countries would consist of data from many systems, including the Treasury core system or IFMIS, and other IFMIS and even manual accounting systems.

4. Finally, even though the implementation of IFMIS-type systems is the bedrock of efficient government financial operations and an essential prerequisite to ensure success for broader budget reform, this is not a sufficient condition for good financial management. Budget reform and good budget management require several other conditions, mainly related to the prevailing state of governance and the political economy in the country, before an information system can be effective and yield results.

In addition to the main text, the handbook contains several annexes with information that could be useful to Government Treasury/Finance managers and project staff engaged in the planning or implementation of such systems.

**Annex I** presents five case studies. These case studies describe the implementation of IFMIS systems in seven countries with varying initial start-off conditions in which the author was personally involved in the design and implementation stages as a member of the Bank's team. The case studies start with a description of the pre-reform situation and go on to describe the diagnosis

and design stages through to actual systems procurement and implementation, and give a listing of the factors that shaped project outcomes, including political economy issues. The cases have been selected to show how the project design, implementation path, and outcomes depended on one or more factors and some country specific situations. The IFMIS implementation experience in these countries, amongst others, has been used to derive the overall lessons that have been presented in the main text.

**Annex II** provides a check list of items needed to assess the state of implementation of the treasury function and associated systems in a country before a reform program is initiated. Such an assessment is necessary to identify any weaknesses in the underlying legal and institutional arrangements and systems, and to provide a list of areas that need attention, and a road map for further reform.

**Annex III** is intended to assist treasury managers in the process of selecting appropriate application software from the wide range of options that are now available in the market. This questionnaire focuses on treasury specific requirements that are not commonly found in a statement of requirements for commercial accounting systems. It is intended to provide a benchmark to determine the goodness of fit of the major products on the market with the core treasury functional processes and requirements. In a software selection process it would be used to supplement the normal set of requirements used in the selection of accounting systems.

**Annex IV** gives a short listing of the technical skills that should be available within government to operate and maintain the systems, and to provide end user support to ensure sustainable operations.

# II. Some Basic Concepts

## Rationale for Implementing Integrated Government Fiscal[6] Management Systems

Before the start of an IFMIS project it is important to determine correctly the rationale for implementing the systems and to identify the problem that the proposed project is intended to solve, since the nature and scope of the solution to be adopted would largely depend on this.

Work on IFMIS projects is often initiated after problems are faced by Government in the area of budget management. Typical problems are:

- Increasing fiscal deficits and lack of any means of exercising fiscal control,
- Lack of in-house capacity to determine the fiscal position, and reliance on the books of the Central Bank for this information, resulting in an inability to perform the cash management function effectively,
- Weaknesses in the transaction processing capacities of systems used by operational agencies such as the Treasury, Tax Administration or line agencies, which result in lack of timely information in a form that facilitates effective expenditure control, revenue management, and management of agency programs and projects.

### *Diagnostic Study*

To address these problems the government usually commissions a diagnostic study to determine their underlying causes. This study normally starts with a review of the legal, policy, and institutional framework governing budget management. It then tries to identify any gaps between the existing arrangements and international practice, and the fiscal problems that these gaps have created. Such an analysis could also be part of a wider effort at formulation of a PFM reform strategy. The study can result in recommendations for formulation of revised policies, procedures, institutional structures and functional processes to remedy the problems, including a review of:

- The budget management law/decree for management of public funds
- The budget classification system and Chart of Accounts consistent with the IMF's Government Finance Statistics (GFS), and
- Institutional arrangements for banking government funds and processing payment transactions.

In addition, the study also reviews the existing state of transaction processing systems and availability of timely information for economic management. It identifies improvements/ redesign or implementation of new information systems that are needed to ensure adherence to new policies, procedures and control structures, and remedy problems associated with timely availability of information for economic management.

[6] The words fiscal and financial are used interchangeably in this handbook.

The study also determines the IFMIS strategy for the project—the feasibility and overall scope of the systems to be implemented, and provides a blueprint for systems implementation, including their sequencing, approximate costs and time line for implementation and the project management and technical capacity and other ancillary requirements needed to enable systems implementation, procurement and satisfactory ongoing operation Implementing a new IFMIS system without putting in place the basic policy architecture that ensures good fiscal control, cash management, and good fiscal reporting would only result in improvements at the margin, and may not address the main problems that confront the government. Furthermore, in the absence of a comprehensive IFMIS strategy, the focus of the design and scope of the new information systems could be misdirected towards areas that are not the primary concern at the time and/or areas in which implementation could run into unanticipated problems.

## Functional Requirements of Agencies Responsible for Economic Management

The various agencies responsible for a country's economic management have different functions and therefore their expectations from such a project also vary. However, since the IFMIS is a tool that would be used across all these agencies in the performance of their day-to-day operations, it will need to meet these diverse expectations. The overall success of implementation of the system would be measured by the degree to which the diverse objectives are met.

The MOF has two primary objectives in mind. It would like to have a tool that would:

- Assist in ensuring better fiscal control and provide up to date information on the ways and means position. It needs a system that enables full integration of the approved budget and budget execution data and ensures that all expenditures are in accordance with budget appropriations, commitments and cash allocations. MOF officials need the systems databases to provide information to enable close monitoring of outstanding bills, cash in government bank accounts, arrears, and fiscal deficits.
- Enable better cash management and give finance mangers complete and up to date data on all unspent Government financial resources to enable them to decide on how to allocate such resources to government programs and projects, to invest these resources to maximize returns, and plan for additional borrowing as requirements arise.

For the MOF, implementing such a tool would provide a means for:

- Monitoring the budget execution process and producing timely and up to date budget execution reports for economic management. For this, it will require up-to-date information on programs and projects executed by a large number of spending units distributed across the country.
- Improving the quality of baseline data for the previous year to enable accurate budget preparation for the coming year.

Operational agencies such as the Treasury, the Revenue Agencies, the Ministries, and their subordinate departments need a tool that would enable efficient transaction processing, in accordance with the prescribed controls, for the transactions for which they are responsible. This includes:

- Approval, processing, and payment of a large number of expenditure requests from spending units (SUs) distributed across the country.
- Compilation and processing of payrolls and government pensions of large numbers of government employees and retirees who need to be paid regularly as scheduled.

- Recording and classification of a large number of transactions related to government expenditures and receipts, generated at multiple sites across the country, according to the Chart of Accounts in use in a timely and efficient manner, and production of statutory financial statements and financial reports.
- Recording and classifying the large number of tax and import duty/excise tax collections from across the country and establishing whether they are in accordance with the assessments.
- Recording and maintaining data related to the large number of foreign domestic loans/ grants/T-bill issues, managing debt servicing, and developing borrowing requirements and strategies.

The external and internal audit agencies require ready access to up-to-date, complete, and accurate transaction level data related to all government budget, expenditure, and receipts to carry out their fiduciary responsibilities.



## Considerations in the Design of an IFMIS

The complex and varying requirements and differing emphases of the various stakeholders, makes the design and development of such a tool that can satisfy all these requirements in terms of data/ information availability, timeliness and accuracy, a rather complex affair.

Four sets of considerations need to be kept in mind while designing the tool to satisfy these diverse requirements.

***First, the basic characteristics of the functional processes that govern fiscal management require that the tool has some degree of automation to ensure timely availability of comprehensive data.***

The characteristics of these transactions are:

- A prescribed set of rules governs the majority of transaction processing involved in government fiscal management. These rules include, budget appropriations control regulations, tax and customs tariff, loan terms.
- Very large transaction volumes are often involved and these are generated at multiple sites spread across the country.
- Transaction data pick up needs to be comprehensive and timely to be useful to users for decision making. To ensure this it is necessary that each transaction is picked up at the point of its origination and that transaction processing is integrated with transaction recording. This means that it should not be possible to process the transaction without applying all necessary controls and simultaneously recording it.

Computer-based automated systems can respond efficiently to all these requirements:

- They can facilitate automation of controls and procedures. As a transaction is processed, the system can apply the necessary controls. For example, it can ensure that a proper budget allocation exists prior to making a commitment or approving a payment. Manual intervention is required only in cases which require an exception to the procedures. In such cases, the system would keep an appropriate audit trail that would include details of the authorization for the exception.
- They enable efficient handling of large transaction volumes and, in a context with a good telecommunications network, can enable processing, gathering and reporting of the timely

and accurate information required for decision making and accountability from a network of sites across the country;
- They make it possible to integrate transaction classification and posting with transaction processing. This means that as a transaction is processed, for example as a payment is made, it can be simultaneously classified and posted to the relevant account. This ensures that all transaction data are promptly and correctly included in system databases.

***Second, to ensure that the system meets the information requirements of the various stakeholders, it is necessary that the systems design is responsive to their diverse functional and data exchange requirements.***

A number of different functional processes such as budget preparation, budget execution, cash management, revenue administration, auditing are involved in GFM. Several organizational units and agencies are associated in carrying out these processes for which they need to share information and to work on a common set of databases. This requires that systems design follows a very structured process.

The design of a system or systems that can support all these processes and share information must start by analyzing the functional processes associated with GFM, the overall regulatory framework that underpins these processes, their information requirements, functional responsibilities of agencies commonly responsible for the processes, information flows between the agencies, the nature, volume, and frequency of these flows, and the data characteristics of the information used and created by the processes.

Such a process, termed an Information Systems Planning (ISP) exercise, results in what is referred to as the information architecture (IA) for the GFM systems landscape. This architecture addresses questions such as:

- What are the different information systems modules that are required to support GFM functional processes?
- What is the function, scope, scale, and type of a particular systems component?; and
- What are the primary interfaces of the modules with each other, that is, how do these modules exchange and share information and what are the characteristics of the primary information flows?

***Third, since several systems modules are used to support fiscal management, it is necessary that these modules are integrated to facilitate data share and exchange.***

A basic principle for the design of these systems modules to enable integration calls for them to be structured along functional rather than organizational lines.

A specific GFM system module should provide support to a functional area and across all organizations involved in the functional processes associated with this area. This approach supports the creation of systems and databases in which the primary responsibility for the timely provision and maintenance of a particular subset of data resides with the organization responsible for that function. However, data in the system databases should be accessible by all other relevant organizations, subject to appropriate security controls. Adherence to this design principle eliminates duplicative investments in systems and data gathering and, more importantly, enables all agencies responsible for specific GFM functions to work with the same set of data, thereby eliminating risks of data inconsistencies, which are inevitable in separately gathered data. This criterion can be used to assess whether the various modules are integrated.

***Fourth, for practical system implementation, it is necessary that various system modules are sequenced and developed in a modular way***.

Undertaking simultaneous implementation of all systems modules is neither practical nor required in most cases**.** Integrated systems are not monolithic. Once the initial GFM systems framework has been set up and the prerequisites and criteria for integration spelled out and incorporated into the implementation plan, the actual implementation and integration of systems modules will need to be sequenced and phased in over time in accordance with requirements. The issue of systems sequencing is important for a successful outcome of a systems implementation program and is discussed in greater detail later in this handbook.

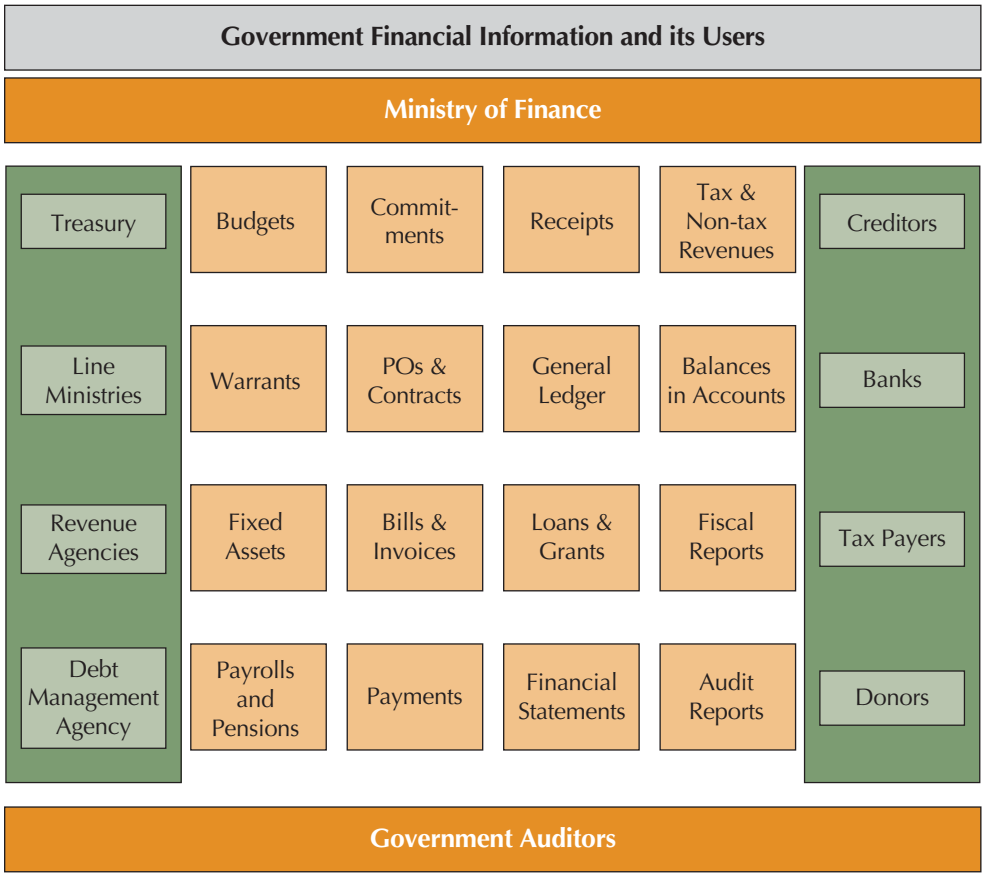
## What is Involved in Setting up these Systems?

In view of the above, work on the design and development of IFMIS-type systems and planning for their satisfactory maintenance and operation need to proceed in the following areas:

- ***Review of the Legal and Institutional framework:*** Reviewing the current state of the legal and institutional framework that underpins the function and defines the roles and responsibilities of the various organizational entities involved will enable documenting what exists and any associated problems. This would be followed by developing a plan for improving the legal framework, if needed, to address the identified problems.
- ***Review and Design of Business and Functional Processes***[7]***:*** This includes a review of the functional processes and information flows and associated requirements for specific functions, and identifying related issues. This would be followed by a redesign of these processes, where necessary.
- ***Systems Design:*** The redesigned processes, information flows, and information requirements would form the basis for the definition of the overall information architecture for fiscal management and the actual design of the information systems modules to support the functional processes for a specific function.
- ***Systems Procurement and Implementation:*** It is only after that the above activities have been completed or at least are well-advanced that one can proceed with the selection, procurement, and implementation of appropriate technology to implement or support these systems.
- ***Ongoing Systems Operation and Maintenance:*** Once operational, an IFMIS becomes a mission-critical financial system used by all government accounting and budgeting entities within government for the day–to-day performance of their functions. Any disruption in the operation of the system can cause significant disruption in the government's financial operations. To mitigate this, it is necessary that governments make adequate provisions for recurring costs associated with the operation and maintenance of a system. In addition, setting up and staffing of a technical organization with sufficient capacity to operate, maintain the system and to provide end-user support is critical for the operational sustainability of the system and the continuity of the government's budget management and financial management operations.

In subsequent chapters we will discuss the specific tasks that need to be completed in each of these areas.

[7] Also see: Khan, A. and Mario Pessoa. 2010. Conceptual Design: A Critical Element of a Successful Government Financial Management Information System Project. Washington, DC: International Monetary Fund.


Government Financial Information and its Users
Ministry of Finance
Treasury
Line Ministries
Revenue Agencies
Debt Management Agency
Budgets
Commit-ments
Receipts
Tax & Non-tax Revenues
Warrants
POs & Contracts
General Ledger
Balances in Accounts
Fixed Assets
Bills & Invoices
Loans & Grants
Fiscal Reports
Payrolls and Pensions
Payments
Financial Statements
Audit Reports
Creditors
Banks
Tax Payers
Donors
Government Auditors

# III. Policy Framework and Institutional Reforms

A full discussion of the overall regulatory framework for public expenditure management is outside the scope of this handbook. However, the handbook will describe the basic elements of this framework to highlight the functional requirements and controls that need to be incorporated in the design of component system modules.

The overall regulatory framework for operating the various component modules of the system network consists of the following elements:

- A budget management law that provides the legal basis for financial management.
- Financial and fiduciary reporting requirements that the system needs to fulfill.
- A budget classification structure and accounts classification that enables consistent recording and reporting in accordance with these requirements.
- The institutional arrangements for banking government funds and processing expenditure and receipt transactions as laid out in the budget management law.

## Policy Framework

The information systems will need to incorporate features to ensure that they abide by the requirements of the regulatory framework that underpins financial management processes in the country. Therefore, the regulatory framework needs to be in place—possibly reviewed and modified—before productive work can commence on the design of computer systems to support fiscal management. The main elements of this framework are described below.

### *Budget Management Law and Associated Regulations*

Many of the basic controls that are to be applied to the use of government funds are derived from a budget management law for management of public funds and property that provides the legal basis for treasury systems. It specifies the roles and responsibilities of the Treasury, the MOF and line agencies and the authorities and responsibilities for receipt and custody of public funds. It details the control processes related to public expenditure management, the management of public debt and the standards to be used for accounting, financial reporting and audit.[8] Very often the law is based on basic principles laid down in financial provisions in the constitution and laws related to the management of public finances. Controls are defined at several levels:

[8] Details of the accounting and auditing standards for the different institutional segments of the public sector (ministries, SOEs, SAEs, classified entities) are embodied in a public accounting manual and an audit manual. While transition towards adoption of specific standards may be a long term effort, the implementation of automated information systems to support GFM requires clarity as to which standards will be implemented in the current iteration of the system.

- Formal legislation and regulation that control the structure of funds and appropriations, and administrative practices.
- Financial legislation and administrative regulations that specify the detailed requirements for control to ensure that transactions are properly authorized and documented and that appropriation authority is not exceeded.

Within most legislative frameworks, receipts of governments are paid into a fund—referred to here as the consolidated fund[9]—and any expenditure from this fund must be formally appropriated by the legislature. Additional regulations, administrative instructions, and administrative practices specify the standards and procedures to be followed for transaction processing. These include:

- Document and transaction level controls to ensure correct processing, full and correct recording, and audit trails;
- Access controls to ensure that only authorized personnel can record, change, or report information; and
- Overall system controls to ensure that the system embodies established processing standards.

### *Budget Classification Structure and Chart of Accounts*

It is important to adopt a methodology for consistently recording each financial transaction for purposes of expenditure control, costing, and economic and statistical analysis and accounting. A standard, government-wide classification code structure needs to be set up to provide a consistent basis to:

- Consolidate government-wide financial information.
- Integrate planning, budgeting and accounting.
- Capture data at the point of entry throughout the government.
- Compile budget allocations and program and project costs within and across various government agencies.

The design of the budget classification structure (BCS) and chart of accounts (COA) should, therefore, be determined by the information requirements of each of the above objectives. As a minimum the BCS should have the following segments: (i) source of funds; (ii) function, (iii) organization and spending unit, and (iv) object of expenditure (economic) classifications. Function codes and the economic classification codes should be consistent with the IMF GFS. Also, the economic classification codes should be a subset of the account codes used in the COA to ensure integration of budgeting and accounting.

Additionally codes such as program and project codes could be added to track expenditures for programs and projects. Normally, it is possible to break down the organization codes to a level where a specific unit is carrying out a specific sub function. If this is done then it may not be necessary to specify the sub-function codes in the BCS and COA but use a cross-reference table to report expenditures/ receipts by function/ sub-function.

[9] The fund becomes the basis for accounting and reporting in government. It is common to divide the overall Consolidated Fund into several funds--for example, a fund for current receipts and expenditures, a fund for loan and capital receipts and expenditures, and a fund for receipts and expenditures on behalf of other parties (trust funds). Any fund may have a number of sub-funds.

### *Reporting Requirements*

The broad requirements for reporting are specified in the budget legislation and detailed in regulations, instructions, and administrative practice (for example, report formats actually in use) to cover external reporting to provide information to the legislature and the public as well as other countries, international organizations, overseas investors, and financial markets; and internal management reporting for government policy makers and managers.

## Institutional Arrangements

Implementation of systems to support GFM requires setting up some institutional arrangements to fulfill the requirements for the custody and use of these funds laid down in the budget management law. These include arrangements for: (a) banking government funds and (b) processing payment transactions discussed below.

### *Arrangements for Banking Government Funds – The Treasury Single Account (TSA)*

In a number of transition and developing economies, the IMF has recommended bringing all government accounts under the control of Treasury and consolidation in a Treasury Single Account (TSA) or a Consolidated Fund Account. In the absence of this measure, fragmentation of government financial resources in multiple Bank accounts outside the control of the Treasury leads to buildup of idle balances which can become quite significant. Government may need to resort to additional borrowing, even though these resources are lying idle in Bank accounts outside the direct control of the Treasury. Consolidation of the financial resources in a TSA under the control of the Treasury would provide the MOF with accurate and timely information of cash available and lead to improved cash planning to meet expenditure requirements.

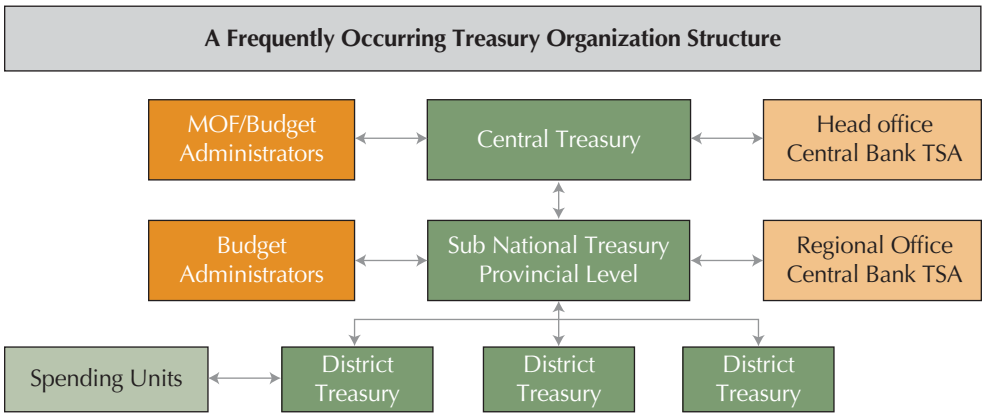
### *Arrangements for Processing Payment and Receipt Transactions*

This requires the setting up of a Treasury organization with a network of offices located countrywide or locating Treasury staff with SUs, and re-engineering payment processes and routing all payment transactions through the Treasury or its out-posted staff. This measure would provide a second check to ensure that all government expenditures are in accordance with budget appropriations, and releases. At the stage of issuing of a payment order, many of the control processes have to be scrutinized again. This may include verifications of:

- Identity of the spending officer.
- Availability of budget provisions.
- Exact budgetary imputation.
- Receipt of goods and services.
- Observation of financial regularity.

In practice, without such controls, expenditures could be undertaken which do not conform to these requirements, and these would be detected only at the ex-post audit stage. This would mean that government resources have been deployed to areas for which they were not appropriated. It could lead to shortages of funds in other areas which were considered more important at the time the budget was prepared. In addition, all receipt processes need to be re-engineered to ensure that revenues are directly deposited in Treasury-controlled Bank accounts. This would ensure that deposits made in bank accounts outside the control of the Treasury would be reduced and Treasury would get an accurate idea of the resource levels at hand.

**Figure 1: A Frequently-Occurring Treasury Organization Structure**




A commonly-occurring Treasury organization structure is shown in Figure 1.

It should be noted that the coverage of the TSA should include all budget resources, extra budgetary funds, technical or internally generated revenues/funds. In cases where some of the latter categories are left out of the TSA and are banked separately in private banks, it has been observed: (a) that the amount of financial resources outside the TSA can become very large and constitute a significant portion of the government's total borrowing requirements; and (b) when Government floats short/medium term instruments such as T-bills to meet these requirements, the banks where these resources are lodged use them to buy the T-bills. Government in effect pays interest on the T-bills which have been purchased from its own resources.

Many donor organizations require that funds associated with their programs be deposited in special accounts, sometimes in commercial banks. This requirement is intended to guarantee that funds are not comingled with government budget funds and are used only for the specified programs. The requirement for the use of the funds for specified programs can still be met if the special accounts are set up in the Central Bank and users access them either directly, or through the fiscal agents for the Central Bank. However, this will avoid the situation described above in which commercial banks use these donor funds for the purchase of government securities.

Placing all these resources in the Central Bank instead of private banks would also reduce the interest charges that government has to pay the Central Bank in case of an overdraft on the Consolidated Fund account since balances in these accounts, which also constitute government funds, would also be taken into account when calculating the overdraft amount and interest.

## Alternative Institutional and Banking Arrangements for Setting up a TSA and for Processing Payment Transactions[10]

Several variations are possible to the basic institutional setting and banking arrangements mentioned above, as long as they preserve the basic requirements for control which are:

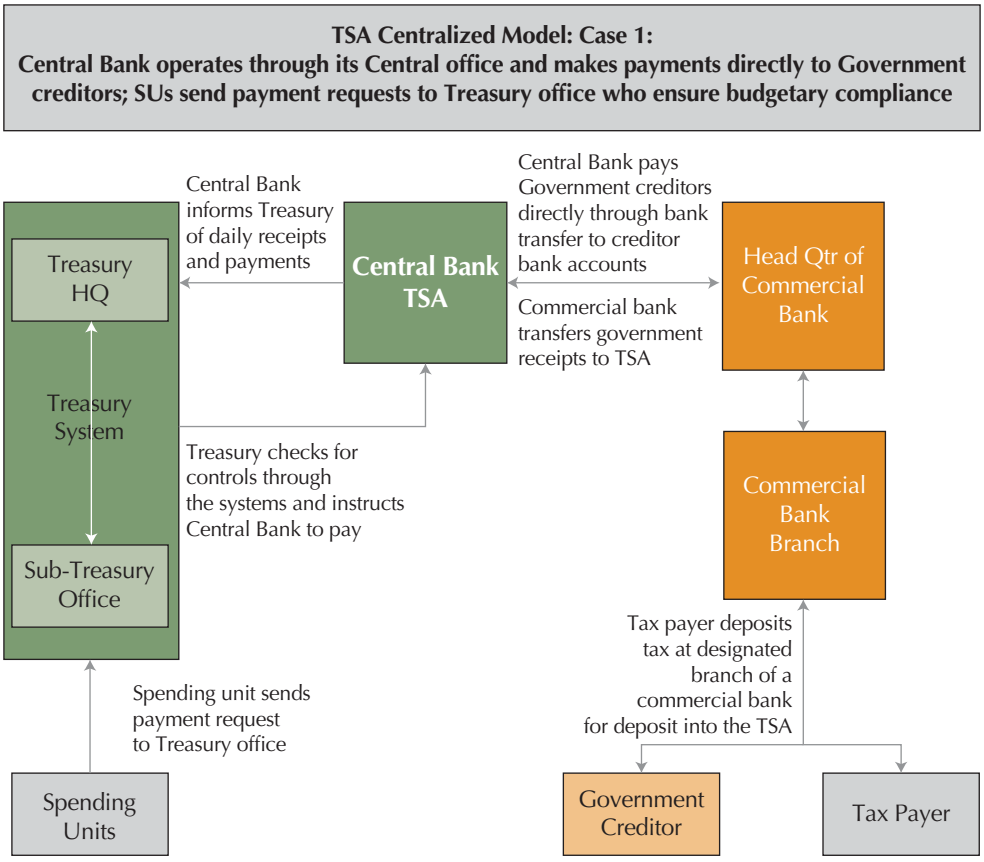
[10] See Pattanayak, S. and Israel Fainboim. 2010. Treasury Single Account: Concept, Design and Implementation Issues. IMF – FAD Working paper.

- All government financial resources should be under the control of the Treasury;
- The Treasury should be in a position to determine the magnitude of these resources at any given point—i.e. the balances in Government accounts;
- All expenditures from the TSA should be subject to budgetary controls;
- All government receipts should be deposited in an appropriate sub account of the TSA.

These alternative arrangements are discussed below and shown schematically in Figures 2–5.[11]

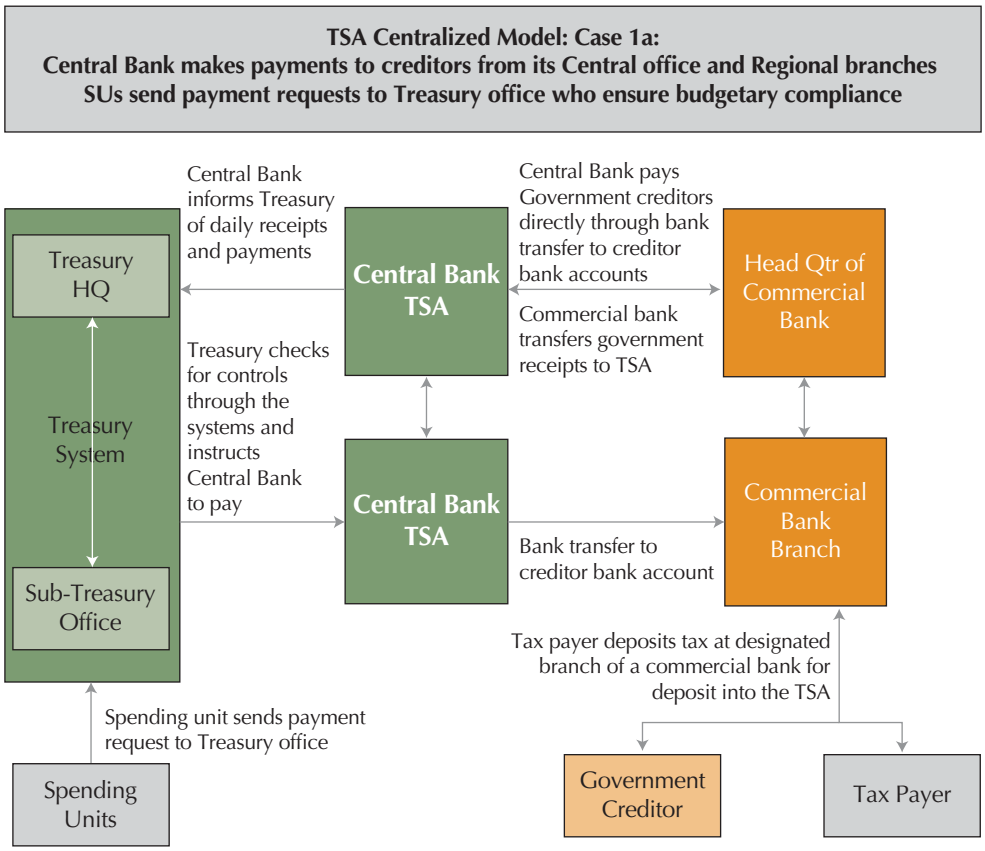
Case 1 (Figure 2) shows the commonly-occurring institutional setting in which: (a) all payments from line agencies are channeled through an office of the Treasury; (b) the Treasury is responsible for making payments from the Treasury Single Account (TSA), which is held at the Central Bank; and (c) the Central Bank is responsible for the retail banking operations associated with government payments. Government receipts are deposited in designated commercial banks which transfer them to the TSA at the Central bank within strictly specified time limits which are monitored closely.

## Figure 2: TSA Centralized Model (Case 1)




[11] These figures show the primary flows involved in a TSA operation. They may not show all the details of TSA operation, which vary in many countries e.g. the flow of transaction fee payments to commercial banks usually associated with zero balance accounts.

**Figure 3: TSA Centralized Model (Case 1a)**



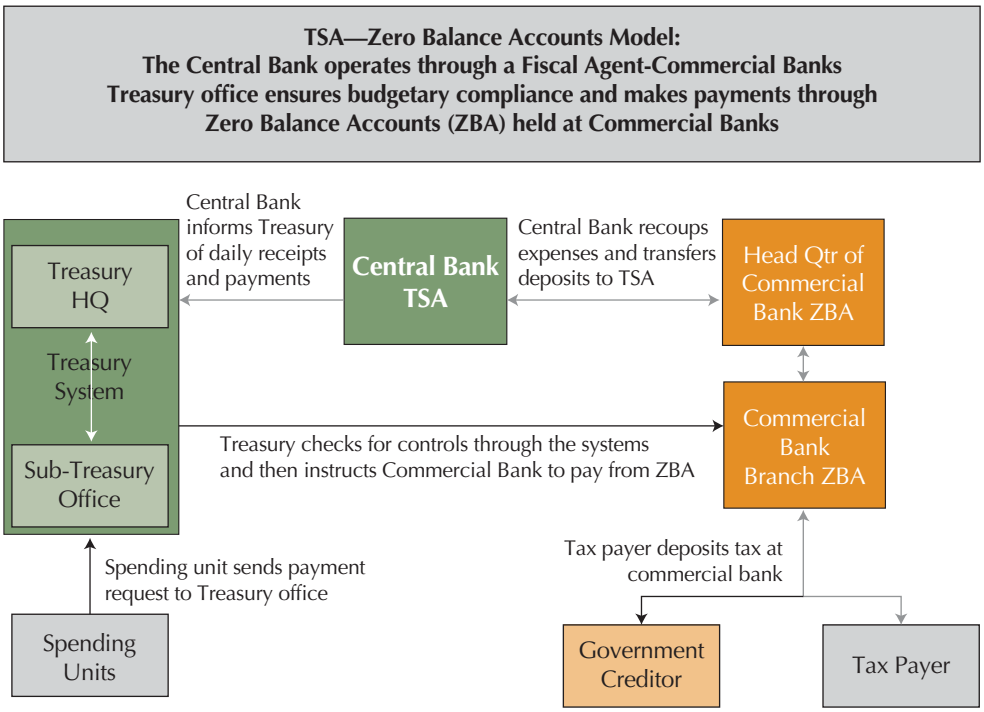

A slight variation to this case occurs where the Central Bank makes payments to government creditors through the Central office and its regional branches. This is shown as Case 1a in Figure 3.

Case 2, illustrated in Figure 4 shows an alternative arrangement put in place in cases where the Central Bank does not have an adequate network of provincial/regional branches, or does not have the capacity to handle the large volume of transactions associated with government payments and receipts. In these cases, the Central Bank selects one or more commercial banks to serve as its fiscal agents. The fiscal agent(s) makes payments on behalf of the treasury, and recoups all payments made from the Central Bank. Fiscal agents make daily deposits of all government revenues to the TSA in the Central Bank. The arrangement has the advantage of providing more expeditious payments to government creditors in view of the greater capacity of commercial banks to process these transactions.

Two aspects are important for the efficient functioning of this system. First, the float of all payments to be transferred to the TSA should be as small as possible. Second, these accounts should be zero-balance accounts (ZBAs). Their balances should be cleared to the TSA periodically to ensure that Government has an accurate idea of the total amount of cash available in the system to optimize its borrowing strategies.

For a system based on the use of commercial banks as fiscal agents to work efficiently, it would be necessary that the fiscal agent bank branches are automated and connected to their

**Figure 4: TSA Decentralized Model Using Commercial Banks as Fiscal Agents**



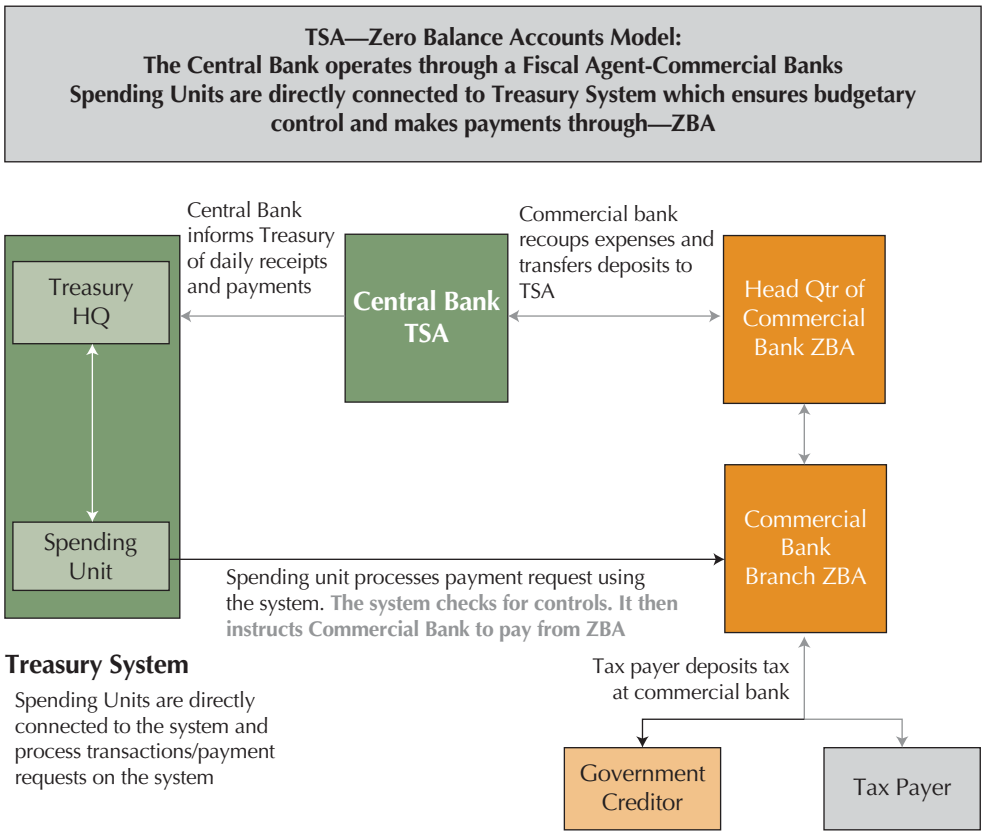

headquarters, and an automated bank/check clearing system is in place. In the absence of such a system, the time taken to clear all payments and deposit all receipts in the TSA could be longer and could lead to significant floats before receipts are deposited in the TSA.

In Case 2a and Figure 5 a variation to this arrangement is shown where the SU have direct access to ZBAs held at a commercial bank. This arrangement may result in a quicker response time for payment transactions since the payment authority resides in the agency itself. However, the bank accounts should continue to be under the control of the Treasury even though SUs may have access to them to make approved payments. This way, Treasury can obtain data on balances in these accounts and make transfers from or to them independently of the spending agencies.

In this case, the responsibility for ensuring compliance with budget execution limits and procedures is delegated to the agency. For this system to be successful, the MOF needs to ensure that the agency adheres to necessary controls prior to making a payment. This can be achieved in two ways:

- First, budget control responsibility can be exercised by officers from the Treasury who are out-posted to the line agency.
- Second, by connecting the spending units directly to an automated Treasury system used for controlling budget execution and for processing payment transactions. Here, the system design should incorporate the necessary controls; the location of the payment authority is not as important as it would be in a manual system. Prior to allowing a payment, the Treasury system software would normally ensure that a budget appropriation exists, a warrant allocation (cash) is available, and a prior commitment has been made—in those cases where commitment accounting has been implemented. Manual intervention would normally be required only to override some of these restrictions. The system would keep a log

**Figure 5: TSA Decentralized Model – Spending Units have Direct Access to ZBA**




of the event including the date, time, amount involved, and the name of the authorizing officer. This would ensure adherence to the controls prescribed for budget execution.

The *ex-ante* adherence to these controls would not automatically be possible in a manual system. Where spending agency finance personnel are functionally and administratively responsible to the head of the spending agency, they may be subject to pressures to process payment transactions that do not comply with specified procedures. It may therefore become more difficult to ensure that prescribed controls and procedures are adhered to in a decentralized system as compared to a Treasury-based central system.

## Other Legislation and Frameworks that Regulate the Operation of Automated Systems

As the basic functional processes associated with government fiscal management would be supported by automated information systems, the subject of this handbook, it is necessary to mention that, in addition to the legislation and policy frameworks associated with the functional processes, these systems also need to adhere to some further standards and legislation. These are: E-Government National Enterprise Architecture and Interoperability Framework which determines the standards for specification, deployment and operation of Information

and Communications Technology (ICT) in the public sector; and governance-related: (i) Right to information legislation; and (ii) Privacy and confidentiality legislation.

## Requirement for Setting up an IT Capability

In addition to the institutional arrangements for banking government funds and for processing payment transactions discussed above, if an IFMIS type system will be used to support government budgeting and accounting processes, the setting up and staffing of a supporting technical organization with sufficient capacity to operate and maintain a mission-critical, countrywide system and provide end user support is critical for the operational sustainability of the system and the continuity of Government's budget management and financial management operations. The agency responsible for systems maintenance and operation may need to develop/upgrade/augment its in-house data processing staff and facilities to maintain and operate the system. Adequate budget provisions should be made to meet on going expenses. These issues are discussed in greater detail later in this handbook.

# IV. Development of an Information Architecture for Government Fiscal Management

## Functional Processes in Government Fiscal Management (GFM)

The main functional processes involved in Government Fiscal Management are:

### *Macro-Economic Forecasting*

This process assists expenditure and resource planning by developing a macroeconomic framework linking the growth of national income, savings, investment, and balance of payments to public expenditures and revenues. It enables the development of: aggregates of the government budget, notably revenues, expenditures, and the overall fiscal deficit and its financing; the balance between the capital and recurrent components of the budget; composition of expenditures by the main sector spending agencies; revenue forecasts consistent with macro-economic assumptions; forecasts of non-tax revenues based on macroeconomic projections; estimates of resources available from domestic and external borrowings; projections of current expenditure.

### *Budget Preparation*

Budget preparation starts with the development of a circular indicating economic prospects, broad policy objectives, how the budget is expected to attain ,them, and sectoral allocations and ceilings consistent with the macroeconomic framework. Next comes the preparation and analysis of line agency expenditure proposals and revenue forecasts and their consolidation into an annual budget document after a series of discussions—at cabinet level, between line ministries, the MOF, the budgetary committees of parliament—and approval by the legislature. These discussions focus on how the budget proposals would meet the policy objectives outlined in the budget circular, on priorities among the various proposals, the validity of the resource requirements contained in these proposals and how they can best be accommodated in the overall budgetary envelope.

### *Budget Execution, Accounting and Fiscal Reporting*

These functions are associated with implementing the budget, and cover the procurement of goods and services in accordance with budget estimates, the recording and accounting of all government transactions, and development of periodic reports to monitor the overall flow of spending or use of appropriations, over the course of the year, highlighting major deviations from the planned budget and suggesting corrective measures.

### *Cash Management*

This entails developing agency and central cash flow forecasts, the release of funds to spending agencies, the monitoring of inward and outward cash flows and expected cash requirements, and the issue and redemption of government securities for financing government programs.

### *Position, Payroll and Benefits/ Pensions Management for Govt. Retirees*

The activities here are associated with the development and maintenance of government's human resource policies such as manpower planning, complement control, civil service pay and pension policies, the fiscal impact of these policies and their administration.

### *Debt Management*

This defines the tasks associated with maintenance of records on all contracted public debt on an individual loan basis, classified according to source and type of loan. It assists economic and policy analysis by determining, for example, the debt implications of different fiscal and deficit financing options by preparing projections of debt service commitments under existing and anticipated contracts.

### *Revenue Administration (Customs, Tax and Excise and Internally Generated Revenues)*

The formulation and administration of tax policies and covers the actual levy and collection of revenues including taxes and duties as laid down in these policies, and the valuation and collection of non-tax revenues, such as stamp duties, user fees, charges for services etc.

### *Auditing*

This deals with the analysis and scrutiny of public, financial, and other transactions to ensure compliance with government policies and procedures, and to ensure cost-effective use of public funds in accordance with overall government priorities.

## Information Systems Architecture for Government Fiscal Management

Each of these processes requires specialized systems to support them. As described in Chapter II, the design of a system or systems that can support all these processes and share information must start with an Information Systems Planning (ISP) exercise that results in the information architecture for GFM systems. This architecture would address questions such as:

- What are the different information systems modules that are required to support GFM functional processes?
- What is the function, scope, scale, and type of a particular systems component?; and
- What are the primary interfaces of the modules with each other, i.e., how do these modules exchange and share information and what are the characteristics of the primary information flows?

The results of such an exercise for GFM systems are shown in Figure 6. The first column shows the main functional processes for GFM in the order in which they occur during the fiscal management cycle. The second column shows the organizational entities involved in these processes and the main body of the diagram shows the systems modules that are required and the primary

data flows and linkages between the various systems modules. A simplified version is shown in Figure 7.

It is important to note that since the required systems modules and the primary linkages are based on functional processes rather than specific organization structures, these modules and their inter linkages —the systems architecture—remain stable even though specific organizational responsibilities within different government settings may change.

In an actual systems development exercise, each box presented in the information systems architecture diagram has to be analyzed further in terms of the processes it covers and the information flows associated with those processes as well as linkages with other systems to determine the specific requirements of these modules.

The functionality of the individual modules, the data flows, and inter-relationships between the various systems modules are described below.

## Systems for Government Fiscal Management

Following are descriptions of different types of Systems and how they are related.

**Systems for Macro-Economic Forecasting:** These provide the information that is required by the MOF in preparing the budget call circular for the coming fiscal year. Line ministries and spending units respond with budget proposals formulated in line with the guidance provided in this circular. The systems then help in the development of budget aggregates, including:

- Estimates of revenues, expenditures, and the overall fiscal deficit and its financing.
- The balance between the capital and recurrent components of the budget; composition of expenditures by the main sector spending agencies.
- Revenue forecasts; forecasts of non-tax revenues based on macroeconomic projections.
- Estimates of resources available from domestic and external borrowings; projections of current expenditure.

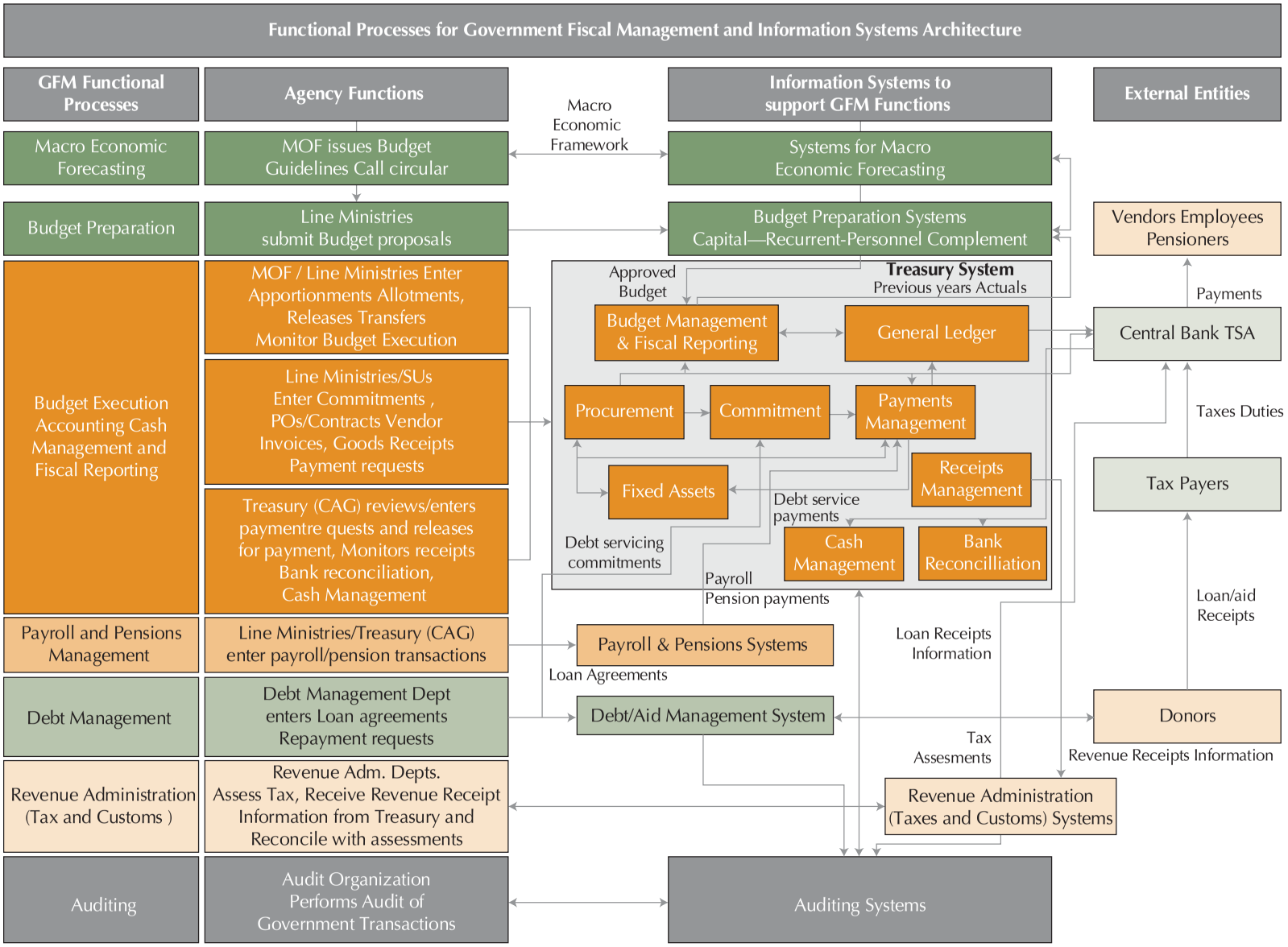
**Budget preparation system**: The MOF uses the budget preparation system, the previous year's data on actuals, and the new funding proposals received to compile the overall draft budget which, after several iterations between the MOF and the sector ministries and after approval by Parliament, becomes the annual approved Government budget for the year. The Budget preparation system transfers data on the approved annual budget for the year to the Treasury system.

**Treasury system**: This uses data received from the budget preparation system to control budget execution. It supports the functional processes associated with implementing the budget, for example:

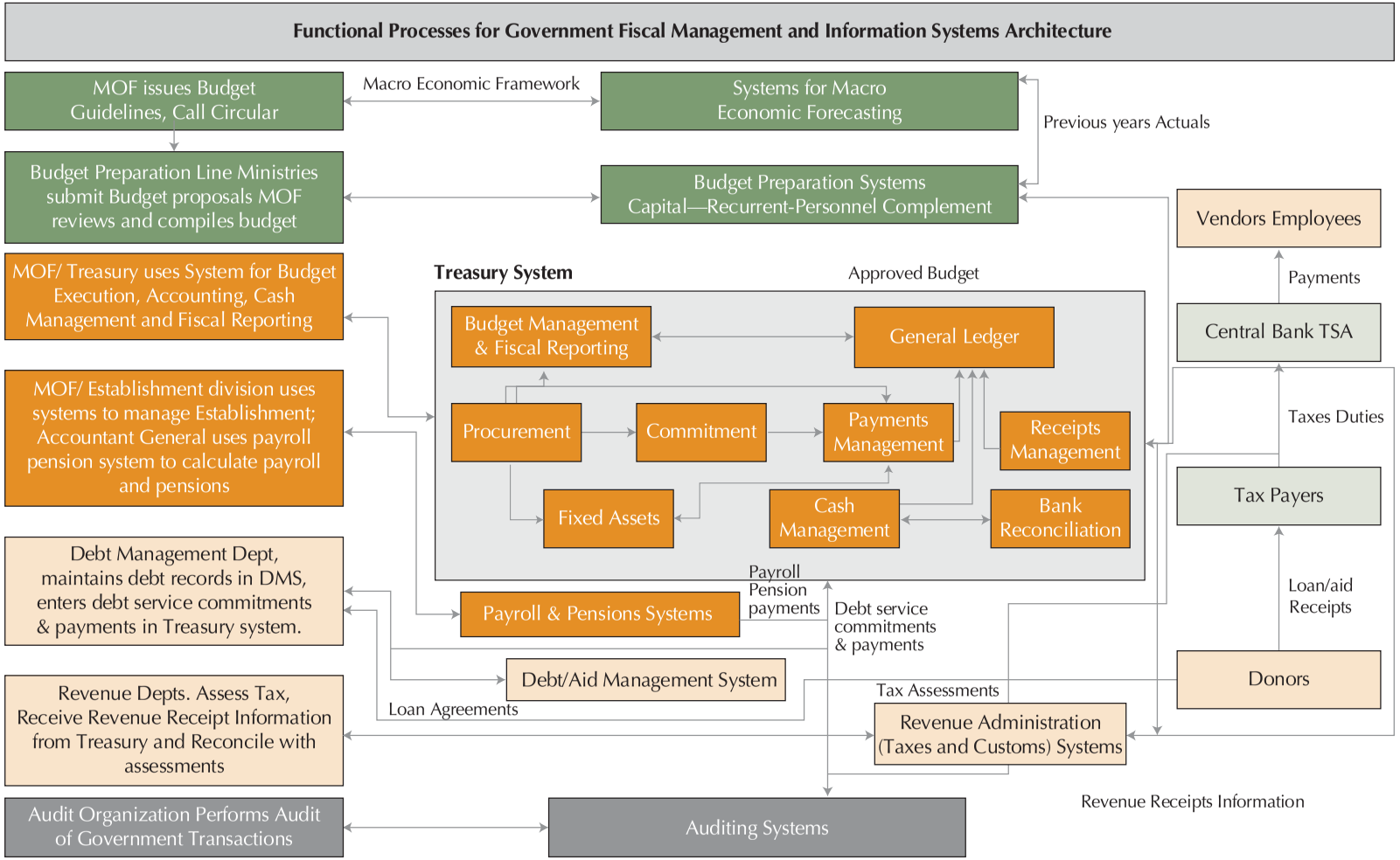
- The procurement of goods and services in accordance with budget estimates.
- The recording and accounting of all government transactions.
- Periodic reports to monitor the overall flow of spending over the course of the year.
- Highlight major deviations from the planned budget and suggesting corrective measures.
- The release of funds to spending agencies.
- The monitoring of cash flows and expected cash requirements.
- The issue and redemption of government securities for financing government programs.

All in-year changes to the budget need to be made in the Treasury Budget execution system. If the budget preparation module forms an integral part of the application software package that is

## Figure 6: Functional Processes and Information Systems Architecture for Government Fiscal Management



## Figure 7: Information Systems Architecture (Simplified Version)



used to support budget execution, then a separate transfer is not required since the two would share databases. The approved budget data would be available to the Treasury system for budget execution purposes.

**The Establishment control, payroll and pension systems** support the activities associated with government's human resource management including establishment control; pay and pension administration; and the fiscal impact of these policies.

The payroll and pension systems calculate the payroll and pensions for government employees and retirees and pass on the data to the Treasury system to make the payments through the TSA to employee and retiree bank accounts. The payroll system should use the establishment control system to ensure that payments are made only against authorized and budgeted positions.

The **Tax and Customs systems** support the activities related to the revenue administration function They cover the actual levy and collection of revenues including taxes and duties; the valuation and collection of non-tax revenues, such as stamp duties, user fees, charges for services etc. Tax and customs revenues collected during the year are deposited in the TSA and recorded in the Treasury system.

The **Debt management system** keeps a record of all contracted public debt on an individual loan basis. It provides an input to the Treasury system to execute the debt servicing liability. It assists economic and policy analysis by determining, the debt implications of different fiscal and deficit financing policies by preparing projections of debt service commitments. Loan and Grant Receipts are deposited in the TSA and recorded in the Treasury system.

**Auditing systems** use the transactions gathered by the system databases to carry out their audit functions. They assist in the analysis and scrutiny of public, financial, and other transactions to ensure compliance with government policies and procedures, cost-effective use of public funds in accordance with overall government priorities.

While each of these systems perform important functions in a government's financial management process, the collection of modules that provide support to functional processes associated with budget execution, accounting, cash management and fiscal reporting, and referred to as the Treasury system (marked clearly in the architecture shown above) are considered to be the core elements of this architecture in view of their central place in the government's fiscal management cycle.

These systems form the centerpiece of the GFM systems network. They are used to carry out the budget execution process as well as to monitor and evaluate overall budget implementation. They are the primary repository of the financial data that serves as the basis of the government's economic management. They include information on resource levels expected to be available during the course of the year, how these resources are to be allocated—as specified by the systems for macroeconomic forecasting and budget preparation—and the balances available for use at any time during the course of the fiscal year.

Other systems, such as those for debt management, tax and customs administration, payroll and pensions systems, though of vital importance to GFM, support the core system by maintaining detailed data related to specific areas and providing this data to the core in accordance with specified requirements in terms of timeliness and detail.

In view of their central place in the fiscal management process, the core elements of the GFM systems network, the Treasury systems, are discussed in greater detail in the next chapter.

# V. Treasury Systems – Functional Processes, Information Flows and Systems Modules

## Core Functional Processes

### *Treasury System*

As noted previously, this supports the functional processes for budget implementation, accounting, and fiscal reporting. This would normally cover the following processes for both the investment and current budgets.

- Budget Management
  - Budget Apportionment, Budget Allotment,
  - Budget Releases, Budget Transfers
- Commitment Management – Recording all commitments relating to intended government expenditures
- Payment Management – Processing all government payments relating to:
  - Procurement of goods and services[12] Salary and Pension Payments
  - Debt servicing payments
  - Fiscal transfers to sub-national level
- Fixed Assets Management
- Receipts Management – Recording revenues and other receipts
- Accounting (posting all transactions as they occur)
- Bank Reconciliation, Cash Management, and
- Fiscal Reporting

[12] Procurement is a process that begins with requisition of an item or service by an end user, goes through shopping or bidding for selection of a supplier, includes formal evaluation of bids or supplier choices, and ends with a contract signature or a purchase order. The procurement process is usually initiated and managed by procurement officers in the SUs or a central procurement agency. This is normally done using a manual or an automated stand-alone procurement system. However, once the government selects a supplier and places a purchase order the process becomes part of the budget execution process. The use of the term procurement in this handbook is restricted to denote the stages beginning from placement of the purchase order, which results in a commitment and blocks budget funds, and includes the subsequent stages such as the receipt of goods and services, and invoice from the supplier. The actual payment made against this invoice for the goods purchased is part of the payment management process. The transactions associated with the management of fixed assets and control of the inventory of assets acquired are included in the fixed assets management and inventory control processes. All these are part of the functional processes for budget execution and accounting which are handled by the Treasury system.

## Treasury Systems Functionality

To perform these functions the Treasury system would need to have the ability to:

- Record initial budgets and inform spending ministries about their budget appropriations, as approved by the legislature, and keep a record of initial budgets, revised budgets, budget transfers and supplementary budgets for a typical government spending ministry.
- Inform SUs about appropriation and commitment authorizations and record commitments incurred by a spending unit against the approved limits and the appropriation during the course of a year.
- Inform Spending units about budget releases / funds releases[13] and keep a record of the amounts of funds released against the appropriations and any changes thereto.
- Process all expenditure requests e.g. for expenditures arising on account of purchase of goods and services, payroll/pensions payments, debts servicing, fiscal transfers. For purchase of goods and services it will record purchase orders, contract details, receipt of goods and services, vendor invoices.
- Authorize payments after checking for controls including availability of appropriation, commitment. and funds allocation prior to payment approval;
- Give payment instructions to the Bank. If required, print checks against payment instructions and/or make arrangements for the electronic transfer of payment information to an external paying entity (a bank, for example).
- Create a record of the asset procured (for purchase of fixed assets), its item code and description, cost and details of depreciation to be applied.
- Record revenue and other receipts information received from the Banks against appropriate account heads.
- Reconcile payments and receipts with bank records.
- Enable monitoring of balances in Government accounts.
- Enable posting of all transactions, enforcement of controls, accounting.
- Enable comprehensive fiscal reporting.
- Ensure that these functions are performed by authorized staff only.

## Budget Execution using the Treasury System

A typical scenario that describes the manner in which the main participants in the budget execution process interact with the various systems modules of the Treasury system while carrying out their core functions and the main information flows from the various agencies that use these modules in the course of budget execution is summarized in figures 8 and 9. The information flows are discussed in detail in Figures 10–14.

The budget execution processes are discussed in detail below.

### *Budget Management (Including Budget Review and Fiscal Reporting)*

*Apportionment and Allotment:* After approval of the annual budget by Parliament it is loaded into the system by the Budget Department of the MOF. The approved budget for spending ministries is then broken down to the detailed level of economic classifications and is apportioned over

[13] The budget release process only specifies a line ministry's/spending unit's authority for spending. No cash transfers take place to ministry bank accounts.

## Figure 8: Treasury System Core Functional Processes and Information Flows

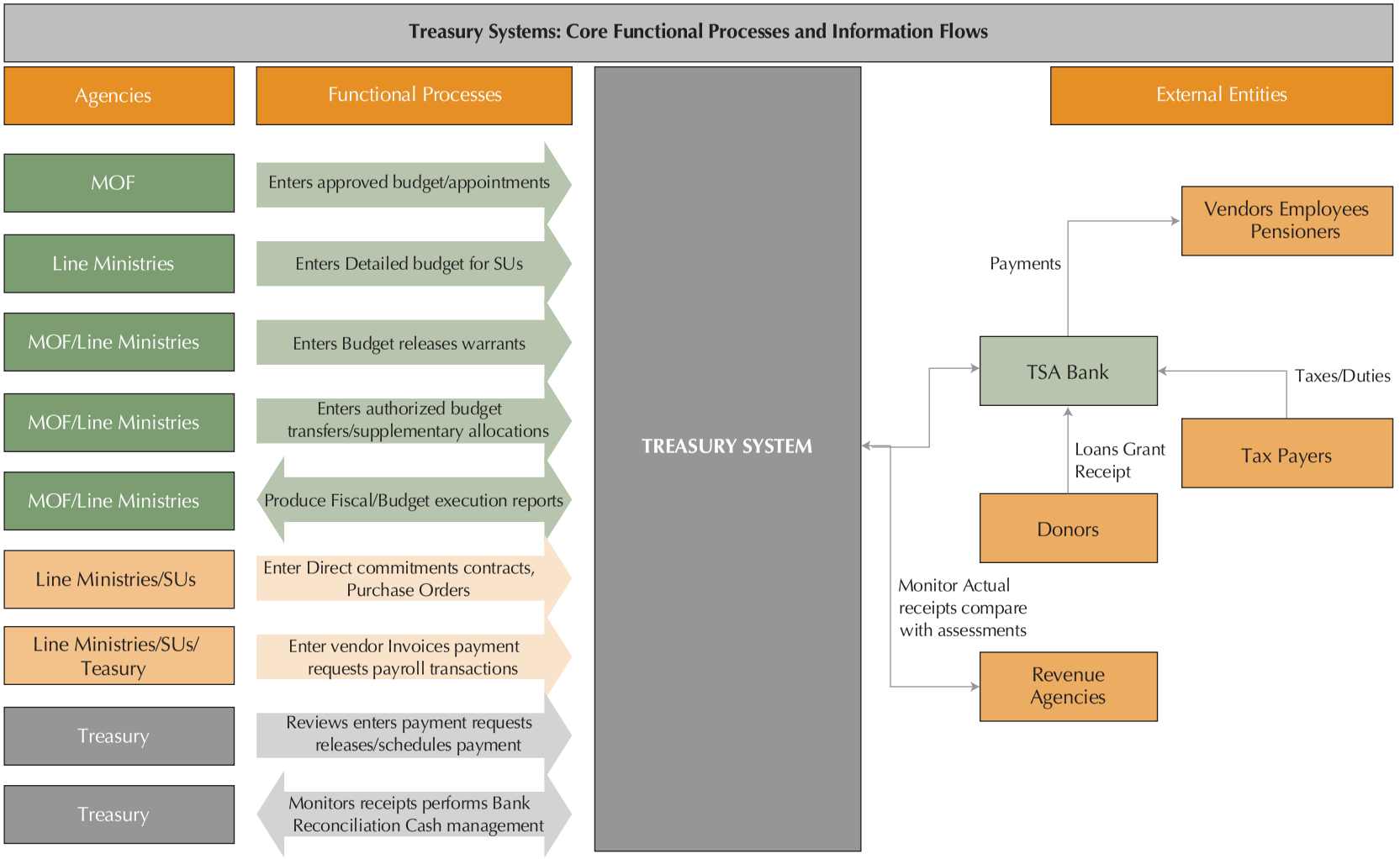
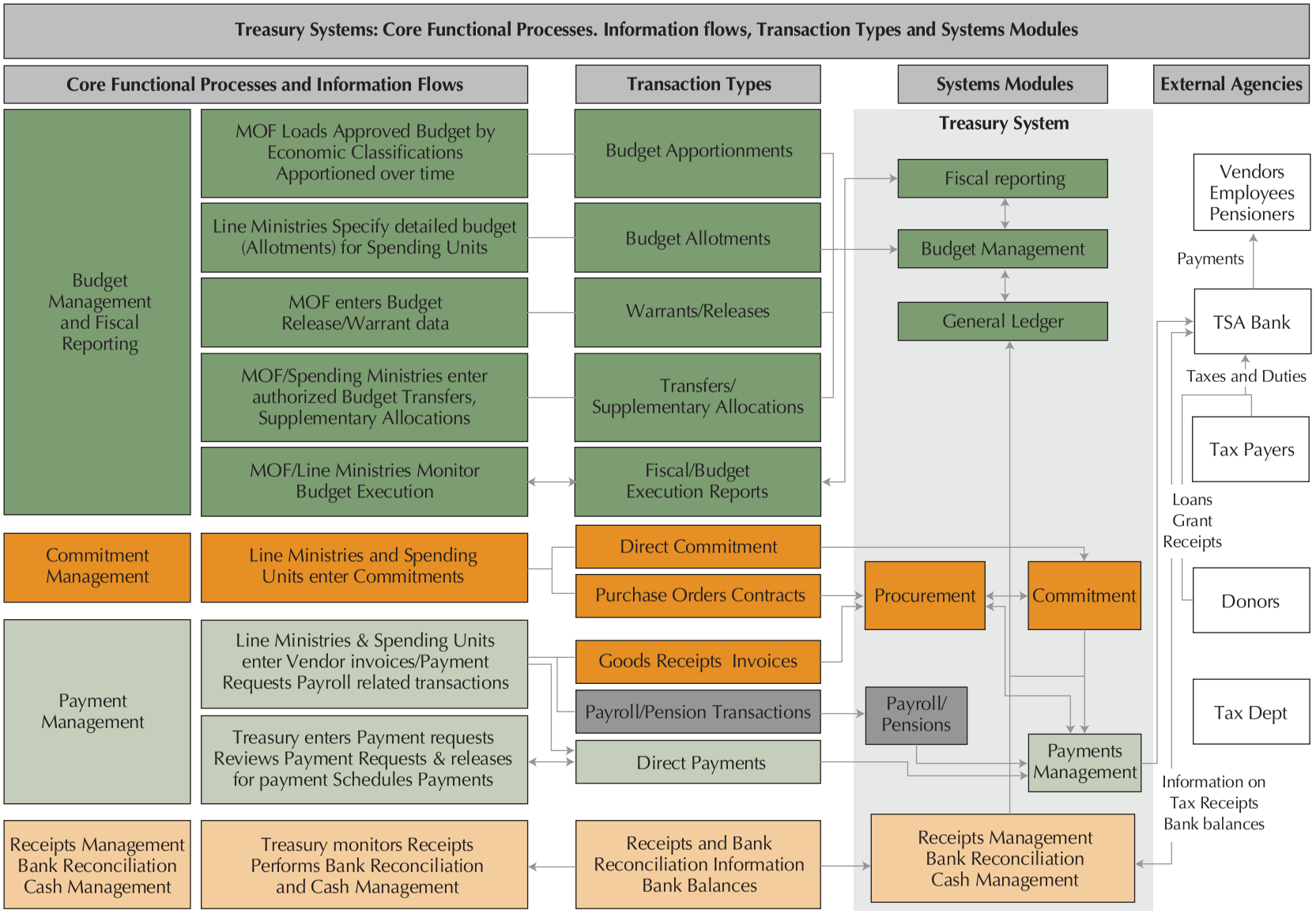


**Figure 9: Treasury System Core Functional Processes, Information Flows, Transaction Types and Systems Modules**



time (quarters and months) and is registered in the system by the MOF and communicated to the spending ministries.

The spending ministries, in turn, register the detailed budget for their subordinate spending units and communicate the allotments to the spending units. These are the spending limits for the spending ministries and spending units by quarter/ month for the fiscal year. Spending limits may be varied during the course of the year in accordance with the results of monthly or quarterly reviews of budget performance. For example, changes may be caused by variations in the revenue forecasts, commitment and expenditure patterns, etc.

*Cash Requirement Forecasts***:** SUs / Line ministries develop estimates of cash requirements and receipts and prepare periodic requests for funds by economic category.

*Budget release – Warrant allocation:* Each year, expenditure plans detailing projected outlays and receipts are developed by spending units and ministries. As the year progresses, sector agencies prepare periodic requests for funds by economic category, which are also captured. The MOF then issues warrants to ministries for each category of spending. The warrant is an instrument that specifies a line ministry's authority for spending. No cash transfers to ministry bank accounts.

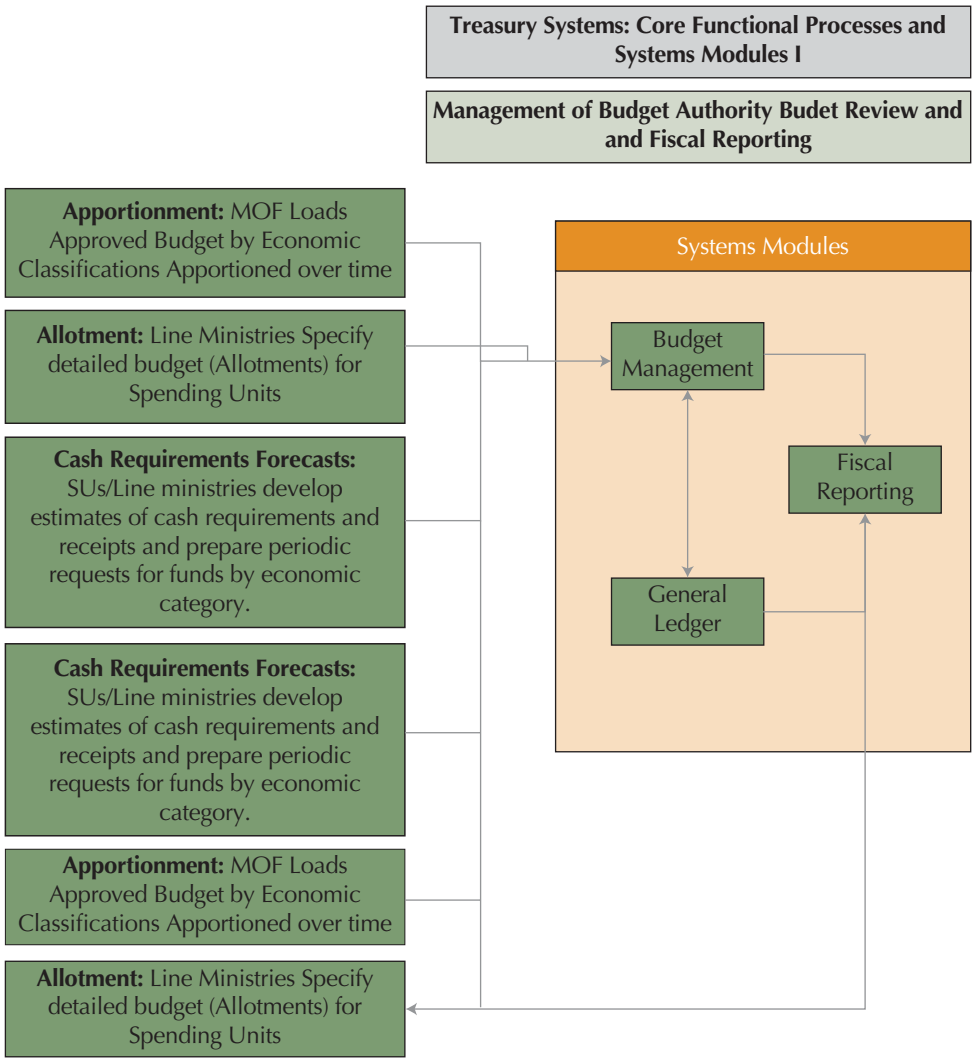
From these amounts the ministries issue sub-warrants for their spending units and advise the appropriate spending units. These processes take place periodically throughout the year. The warrant and sub-warrant amounts need to be within the amounts specified in the spending limits for these organizational units. Warrant amounts are determined based on the results of periodic budget reviews, revised revenue forecasts and cash balances. Separate releases are usually requested and allowed for investment projects after monitoring progress.

*Budget Transfers and Virements:* Normally the Budget Law permits the MOF, the spending ministries and the spending units to shift the approved budget between organizational and object classifications within restrictions set by the relevant laws. Shortfalls identified by spending units in one or more economic categories may be met from excesses in other economic categories in their budget. For this, a budget transfer request needs to be processed. For some items and within certain thresholds, spending units may have the financial powers to make the transfer themselves. For these cases, they will update the budget data base in the system. For cases which are beyond their financial powers, they will request the parent ministry or MOF to process the transfer, depending on the type of transfer. If approved, the Ministry / MOF will process the transfer and update the data base. The spending unit will be informed of the decision on the request.

*Supplementary Budgets:* During the course of the year revisions to the approved budget may be carried out by the Parliament. These revisions are carried out in accordance with the procedures for finalizing the original budgets. The process of preparing supplementary budgets covers the preparation, routing and approvals of requests for a supplementary budget. Supplementary budgets are normally presented to the parliament in mid-year.

*Budget Review and Fiscal Reporting:* The Treasury System is used to produce periodic fiscal and budget execution reports that give a consolidated picture of all receipts and expenditures and progress against budget targets. For these reports to be comprehensive, all items of receipts and expenditure need to be captured. The Government Chart of Accounts is the basis of the fiscal reporting process. These include the Fund, organizational, functional and economic classifications structure of the budget and the classification of account groups, assets and liabilities. As line ministries and spending agencies carry out their work programs, expenses and receipts are posted to the GL by the Treasury system by the budget object classification.

**Figure 10: Budget Management – Including Budget Reviews and Fiscal Reporting**




Ministry systems record physical progress on programs and projects. This information is forwarded to the MOF. ***Capital projects***: Tracking the implementation of capital projects requires data on both the physical progress of the project and the financial outlays and expenditure. The latter is available from the Treasury system. Data on physical progress is maintained by the agency executing the project. These can be combined to obtain a comprehensive report.

The Treasury General ledger records receipts of various types of tax revenues, loan/ aid receipts, and debt servicing expenses. On the basis of this data the MOF can prepare overall fiscal reports that compare actual expenses and receipts with the budget estimates. These reports provide a status report and recommendations and action plans for corrective action during the course of the year. These could include revisions to spending limits, warrants, etc.

The interactions are shown schematically in Figure 10.

### *Commitment Management*

- *Procurement of Goods and Service:* As the year progresses, spending units process requests for goods and services. After verifying the appropriateness of the expenditure and availability of budget and spending limit, the spending unit will process the procurement request according to prescribed procedures and place a purchase order on a vendor for the procurement of goods and services. The vendor should be registered in the database of vendors. The spending unit will then register a commitment in the system. The system will block the corresponding amount from the available budget and spending limit. In case the SU does not have direct access to the system, the commitment transaction is forwarded to the parent ministry and the MOF-Treasury regional office where the transaction will be entered into the system.

  A more detailed description of the commitment management process is given later in this chapter.
- *Commitments for the Investment Component of the Budget:* Commitment control for the recurrent component of the budget can be operated satisfactorily on a within year basis, primarily as an aid to sound cash management activities. However, in the case of the investment component, where many projects have a financial life of more than one year, it is often useful to maintain an accurate record of the forward expenditure commitments. If this is done, Government has a better understanding of the flexibility available to it for future investment decisions. This process can be accommodated in the Treasury System by extending the commitment control field against each investment appropriation line item to cover two years beyond the budget year. As long-term commitments are entered, the financial impact is recorded for budget and "later" years.
- *Direct commitments:* Several types of commitments can be registered in the system without going through the procurement module. These include commitments for Civil Service salaries. Salary commitments may be advised only once a year on an estimated basis and adjusted as necessary during the year. MOF Civil Service Agency enters these commitments. Debt Management Department enters Debt servicing Commitments. Spending agencies may also register direct commitments e.g. those relating to direct payments for utility bills/ rents, etc.

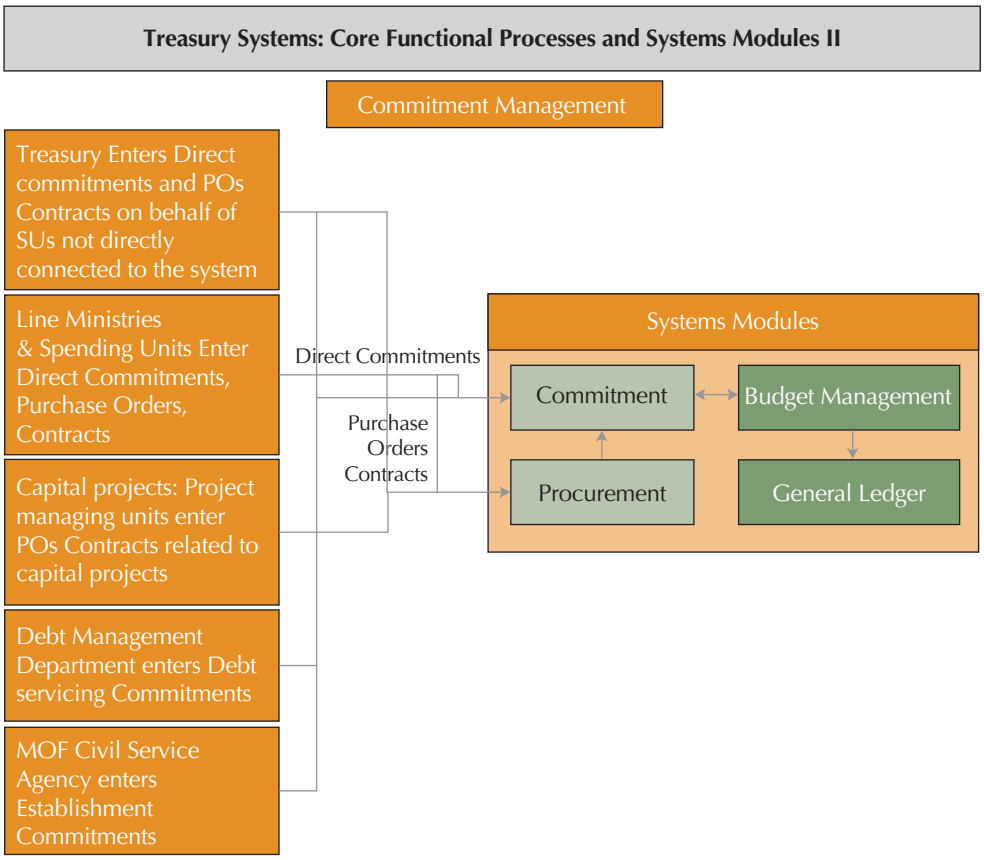
These processes are shown schematically in Figure 11.

### *Payments Management*

- *Verification of goods and services receipt and payments*[14]*:* The process starts with the receipt of goods and services. Receipts need to be validated against the purchase order and a verification of receipts report is generated and entered into the system. On receipt, of the invoice from the vendor the system checks against the receipts report, the purchase order and approves the payment. The system examines requests for payment with reference to the available budget (spending limits, warrants) and the existence of a prior commitment. After approval, the transaction is forwarded to the Accounts Payable module and scheduled for payment.
- For purchase of fixed assets, spending units would need to create a record of the asset procured, its item code and description, cost and details of depreciation to be applied. Some

[14] Verification of receipt of goods and services and verification of vendor invoices against receipts involves operational people in the SUs. It is typically done through dedicated inventory control, resource management and purchase order processing systems. This could imply that the Treasury system must be deployed at all Spending units. This can be very expensive in terms of user license fees for the application software. This information can be transferred to the Treasury system via a web portal. These issues are discussed later in the handbook. Alternatively, this can be done differently through an interface between the SU's system and the Treasury system at the point where an invoice is ready for payment.

**Figure 11: Commitment Management**




software packages require that details of the item to be procured be entered in the fixed assets module at the time of signing a purchase order. The cost of the asset is posted after purchase.

- *Payroll and Benefits and Pensions Payments*: In the case of a decentralized payroll system, the Spending Unit computes the salary of the employees on its rolls. This involves updating the data base for three types of change: (a) Changes to the employee's data that would impact the salary. This includes changes such as promotions, addition of new allowances.; (b) Changes to the employee's general data such as transfers, change of address, account number; and (c) Changes that would impact the employee salary only in the current month. After these updates, the spending unit computes the payroll. This is validated against the authorized position list for the spending unit. The request for payment is then forwarded to the Treasury for approval and payment. The Treasury enters this into the system and which approves this request after checking the available budget (spending limits, warrants) and the authorized position list. The transaction is then forwarded to the Accounts Payable module and a payment order is sent to the TSA Bank to deposit the appropriate amount in the employee's Bank account. If employees do not have bank accounts, the TSA bank may make the cash available to the spending unit for the payment of salaries.

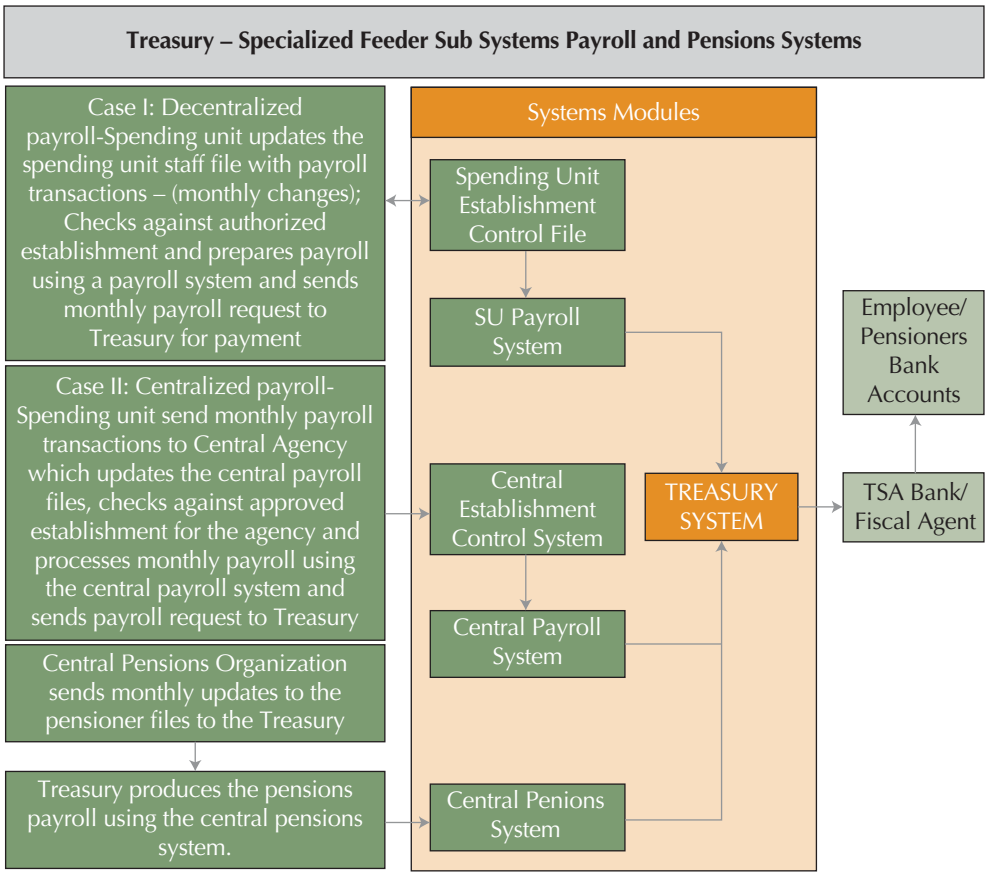
  In the case of a centralized payroll system the spending unit forwards the monthly changes to the agency responsible for computing the central payroll. The central agency,

often the Accountant General's office in the case of many South Asian countries, or the Office of the Civil service in the case of some African countries updates the central payroll file and uses a central payroll system to compute the payroll after checking for available budget (spending limits, warrants) and the authorized position list. The payroll payments file is then forwarded to the Ac Payable module as before and a payment order in the name of individual employees is sent to the TSA Bank to be deposited in the employee Bank accounts.

Similarly for pension payments the agency responsible for pensions for government retires makes changes to the pensioners file and uses the central pensions system to calculate the monthly pensions and forwards the payment file to the Treasury for payment. These systems are shown in Figure 12.[15]

- *Small Expenditures:* The commitment (and verification) of small expenditures (up to a predetermined limit) can be entered into the system simultaneously with the order for payment. However, to prevent misuse, the system must know in advance which appropriation items allow such simplification.

## Figure 12: Payroll and Pensions Systems




[15] The pension management processes discussed here apply to the case in countries where the monthly pension to civil servants is based on a fully non-contributory system and is another line item in the recurrent budget. It does not deal with the issues associated with management of a separate Pension Fund for civil servants, if one has been set up for the management of pension assets.

- Debt servicing: The debt management department receives the loan agreements form the donor/ lending agencies and registers the loan details in the system, including the disbursement and debt servicing schedules. The debt management department also records commitments related to debt servicing as described earlier. On receipt of debt service bills, the department verifies receipts and payments due against the debt portfolio and forwards it the bills to the Treasury for payment. The Treasury processes these payment requests in a similar manner to that for other payment requests. On conclusion of the transaction, the paying bank sends a list of payments to the Treasury which in turn sends the list of debt related payments to the debt management department. These are used for reconciliation purposes. The debt management agency may use an automated debt management system to perform these functions. In this case the DMS would need to interface with the Treasury system and forward payment requests to the Treasury system like any other spending unit.
- *Direct payments/payment scheduling:* the Treasury would need to have the facility to make direct payments / fiscal transfers and to schedule payment requests in accordance with the due date or in view of other exigencies.

These processes are shown schematically in Figure 13.

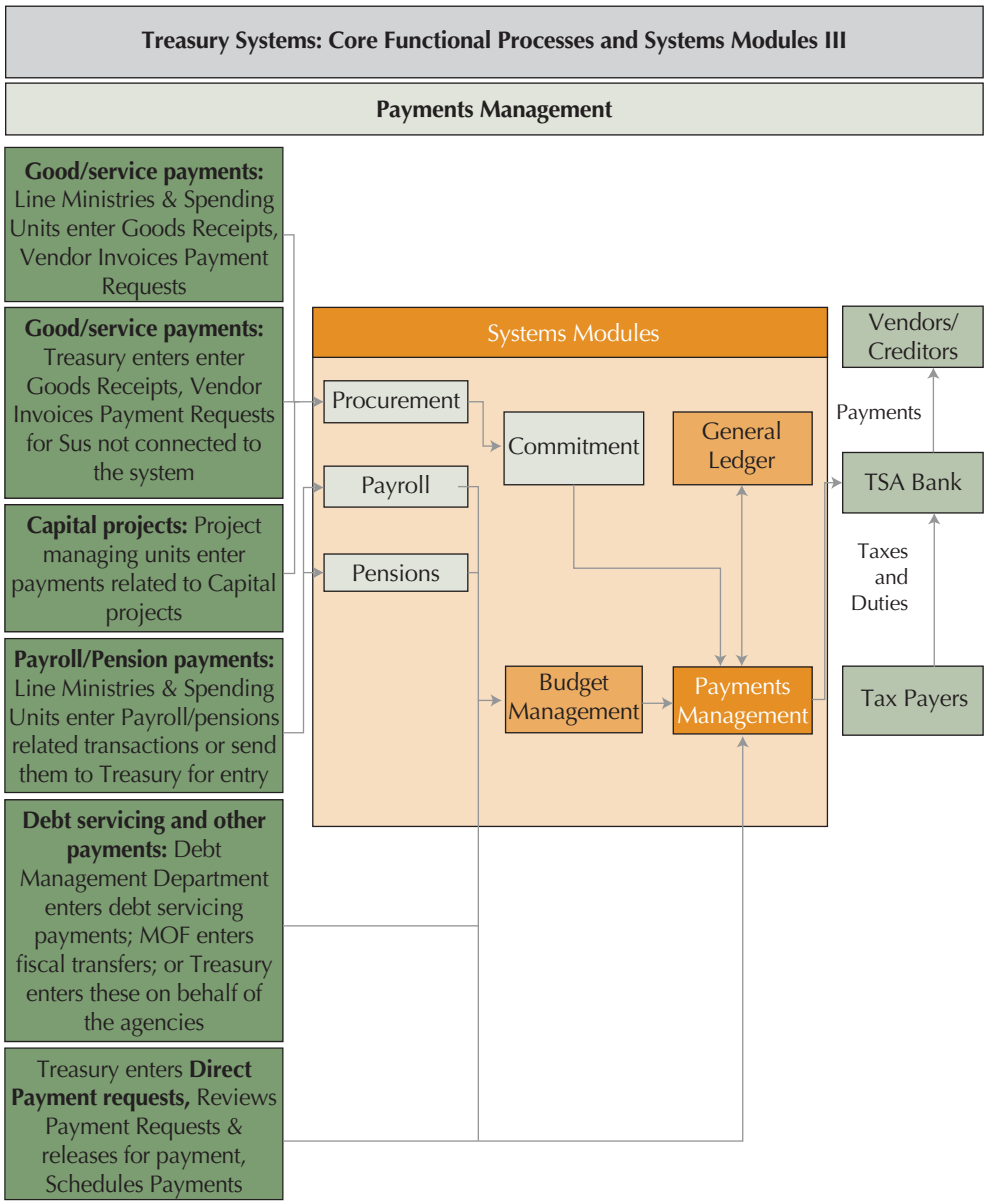
### *Receipts Management*

Government receipts are paid through payment orders issued by the payee on his bank. The bank transfers the payment to the appropriate sub-account of the Treasury Single Account at the Central Bank. The Treasury monitors the deposits of Government receipts through daily statements or received from the Bank or through an online interface. The Treasury implements any revenue-sharing arrangements that are in place between the central government and the sub national governments, posts the detailed revenue category figures accordingly in the General Ledger, and informs the relevant SU or revenue collection department of the receipts.

- **Loan receipts:** The Debt management department(DMD) and/or the spending ministry receive information from donor agencies about loans given to government. The DMD registers the loan agreement and the schedule of tranche releases for the loan. The money is deposited by the donor in the TSA Bank. Receipts are recorded by the Treasury in the general ledger. Information on receipts is passed on by Treasury to the Debt management department which in turn passes it on to the concerned ministry/ spending unit.
- **Grant receipts:** The DMD and/or the spending ministry receive information from donor agencies about grants given to Government. The ministry forwards the grant agreement to the DMD registers the grant agreement and the schedule of tranche releases for the grant. The money is deposited by the donor in the TSA Bank. Receipts are recorded by the treasury in the general ledger. Information on receipts is passed on by Treasury to the Debt management department which in turn passes it on to the concerned ministry/ spending unit.

  *Receipts*: Government receipts (e.g. taxes and duties) are preferably paid by the tax payers through designated commercial banks who act as the fiscal agents of the Central Bank. They are then transferred to the TSA at the Central Bank. A daily file from the Central Bank (or its fiscal agent) to the Treasury informs the Treasury and the appropriate revenue collection agencies of the details of tax and duty collections. Tax and Duty refund requests are made by tax payers to the respective departments. Payments are made by the Treasury on the basis of pay orders approved by the tax and customs departments. Sometimes deposit accounts are set up by the revenue administration authorities for receipt of taxes and duties and these deposits are subsequently transferred to the TSA at the Central Bank Cash Management section.

**Figure 13 Payments Management**




## *Cash Management*

The cash management section receives expenditure and revenue forecasts from the spending ministries, and from the debt management department on debt servicing expenditures. The revenue collection agencies prepare revenue forecasts. The cash management department examines this data with respect to the accounting data booked in the TGL, the debt management database and the cash balances in the TSA and its component sub-accounts. This enables it to determine the liquidity position of the government and shortfalls/ surpluses. This information form the basis

of the MOF determining the borrowing requirements and the spending limits and warrants for spending ministries and units.

### *Bank Reconciliation*

The list of completed payments received from the TSA Bank (normally the Central Bank) is used for reconciliation of records at the Treasury and the Spending Unit. Figure 14 illustrates these processes are shown in.

### *Tax and Customs Receipts and Refunds*

Government receipts (for example, taxes and duties) are preferably paid by the tax payers through designated commercial banks who act as the fiscal agents of the Central Bank. They are then transferred to the TSA at the Central Bank. A daily file from the Central Bank (or its fiscal agent) to the Treasury informs the Treasury and the appropriate revenue collection agencies of the details of tax and duty collections. Tax and customs duty refund requests are made by taxpayers to the respective departments. Payments are made by the Treasury on the basis of pay orders approved by the tax and customs departments. Sometimes deposit accounts are set up by the revenue administration authorities for receipt of taxes and duties and these deposits are subsequently transferred to the TSA at the Central Bank. These information flows are shown in Figure 15. After calculating refunds due to a tax payer, the customs and tax departments need to prepare payment requests like any other SU and forward to treasury for payment. These payments should not be netted out against tax receipts even if the latter have been deposited in deposit accounts managed by the tax agencies.

## Importance of Commitment Management for Budgetary Control

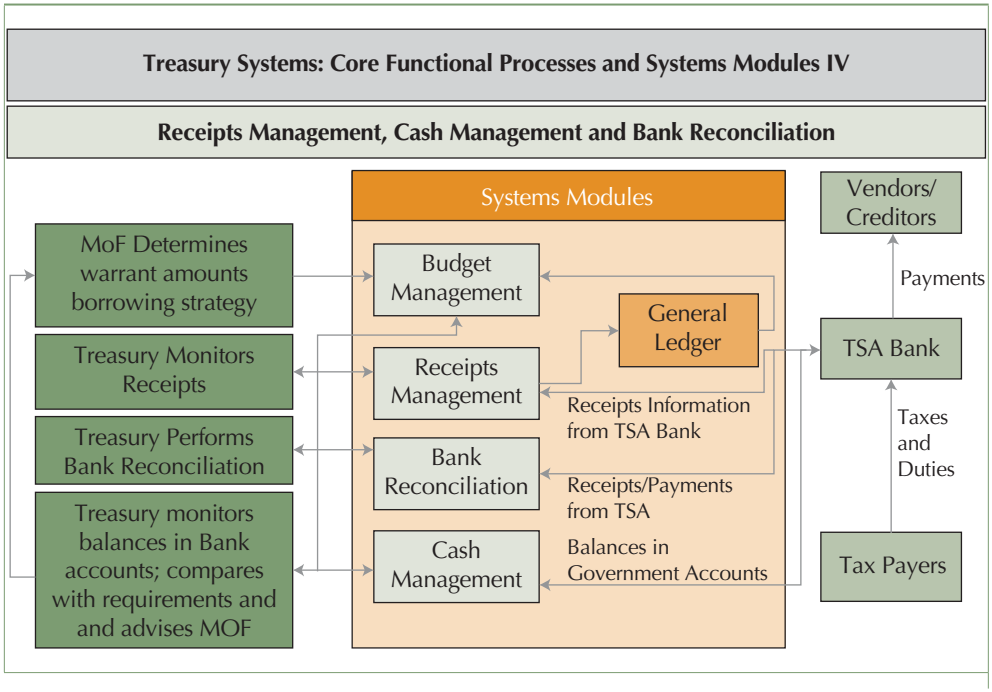
Commitment management is an essential element of any sound budget execution system. The commitment management process ensures that spending units do not enter into contractual or other binding liabilities beyond their authorized budget. The implementation of commitment accounting together with the recording of all accounts payable transactions ensures that the Government has complete information on its total expenditure liabilities and on the stock of arrears, if any, built up over time.

*Commitment management is therefore an essential element of budgetary control. Satisfactory Budgetary control cannot be exercised by **only** checking for budget availability at the payment stage of an expenditure transaction.*

If a spending unit enters into a contractual liability without checking for actual budget availability (calculated after taking into account both the commitment liabilities and the expenditure to date), and this liability is beyond the unit's budgetary authorization then the Government is essentially committed to honoring this liability. When a payment transaction associated with this liability hits the Treasury system, the units will need to make a request to the appropriate authorities for adjustment to its budget (either through transferring budget from another category or through a supplementary allocation) and will need to make budget available so that the transaction can be processed.

*Implementation of Commitment control will enable the government to move the "budget checking" control from the payment process to the point when goods and services are requested. Adopting commitment control will bring real budget control into the transaction processing cycle. This will establish budget control at the point the transaction is first initiated. Control at the point of payment is too late to be an effective control, since the goods and services would already have been received, and the government would have a legal obligation to pay the vendor.*

**Figure 14: Receipts Management**



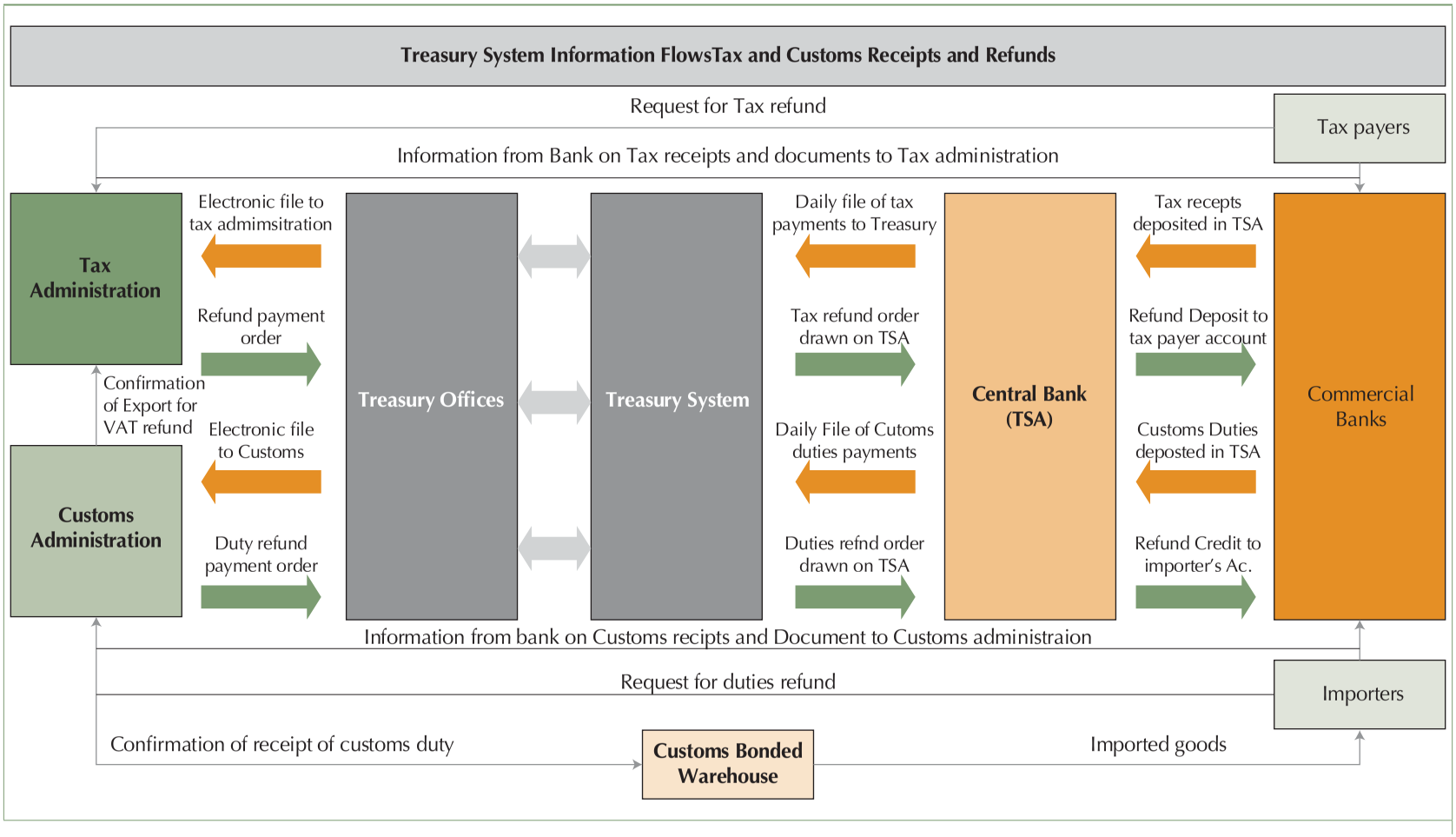

### *The Commitment Process*

As the year progresses, spending units process requests for goods and services. The first step is to verify the appropriateness of the expenditure and availability of budget and spending limit. The spending unit processes the procurement request according to related prescribed procedures. such as competitive procurement, then sends a purchase order to a vendor for the procurement of goods and services. The vendor should be registered in the database of vendors.

The spending unit will then register a commitment in the system and block the corresponding amount from the available budget and spending limit. The commitment transaction (purchase order) is forwarded to the designated Treasury office which will record the commitment transaction in the Treasury system. When the invoice is received by the SU for this purchase, the SU will verify the receipt of goods and services via a goods receiving note and forward the invoice to the designated Treasury office for payment. The Treasury office will check the prior commitment and associated information in the purchase order to establish that the payment is being made to the correct vendor and is in accordance with the contractual terms of the purchase order. If found satisfactory, the Treasury office will make the payment, by debiting the corresponding budget line item and also retire the commitment.

In cases where a partial payment is made against the purchase order, the amount of the commitment will be reduced only by the amount actually paid. In this way the Treasury system will be able to keep a full record (and inform the SU) of the available budget—the latter being the difference of the total budget minus the sum of payments made and outstanding commitments. Further commitment transactions will be checked against this amount before allowing them to be registered in the system.

**Figure 15 Tax and Customs Receipts and Refunds**



### *Commitment Thresholds*

In order to reduce the amount of work involved in related transaction processing, some governments institute a policy that only commitments above a certain threshold value would be recorded in the system. This policy is based on the assumption that the commitment and expenditure patterns associated with budget execution follow the 80–20 rule, that is, 20 percent of the commitments by number (and associated expenditures) would account for 80 percent of the budget amount. The remaining 80 percent (by number) of the transactions would only total to 20 percent of the budget by amount. This is found to be the case for most commitment and expenditure patterns. In practice, it would be necessary to profile the contractual patterns that exist in a given environment, and determine the commitment threshold accordingly. The threshold should ensure that the bulk of the commitments by amount (80–90 percent) are recorded in the system, and associated expenditure are checked against these commitments prior to payment.

### *Multi-year Commitments*

Normally, commitments are registered in the system against the budget available for the current fiscal year. In cases where entering into such liabilities is necessary beyond the time horizon of the budget authorization (usually a fiscal year), for example, for contracts that will require multiple years for completion, the system should have an accurate record of such commitments to facilitate appropriate budget provisions for subsequent years. Since the payment schedule associated with these commitments are also recorded, this will also provide information on future cash flows expected, enabling the budget department to take these into account while issuing budget releases.

### *Commitment Carry Forward*

For those cases where a commitment has been made for a contract which is normally expected to be completed within the time horizon of the budget authorization but has not been completed, the commitment record also provides a list of liabilities that will need to be carried forward to the next fiscal year and for which appropriate budget provisions needs to be made. Commitment control will therefore allow the government to close the books at year-end in a more timely fashion by identifying the outstanding commitments and providing the ability to roll those commitments to the next fiscal year.

### *Salary and Payroll Commitments*

For salary and payroll expenses, the spending unit calculates the payroll commitments on the basis of staff on board and the authorized pay and allowances for staff. These are checked against budget availability and then advised to the spending agency and the MOF. Salary commitments may be advised only once a year on an estimated basis and adjusted as necessary during the year**.** Changes would be necessary if the pay and allowance structures change, staff on board are promoted, new staff are added or staff reductions occur.

### *Transition to Commitment Accounting*

All full function Treasury systems have the capacity to record all information associated with commitment accounting and the facilities to enforce required controls. In many countries, the implementation strategy for commitment control is based on a gradual implementation of controls so as to enable a smooth transition to the new system. The first phase of the systems implementation focuses on ensuring comprehensiveness of transaction processing, ensuring that all expenditure and receipt transactions are processed through the system, and a strict implementation of the

budget check prior to transaction approval. After this phase has been successfully completed emphasis should next be placed on moving to full commitment management.

One way forward is that when the SU sends a purchase order (PO) to the Treasury office, the details of this PO are entered in the system by the Treasury. This will automatically create a commitment in the system. However, this will only produce commitment data for POs generated for goods and services purchases for the non-development budget. Separate procedures will need to be implemented to cover the development budget and project-related expenses. For the latter, the Head of the Treasury or the Controller General of Accounts will need to develop a policy and issue instructions so that commitments in respect of capital expenses—often the main source of concern—are recorded. For example, the accounts officer attached to the project would be instructed to send a copy of the work-order to the Treasury office in advance of the initiation of any payment for the project. The Treasury can then set up a commitment in the system, and ensure that no payment is made prior to the recording of the corresponding commitment.

## Systems Deployment Options: Treasury-Based or Spending Unit-Based Systems Deployment

As discussed already, it is best to pick up (record) the transaction as close to its point of origination as possible to ensure comprehensiveness and timeliness of transaction capture. Therefore, a spending unit-based deployment option would, in principle, be preferable. However, there can be significant cost implications involved in such a deployment. The number of spending units in a country can be quite large (often in the orders of several thousand) compared to typical sub-Treasury office numbers which would normally be of the order of 100–200. This would mean that the number of end-users connected to the central server and using the application software directly would be correspondingly higher as hardware would be required to provide systems access to all these users across the network. Hardware and software (license) costs for a typical remote use could be about $2,000. If there are 5,000 such users across the network the additional capital cost involved would be $10 million. There would also be a corresponding increase in the recurring cost—for electricity, maintenance, etc.

As a compromise, spending units may be required to send their transactions to a designated Treasury office either in hard copy or electronically to be entered in the system. The line ministry head offices could still be connected to the system directly to enable them to monitor the status of their budgets etc.

With the advent of web-based technologies alternative means are now being implemented to give spending units access to the system while at the same time ensuring that the Treasury continues to exercise control on payments. SUs can now have access to a web-based portal that would enable them to send a transaction directly to the system. At the time of writing, this transaction would not update the databases and would only create a file that would subsequently be used by the Treasury office to update and process the transaction.

Web portals can also be set up to enable budget administrators to have direct access to the system to carry out their responsibilities and for line ministries to get access to budget execution figures and reports. These deployment options are shown in Figures 16, 17, and 18.

It needs to be clarified that the IFMIS is intended to serve the Consolidated Fund and all its budget entities, irrespective of the system deployment option adopted. The alternative deployment systems options presented in Figures 16 and 18 merely show how transactions from the spending units would be routed from the spending unit to the system. Treasury-centric deployment could

## Figure 16: Case 1 – Treasury-Centric Deployment

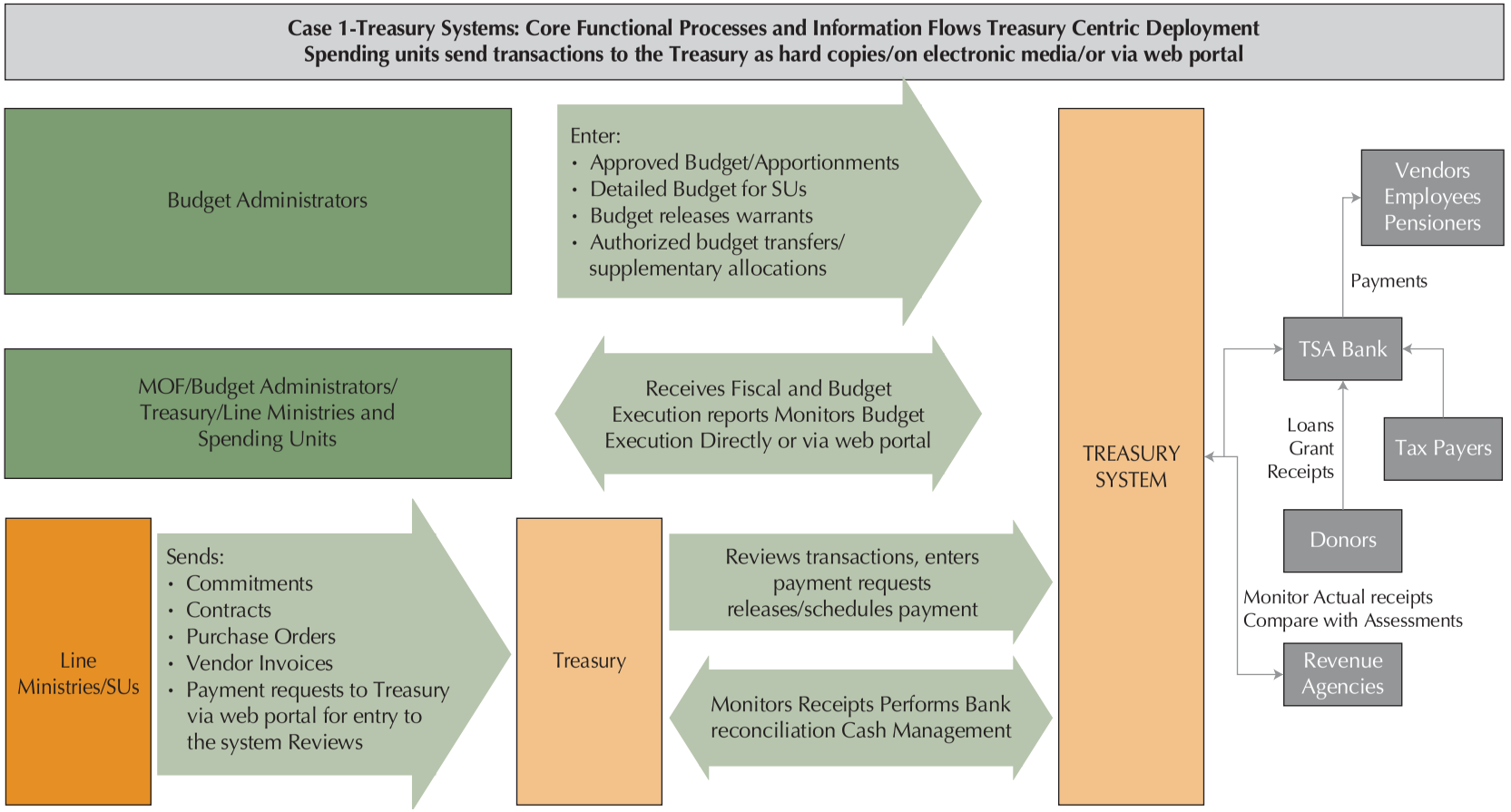
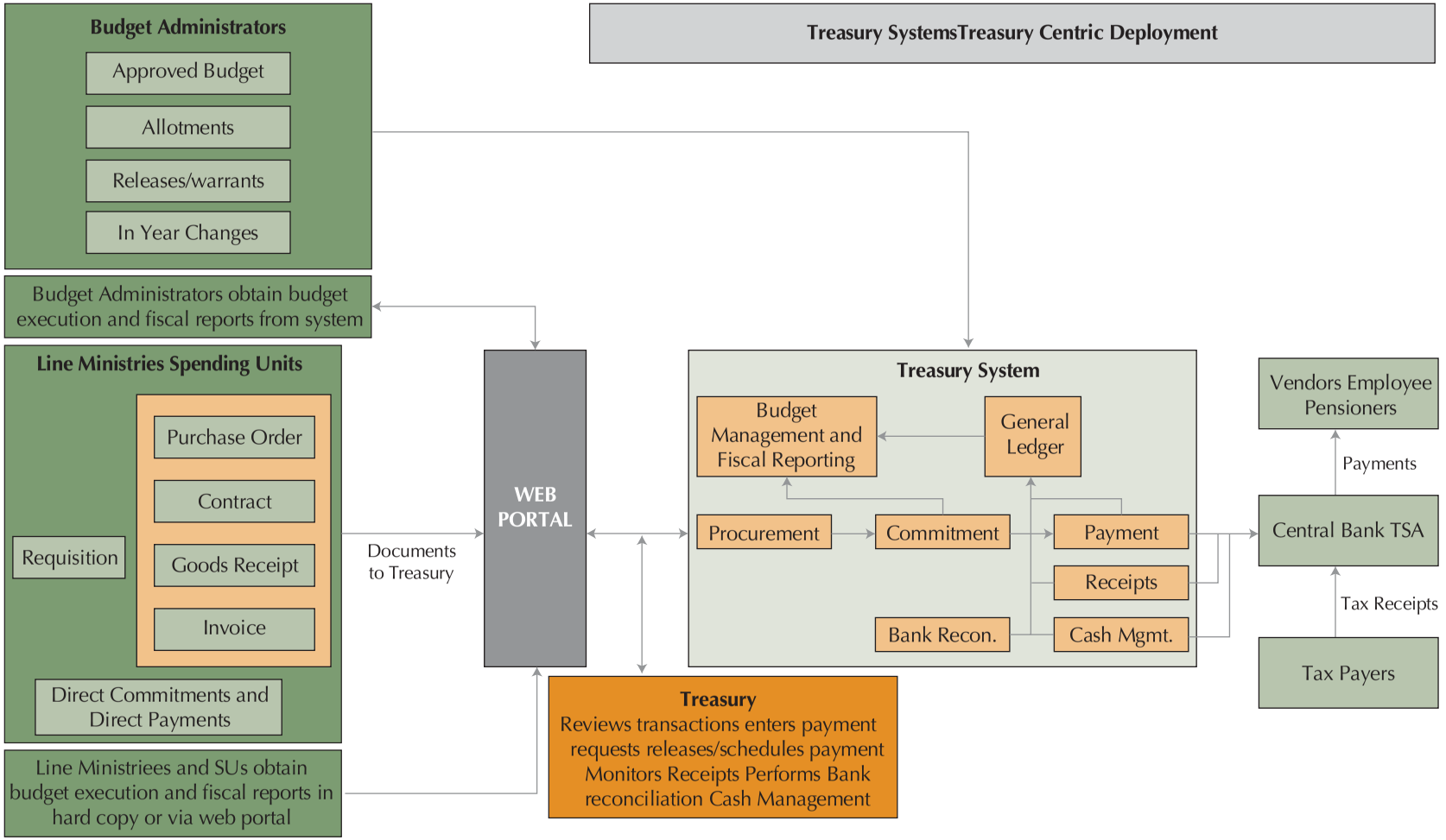
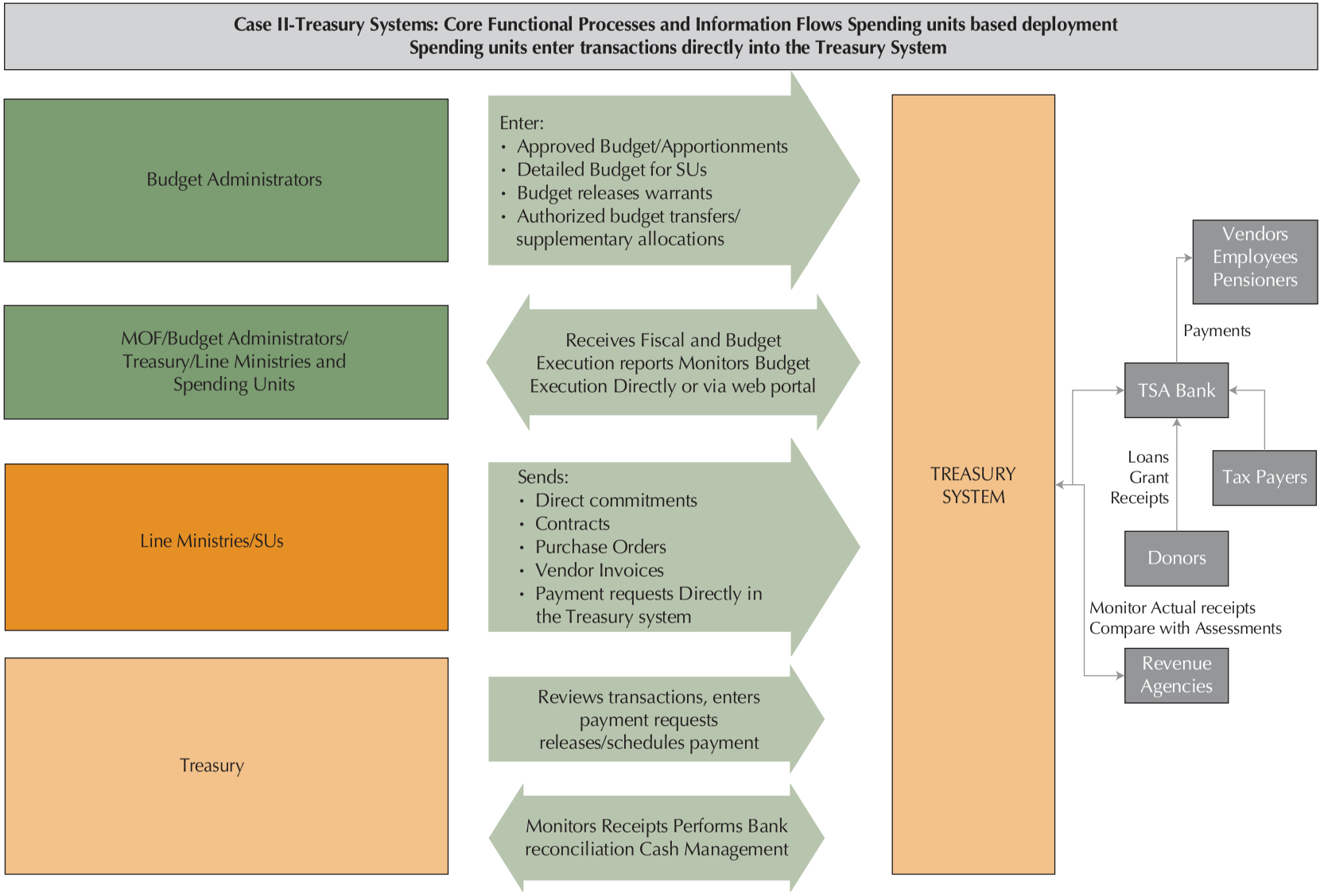


**Figure 17: Treasury-Centric Deployment (Another View)**



## Figure 18: Case 2 – Spending Unit-Based Deployment



be via a web portal. Spending unit-based deployment the transactions would be directly entered in the system. In both cases all SU transactions will be processed by the system.

## Primary Treasury System Interfaces

The primary interfaces between the core Treasury system and other GFM systems modules shown in the information architecture are described below in greater detail and illustrated in Figure 19 in the attached diagram. These interfaces specify the information that flows between these modules.

Generally, it is better to have modules such as budget preparation and payroll as an integral part of the suite of modules used for systems implementation. This means that they would share databases—including those for the Charter of Accounts (COA)—with the other modules which deal with budget execution.

Currently, the payroll module is available as an integral part of the suite of modules in an ERP system with several packages, (for example, Oracle Financials and SAP software) and several countries use this module for payroll management and this would be the recommended position.

The availability of an integrated budget preparation module is more of an issue on two counts: First, several commonly-used packages (for example, Oracle Financials and Free Balance) have recently, either introduced new modules—Hyperion in the case of Oracle EBS, or an integrated version of the module—as in the case of Free Balance version 7. Second, MOF budget division staff generally are less familiar with the functionality of budget preparation packages than their colleagues in the budget execution division due to the shorter exposure of budget division staff to budget preparation systems. In view of this many governments are still using separate modules for budget preparation and budget execution.

This section of the handbook therefore discusses some of the issues involved while interfacing a separate budget preparation module with the budget execution modules in some detail. It also examines the issues that need to be considered should separate payroll module be used and interfaced rather than integrated.

### *Interface with the Budget Preparation System*

If the budget module forms an integrated part of the application software package used for budget execution, then the two would share databases and no separate interface would be necessary. However, if the budget is prepared using a separate module which is not integrated with the Treasury system a facility is required to upload the approved budget after it has been finalized by the Parliament to the Treasury System. Further, the budget preparation module should use the same chart of accounts as the Treasury budget execution modules. All in-year changes to the budget need to be made directly by Budget department in the Treasury system, and all budget execution reports obtained directly from the Treasury system.

### *Interface with the Payroll System*

As mentioned above it would be preferable to use an integrated payroll module which shares databases with the rest of the financials modules. Nevertheless some governments do use a separate payroll module for payroll calculations.

If the Payroll is calculated separately, either through a separate computer-based system or manually, then this interface enables the amount of the payroll for each SU to be entered as a payment

request in the system. In the case of a separate automated payroll module, this interface enables a list of individual payments to employees to be transferred to the Treasury system as separate payment requests, with the payment being deposited directly into the individual's bank account.

In the case of a separate payroll system, it needs to ensure that the COA used by the two systems are identical and changes are synchronized. This would require additional processes and controls to ensure that transactions are not rejected at the time of posting. Given the size of payroll systems this could result in additional processing and controls to resubmit rejected transactions and it may also influence the accuracy of expenditure data at any given cut-off point.

Similar interfaces will need to be set up between any subsidiary specialized systems that manage employee benefits such as the General Provident Fund or staff loans and advances, etc.



### *Interface with the Debt Management System*

The Debt Management System maintains a record of all loans and related details such as name of lender, amortization schedules, etc. Loan receipts, debt service commitments and payment transactions with respect to these loans need to be entered in the Treasury system. This could be done manually by the debt management unit or electronically by an interface with the debt management system. It is important to note that the payments need to be made from the Treasury system and not directly by transactions generated outside the system.

### *Interface with Tax and Customs Systems*

Customs and Tax systems calculate and record the tax and duty assessments made. The actual payment is made by the tax payer to a Bank account controlled by the Treasury (TSA/ sub account). The Central Bank periodically informs the Treasury about tax/customs receipts for that period. A copy of the payment receipt is also given to the Tax/Customs departments and recorded in the tax/customs systems. This enables the tax/customs departments to determine whether the tax or duty assessed has been paid in full or not. The actual amount of the deposits of taxes and or duties as recorded in the Treasury system is the official government record of receipts. The tax/customs departments need to reconcile receipts recorded in their systems with this record. In order to facilitate reconciliation between what the Treasury has actually received from the Bank as deposit and what the tax/customs departments have recorded in their systems as receipts, it is necessary that the tax payer uses a special deposit slip for such deposits which shows the details of the tax payer, such as Tax Identification number, and gives the detailed budget code that identifies the type of duty/tax collected. In the absence of this, the deposits by the tax payer may not be identified correctly and the amounts can be posted incorrectly, making reconciliation very difficult.

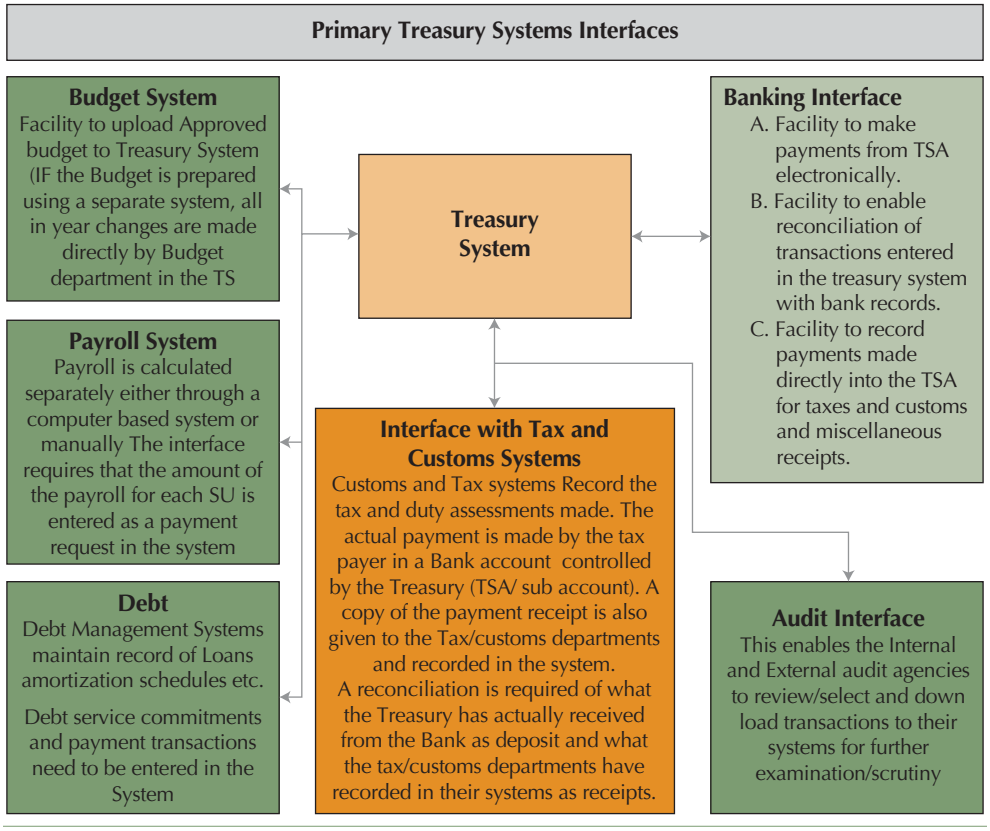
### *Interface with the Banking system*

This facility enables the Treasury system to pass information electronically to the Central Bank to make payments from the TSA. A facility is also required to enable reconciliation of transactions entered in the treasury system with bank records and receiving information from the Bank of all receipts into the TSA for taxes and customs and other miscellaneous receipts.

### *Interface with the Audit Systems*

This enables the internal and external audit agencies to access Treasury system databases, review/select, and down load transactions to their systems for further examination/scrutiny.

## Figure 19: Primary Treasury Systems Interfaces



# VI. Technology Architecture

Technology architecture defines the nature of the hardware, software, and communications technology required to support the information systems architecture. The process of specifying, procuring and implementing appropriate technology to support IFMIS systems would include detailing the requirements for:

- The nature, size, and distribution of the computer-processing facilities and associated hardware, including servers located at various processing centers, Work stations, and peripheral hardware.
- The nature of the communications interconnections between the computer processing facilities, including; Telecommunications Infra structure, Wide Area Network (WAN) links between various Treasury offices via telecommunications network—public switched network, leased lines, dial up lines; LAN connections between work stations at a particular site, and Network management systems.
- The nature and type of applications development and systems software, Application Software—to support functional processes; Middle ware-Operating systems, database management systems (DBMSs), Application development tools, systems management tools; office support systems software.
- Back up/Disaster Recovery arrangements, Business Continuity Strategy; Power backup systems.
- Information security systems and the security architecture for the system.
- The business intelligence platform including Data ware housing and special purpose software to support analytical capabilities, Online Analytical Processing (OLAP) tools, document management systems, etc.

Definition of the technology platform provides the basis to:

- Select appropriate technology to support the systems architecture.
- Guide acquisition of hardware, software, and communication facilities.
- Ensure integration and compatibility of component elements of the architecture.

The different elements of the technology architecture will be country- and application-specific. Country specific factors include the size of the country, the state of the telecommunications network and other infra-structure, the availability of technology and facilities for its maintenance. The Application factors are discussed below.

## Application-Specific Factors

Technological requirements for the various systems modules described in the foregoing sections could vary quite significantly. Some of the application-specific factors that determine the choice of information technology are the:

- Volume of data to be handled and the sizes of the databases required to be maintained.
- Volumes and rates of transactions that take place against the databases and the numbers of concurrent users of the system.

- Volumes and frequency of information flows between component parts of the system or with other systems.
- Information processing requirements – whether they are centralized to a single location or are distributed to a number of widely-separated locations. If it is the latter, how frequently the information maintained by the system is required to be aggregated at the center or referred to by other agencies of government.
- Type of data handled by the system: whether it is primarily alphanumeric or textual; and whether it pertains to a given time slice or, requires time series.
- Nature of output facilities required by the system: graphics, report writing, desktop publishing and imaging.
- Nature of analytical facilities required, for example, modeling, statistical analysis tools, data warehousing, data mining, etc.
- Data distribution profiles and the nature and frequency of information flows between component modules of the system or with other modules of the GFM network, which determine the nature of the telecommunications facilities that will be required.

## Systems Topology – Centralized and Distributed Technology Architectures

The available choices are as follows:

### *Centralized Architecture*

Here, the application software runs on a central server and all Treasury/MOF offices connect to this server in an online mode to process their transactions

### *Distributed Architecture*

In this case, copies of the software run on multiple servers across the network. Work stations at a site connect to the local/designated server to process transactions.

These architectures are shown schematically in Figures 20 and 21.

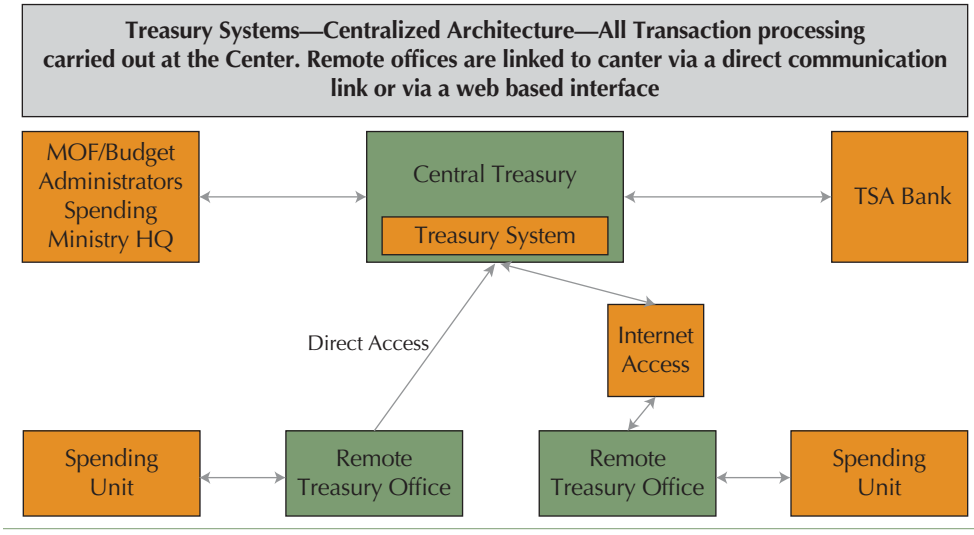
In practice, it is found that centralized architectures are easier to maintain and operate since they enable all changes to the software to be managed centrally. Consequently, such a deployment would need a less intensive technical capacity at each node of the network. This topology also results in better synchronization of databases since there is a single repository of most data on the central set of servers. Similarly, since there is only one copy of the application software running, network-wide this leads to uniformity of systems across the network. Implementation of a centralized architecture requires a good country wide WAN to enable real time online connections from all remote offices.

Distributed architectures are adopted when the telecommunications infra-structure in the country is not well developed and it is not possible to connect all Treasury/Spending unit offices in an online mode to the central server. Most distributed deployments are converting to a centralized deployment as the telecommunications networks improve.

### *Partially-Distributed Architectures*

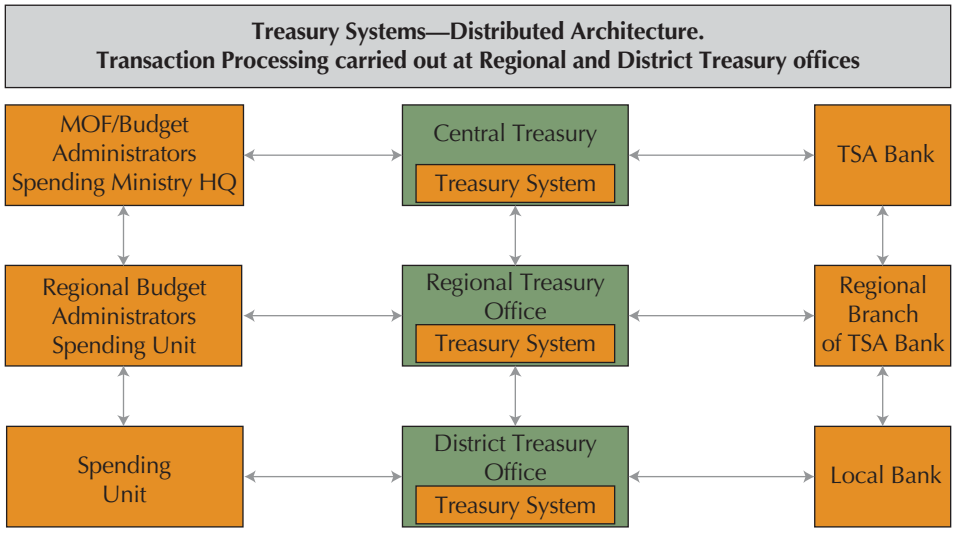
Sometimes for administrative and other reasons a hybrid topology—called a partially-distributed architecture—is used. This is done in cases where separate but identical systems are required

**Figure 20: IFMIS Centralized Architecture**




for the provincial level and housing all these systems on one central server, could create capacity problems. However the system is logically centralized (through replication or duplication) since there is only one General Ledger (GL) database for country wide reporting, while it may be physically distributed for performance reasons. In this setup local transactions are visible to the center (according to centrally specified access rights) even if they originate locally against distributed versions of the database. Such a deployment has been used in Russia, where a province/oblast-based deployment has been implemented with an additional system at the center. Here the main consideration was the sheer size of the system, which extended across 83 provinces and nine time zones.

**Figure 21: IFMIS Decentralized Architecture**



The advantage of such a deployment is that for very large systems, where the total number of users across all provinces is very large, a partially-distributed architecture has proved technically more feasible. It has been reported that for some projects—for example, the Vietnam TABMIS—where all transactions are processed on a central server in Hanoi and Oracle Financials is the chosen application software, when the number of concurrent users reached 7000–8000, the granularity of the locking mechanism in the application software during the funds checking process, prior to posting an expenditure, caused a transaction lockout across all other provinces while a transaction was being approved for one province. Long queues built up and this resulted in very low transaction throughput.

In this case, part of the problem was the low capacity of the central server, and this was rectified by increasing its size. The contractor also needed to modify (customize) the software to get around the granularity of the locking problem.

In the case of Russia, which also uses the same software as Vietnam (Oracle Financials), the queuing problem encountered in Vietnam did not arise since the project uses a partially-distributed architecture, with each oblast having a separate server and the 40,000 or more users distributed over several servers.

*In view of this, the size of the system in terms of the maximum number of concurrent users expected on the system could be a consideration when choosing between a fully centralized and a partially distributed architecture.*

### *Satellite-Based Communications From Remote Sites*

Web-based technologies have simplified the technological requirements at remote sites, since a work station at these sites would in principle require only access to a WAN via a web browser. Communications from remote sites could be via a landline-based WAN or a satellite based network.

The use of centralized web based systems via a satellite-based telecommunications network has proved difficult to implement in some cases. This is so, since: (i) the significant latency delays involved in satellite based networks (about 250 milliseconds) can cause lock out problems in the data base; and (ii) in web-based systems the application software and all databases including reference files reside on the central server, it may require multiple passes across the network for validating and processing a single transaction. These two factors taken together have often resulted in unacceptably high response times.

These issues can be partly overcome by using Citrix type terminal servers at remote sites that would enable block transmission across the network. However, this would increase the investment cost at the remote sites and may also require that some reference files are available for editing a transaction at these sites prior to their transmission to the central server. These problems are less intensive in land based telecommunication networks, since the latency delays involved in such networks are much smaller.

It needs to be noted that some countries have had to change from satellite-based communications from remote sites to a landline-based system to overcome unacceptably long response times. Examples are Kazakhstan and Azerbaijan. Russia was initially planning a satellite-based implementation but switched to a landline-based system, after tests using a satellite based connection resulted in in very long response times.

## Application Software Options

### *Commercial Off-the-Shelf (COTS) vs. Custom-developed/Bespoke Application Software*

It is important to choose appropriate software strategy for project implementation. The, choices derive from a strategy based on in-house or bespoke development of application software, or use of commercially available off-the-shelf software (COTS) packages.

In-house development of application software is often stated as being most attractive in terms of the time and resources required for developing a core or prototype application quickly. Also, with custom-developed software implementation can be done incrementally, with only a subset of core features being implemented initially and other features being added later. Such applications will generally provide a better fit with requirements in the short term. The downside is that incremental development generally tends to continue for long periods of time, with the core application being re-developed each time a new feature is added. Generally, such systems can provide only the most basic functionality, and efforts at enhancing them to a full functionality system usually turn out to be very time-consuming and expensive. The flexibility to replicate non-standard business processes is also not a good thing since it allows those processes to be incorporated in the software whereas they should be replaced anyway.

However, in situations where the business processes and application requirements have not been firmed up, the initial use of bespoke development for a core prototype application helps in firming up application software requirements. Once this is done, these requirements can be used to procure a full function COTS package that meets those needs. It is in these situations that the use of bespoke development is most useful, specifically as the first of a two-step transition where the eventual goal is to implement a full function COTS package. For example, bespoke software was first used to implement core Treasury functionality in Kazakhstan, Russia, and Ukraine, but it has now been replaced by COTS Software (Oracle Financials) in Kazakhstan and Russia. The new project in Ukraine envisages use of COTS Software.

In a situation where good software development expertise is available locally, such as in India, Brazil and China, bespoke software could offer a medium term option. Ironically, these middle income countries could also afford the more expensive COTS solutions.

In lesser developed countries, where generally software development expertise is not available, it would be more practical, cost-effective, and less risky to use a COTS solution as the basis of an IFMIS type of project. The expertise required to operate such a solution can be developed relatively easily through specific in-country training programs. Maintenance of the software is the responsibility of the supplier, and is available by purchasing the annual license agreement.

In general, it is advisable to research availability of a packaged software solution for all or core elements of the system before embarking on an exercise of in-house development. Packaged software can be acquired for systems with relatively standardized requirements. Off-the-shelf application software packages originally designed for the corporate environment are now commonplace in the public sector in areas such as financial management, accounting and personnel management. Some packages are available for use in more specialized areas such as tax and customs administration, and debt management. In some cases, the COTS application may need to be enhanced by custom addition of some elements of the system with country-specific requirements.

Factors that discourage the use of COTS packages are cost of the package, recurrent license fees and the costs associated with parameterization, which constitute major cost elements of a systems implementation project. Also, though they may initially appear to be more expensive when compared to a modest in-house prototype, such packages can result in significant savings of both time and money in the long term. It is important when comparing costs to compare "like with like."

Custom developed solutions normally have a limited set of features available. Building in all COTS features—functionality, controls and integration—in a custom-developed package will require extensive software development, and can be very costly and time consuming. In short, you get what you pay for. In addition, without extensive technical and project management expertise, custom development can be very risky.

Generally, the use of off-the-shelf software facilitates faster implementation of a full-function system, continuing software support with periodic upgrades, good documentation and training.

In summary, a decision regarding the choice of application software needs to be made in the context of (i) requirements for professional software engineering capabilities in the country; (ii) trade-offs between costs and risks; (iii) speed of implementation; and (iv) long-term sustainability of technical capacity for system evolution.

It would be advisable to first explore the availability and fit of available COTs solutions before embarking on a customized development exercise. While conducting a review of available COTS packages, the project team will need to ensure the following:

- The software package provides the required functionality and a local language version is available where required.
- Access to technical support is available locally for the package, and it is possible to obtain and install upgrades and/or changes to the packages as they become available in that particular country.
- The package vendor provides configuration/ parameterization assistance as may be required;
- No major customization is required and the costs associated with any customization are identified clearly in the total price. The following section defines what constituted customization of the package and why this practice should be avoided.
- The package runs on a range of hardware and operating software which is compliant with the technology architecture proposed for the systems;
- Adequate documentation is available to support package installation and use, and
- Licensing arrangements that can accommodate the use of the package at multiple sites in the country are available.

Several packages are now available on the market that can support most of the functionality requirements of a Treasury system after parameterization. Examples are SAP, Oracle Financials, Free Balance, Epicor, Serenic Navigator (Navision), Smart stream, Agresso, Technology-1 etc. Some packages may require development of specific modules to fulfill all functionality requirements. Most of these packages are based on accounting systems developed for the private sector. The better known packages have incorporated functionality required for the public sector related to budget management and commitment control. COTS packages have been developed after studying international best practices; they embed best practice business processes and conform to Internationally-Accepted Accounting Standards

The better known enterprise resource planning (ERP) software packages offer full-function functionality and include modules that can record and process all transactions related to the budget compilation and budget execution Processes, namely: initial (draft) budgets, budget revisions/

transfers, commitments, purchase orders, goods receiving reports, invoices, payments; tax and non-tax receipts; journal vouchers, interfaces with banking systems, etc. They can offer a migration path from cash to accruals.

COTS packages offer built-in controls and audit trails; (for example, ensure the integrity of vendor file, personnel file, etc.), offer good security features and better integration—all modules work against a common data base ensuring data sharing and data integrity. They provide rich end-user features, good documentation, availability of technical support, and regular software updates. COTS packages also provide tools to accommodate front end processing and report writing.

### *Customization, Parameterization, and Reports Development*

These three areas are frequently confused and bundled together as customization. The differences are clarified in the following.

In parameterization, COTS packages offer facilities to parameterize the software to country specific requirements. This includes facilities to configure Charts of Accounts, business process work flows, configure controls, and select from Cash or Accrual basis of accounting. This requires no changes in the source code of the package.

Customization involves changing the source code of the package to accommodate a specific system requirement. This changed source code will not normally be supported by the vendor and may even invalidate the software warranties and maintenance agreement, and should therefore be avoided. This change would need to be implemented again as each new version of the software s introduced if it has not been adopted as a standard feature in the software.

In the case of Vietnam's TABMIS system, the implementing contractor customized the Oracle EBS software to reduce the granularity of the locking mechanism for some transactions to shorten the wait time between transactions). In other projects, workarounds can be done to the functionality available in the existing software to meet specific functional requirements. This is not customization of the code since these workarounds would be available in the new version of the software also.

#### Report writing

Sometimes the development of reporting capabilities using the tools provided by the vendor is also confused with customization, which it is not. Custom report development is a normal activity with any software and the tools available with most packages including data warehousing tools enable the users to develop reports in accordance with their requirements. This is not customization, but it does require good training for the users regarding these tools provided by the vendor and in facilities to down load the data to EXCEL type of files so that other tools such as Crystal Reports can be used to produce the reports.

#### Public Sector Versions of the Application Software

Only better-known packages have transitioned to and incorporated public sector requirements related to budget control, budget releases, etc. (for example, SAP, Oracle Financials, Free Balance). COTS packages will only incorporate standard core functions. Ancillary front end features that support various country specific administrative/procedural requirements such as those supporting pre-audit may need to be programmed separately using tools available with the package.

# VII. Systems Implementation

As discussed in Chapter II, work on IFMIS systems implementation is usually initiated after a review of the fiscal management framework, associated policies, procedures and institutional structures and the existing state of the transaction processing systems supporting fiscal management processes. These reviews result in:

- An **overall PFM reform strategy** that includes recommendations for formulation of revised policies procedures, institutional structures and functional processes to remedy the underlying issues in the policy architecture that have caused problems in the area of fiscal management.
- An **IFMIS strategy** that identifies improvements/ redesign or implementation of new Information systems that are needed to ensure adherence to new policies, procedures and control structures; and remedy problems associated with timely availability of information for economic management.

The IFMIS strategy provides a blueprint for systems implementation and determines the feasibility and overall scope of the systems to be implemented, their sequencing, approximate costs and timeline for implementation, project management and technical capacity, and other ancillary requirements needed to enable systems implementation, procurement and overall satisfactory ongoing operation**.**

This chapter discusses the issues that need to be addressed during actual systems implementation. This includes setting up project management structures; a listing of activities and tasks involved in implementing the system; an indicative timeline for implementation, and a list of the main cost elements for the project.

## Project Management Structures

Actual project implementation requires setting up appropriate management structures for providing policy guidance and project implementation. These include:

- Identification of a Project Sponsor: This needs to be a high level Government official such as the Minister of Finance/Permanent Secretary/Controller General of Accounts. As mentioned earlier implementation of such systems requires arriving at a consensus on various issues across a broad spectrum of stakeholders. It may also involve changing the underlying policy, legal and institutional framework. All of this requires a considerable amount of government commitment. The appointment of a senior level project sponsor shows that such commitment is present.
- Appointment of a Steering Committee with representatives of all major stakeholders: MOF, Treasury, Budget, Central Bank, line Ministries, revenue collection agencies, to provide policy guidance and ensuring consensus across all stakeholders. This committee should have the authority and responsibility for resolution of conflicts, between various stakeholders and for inter institutional agreements—with the Central Bank, for example.
- Selection of a Project Manager: A common mistake is to consider IFMIS projects as IT projects. While significant investments are often required in setting up the technology platform

required to support the system, the primary emphasis of the project needs to be on the functional objectives like fiscal control, cash management, etc. Ensuring that the system can address these issues requires that the management of the project is competent in these areas rather than technology. The project manager needs to be a senior official from the functional side with stature within the bureaucracy as well as adequate financial and administrative powers to cater to day-to-day operational administrative and financial requirements.

Usually, the project manager should have the authority and responsibility for day to day operational decisions regarding the project. This could include approval of the specifications, acceptance of deliverables and for final overall system performance. He may however, refer some issues to the steering committee for final decision and to obtain wider buy in amongst all the stakeholders.

- Selection of a Core team/Working group from the stakeholder agencies, but with expert knowledge of their functional areas. This group will be tasked to ensure that the new system design is responsive to functional requirements. They will help document the "as-is" business processes and assist in the design of new functional processes. After the system has been completed they will serve as change agents during systems implementation. This group will have a detailed involvement in resolution of design and implementation issues.
- Setting up a Project Secretariat to handle daily administrative aspects, including procurement of consultants and of the hardware and software necessary to implement the system. This secretariat should include specialist staff/consultants with experience in the installation of large scale IT systems and IT procurement.

## Implementation Phases

Systems implementation can broadly be divided into three phases:

- The Design Phase
- The Procurement and Contracting Phase, and
- The Implementation Phase.

The Activities and tasks in each of these phases are discussed below.

### *Phase I – Systems Design*

The tasks associated with this phase are:

- **Definition of the business processes, functional requirements and functional design of the new system that will need to be put in place to support the new policies, processes and procedures.** The tasks involved in this activity include:
  1. Studying and documenting existing functional processes, administrative procedures, transaction documents, forms and information flows—including data flow statistics—covering all organizations involved in the functional area for which the system is being designed. For example, in the case of budget execution this would include the MOF, the Treasury, the Central Bank and the budgetary institutions, the revenue agencies, etc.
  2. Developing and re-defining, where necessary, a new set of g functional processes, information flows, operating procedures, transaction types and associated documents and forms, and related organizational arrangements required to operate the proposed new systems.
  3. Defining and drafting the format of major statements and reports to be produced by the new system to satisfy users' needs and formal requirements.

4. Developing functional requirements and systems specifications for the application software required to support the functional processes and their interfaces with any external systems, such as those of the Central Bank. It is important to ensure that the systems specifications capture the essential characteristics of the "to be" functional processes and list them as specific requirements for the application software. In addition they would include a list of features required to ensure systems security and ensure user friendly access. Features will need to be divided into mandatory and desirable categories to enable comparison of different software options, packages offered, etc.

The functional analysis and design of the various systems is normally conducted by a team of experts including one or more functional specialists, including PFM/accounting specialists, who will develop the functional design and define the overall system from the functional point of view, and systems development specialists, who will develop the application software specifications for the necessary application software required to automate the systems and the specification of the technical interfaces between the system under development and other external systems modules with which this system interfaces.

- **Development of design, topology, and architecture for the technology platform required for implementing the new system (including the specifications of the individual elements of this platform**—i.e. the hardware, the systems software, the telecommunications network (LANS/ WANs), the information security and network management systems, power supplies, disaster recovery arrangements etc.

  This activity would include developing the technical design for the technology platform required for the operation of the system, specification of the hardware, the networking and the topology of deployment. It normally involves:

  1. Surveying central, provincial/district offices of the agency responsible for the process, e.g. Treasury offices, for budget execution and those of any related agency such as the central bank, the budgetary institutions that are expected to transmit or receive data to the agency to determine the locations where the computer systems would need to be implemented; the associated transaction volumes (current and projected) and data requirements. Determine sizes and configurations of the hardware and software to be installed at these nodes and the mode and characteristics (e.g. bandwidth) of the interconnection of the nodes to ensure accurate and timely data transfer between nodes (LAN/LAN).
  2. Preparing the specifications for the hardware and systems software required at the various sites and those required for a disaster recovery center.
  3. Defining the information security requirements to ensure secure access to the system functions and databases for authorized staff and secure transfer of information between various nodes of the network.
  4. Drawing up specifications for associated facilities required for the installation of the system, such as power stabilizers, Uninterrupted Power Supplies (UPSs), redundant power supply, telecommunication interfaces and environmental computer site requirements (air conditioning, dust protection, physical access security).

### *Phase II – Procurement and Contracting for the System*

This includes the development of tender documents for the various components, the associated implementation services and the evaluation methodology for the bids receives in response to this tender. This would require:

- Incorporating the hardware, applications software, WAN/LAN and information security specifications prepared as part of earlier tasks into a Standard bidding document to be used for the acquisition of the hardware and software. The specifications for procurement must include provision for maintenance and support of the hardware, software, and consumables. Hardware requirements should also include associated facilities, such as UPSs, etc.

- Developing criteria for the evaluation of vendor proposals. These include specification of mandatory and desirable features, technical scoring schemes for desirable features, weight of technical and price scores.
- Evaluating vendor proposals and selecting a contractor or contractors for, Application Software, Hardware/ telecommunications/networking, Implementation services, and
- Contracting for hardware, software, telecommunications/ networking and implementation services.

Setting up arrangements to monitor and supervise contract implementation by the contractor selected to ensure that it conforms to the design set out initially.

In view of rapid technological advances, the performance of hardware available in the market continues to increase very rapidly while prices continue to fall. To take advantage of these factors, hardware procurement should therefore be phased so that it is procured as close as possible to the time when it will be installed.

### *Phase III – Systems Implementation*

The activities and tasks associated with systems implementation are:

- Application Software configuration/ parameterization and testing and integration of all components

  The tasks included in this activity are:

  1. Setting up test site
  2. Plan and prepare for data conversion, user training and systems acceptance testing.
  3. Building up a team of technical and end user specialists for system testing/ acceptance
  4. Drawing up specifications for testing of the hardware and software procured for the project.
  5. Development of test scripts to ensure S/W compliance with requirements,
  6. In the case of procurement of software packages the project team would be required to ensure that the software meets the functional requirements. In case the software package requires customization to meet specified functional requirements, the team will specify the changes required and arrange for the changes to be implemented.
  7. Parameterization / customization of the application S/W as required. This would include setting up any code structures, files and databases that may be required by the software package.
  8. Testing the application S/W for required functionality, and;
  9. Adjustment and acceptance.
- **Pilot systems implementation**

  Normally it is best to install the selected hardware and software at a set of pilot sites to ensure that the system meets user requirements in an operational environment before it is extended to other sites. The tasks associated with pilot systems installation are:

  1. Install hardware/networks at pilot sites
  2. Install application software for pilot sites
  3. Train end user and technical staff. The team will need to ensure that necessary documentation exists for the application systems modules and for training end-users. A sufficient number of local staff will need to be trained to a level sufficient to operate and maintain the systems, and to provide necessary end-user support.
  4. Set up end user help line
  5. Institute change management procedures
  6. Migrate data as required

7. Implement systems at pilot sites
8. Review and adjust

- Replication of the systems across other sites

  After a successful pilot, the system will need to be replicated across all other agency sites. This phase will cover the replication of the system to other designated provincial and town sites. The process of replication across all sites may take considerable time, depending upon the number of sites involved and the number of users requiring training. It is best to first develop a replication plan for the system for all designated sites. This is a document (checklist) detailing all tasks—including training of end-user and technical staff—that need to be undertaken for system replication at a typical provincial or town site and a schedule of when each site will be implemented.

- On-going systems maintenance and operations.

  This requires that a technical and end-user support organization exists with sufficient capacity to operate and maintain the system. The agency responsible for systems implementation may have to develop or upgrade its in-house data processing staff and facilities to maintain and operate the Treasury and associated systems developed as part of the project.

  Project consultants should analyze the existing agency Data Processing (DP) staff resources and develop a plan to upgrade the DP organization. This would include assisting the agency to develop a training program for its staff, including specialized training in the use of the various tools such as operating systems, DBMSs application development facilities, etc. It would also include more general training in EDP project management, maintenance and provision of end-user support and training for a country-wide treasury system, etc. The consultants should also assist the government to procure training services from specialized vendors, and in setting up appropriate schedules to train end-user department staff in the use of the system.

## Software Testing and Acceptance

The process of application software testing and acceptance that needs to be carried out in the various systems implementation phases described above is well documented in the literature. A summary of the application software testing and acceptance process, and methodologies used to classify and remove systems defects is given in Box 1.

### *Unit Testing*

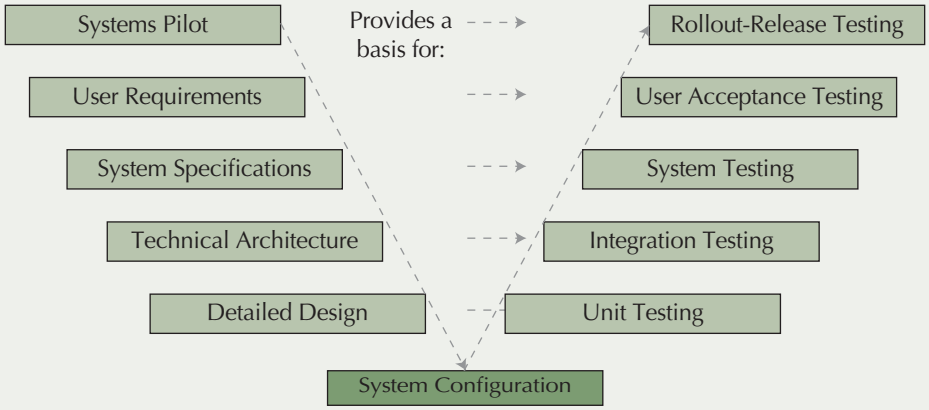
This is the most elemental scale of testing. A unit is the smallest testable software component. Unit Testing is done by the developer as each module is coded; a tester can help. This requires detailed knowledge of the internal program design and code. The units are tested in isolation. Ensures the component is working according to the detailed design/build specifications of the module. Not to be confused with debugging, this is also known as component, module, or program testing.

### Integration Testing (also called Interface Testing or Assembly Testing)

In this phase, individual software modules that have been unit tested are combined and tested as a group. It involves testing of more than one (tested) unit together to determine if they function correctly. The focus is on interfaces and communication between units. It is done using the integration test design prepared during the architecture design phase. Integration testing is done by developers/designers and testers working in collaboration and helps to assemble incrementally a whole system and ensure the correct 'flow' of data from the first through the final component.

**Box 1: Application Software Testing and Acceptance**

The various stages involved in the application software testing and acceptance are shown in a "V" diagram which specifies a structured approach to testing. Each phase must be completed before the next phase begins.




## System Testing

System Testing is conducted on the complete, integrated system to evaluate the system's compliance with the systems specified requirements. It also includes load testing and should test the network's capability to support the application as well as the application software. As the name implies, this testing covers all combined parts of a system, and ensures that the system meets all functional and business requirements. The focus is on verifying that specifications are met and validating that the system can be used for the intended purpose. The system test design is derived from the system design documents, and should be done by an independent testing group. It can involve a number of specialized types of tests to check performance, stress, documentation, etc. Sometimes testing is automated using testing tools.

## Acceptance Testing

Also called User Acceptance Test (UAT), Beta Testing, Application Testing or End User Testing, this is conducted by real business users after system testing is completed, to determine whether a system satisfies its acceptance criteria and business requirements or not. It is similar to system testing in that the whole system is checked, but the important difference is the change in focus. Acceptance testing should be performed in the real operating environment to allow the customer to perform any test based on their business processes prior to final customer sign-off, when the customer determines whether to accept the system or not. .

## Release Testing

The stage begins when system is rolled out to the first department end users—when reality meets theory and the actual users input real data in parallel with the current process. If the testing described earlier has been comprehensive, most of the major issues would already have been resolved. However, other bugs or unanticipated issues usually begin to surface in this phase. Therefore, it is important to choose beta sites that have end users who are tolerant of minor problems, as their positive acceptance will influence the rest of the users during the rollout.

Defects found in testing will need to be scored. The measures must be understandable but reasonably precise, as end users who are not experienced testers will likely be required to record defects in the system as they are found. The following is a typical classification, adapted from the International Software Testing Qualifications Board (ISTQB) certification, internationally-recognized software testing certification organization.

The actual terminologies, and their meaning, can vary depending on people, projects, organizations, or defect tracking tools, but the following is normally accepted classification.[16]

A threshold for defects must be defined to determine whether a tested unit or system passes or fails.

The table represents a typical color-coding scheme used to classify defects, with red meaning it should fail the test, orange being possible acceptance, and blue being acceptance.

Ideally, all critical and major defects in the high and medium categories should be fixed before rollout. The majority (80–90 percent) of the rest should be addressed before rollout, and the rest should be fixed during the warranty period after system acceptance.

## Internal Control and Systems Security

Two types of controls are required. First, an authorized user must be prevented from performing improper or unauthorized actions within the system. These controls limit access of staff to specific types of transactions and specific segments of the database. These types of controls are usually defined as part of internal control procedures.

In addition, the entire system needs to be secured from unauthorized access through the use of password controls and other appropriate information security protocols. These controls relate to IT security and IT management procedures. The internal audit department should be involved in system design to ensure that appropriate internal control strategy is embedded in the systems design including appropriate controls and reports. This department should audit the IFMIS internal control and security features and use of the system regularly over its life. The IT security specialists should formulate an IFMIS internal control policy principles and standards document which presents a risk-based approach for defining internal control. They also need to draft an information technology security policy which addresses IT security aspects such as physical and logical security.

These controls and related risks are outlined in a standardized approach (COBIT[17]) and address topics such as IT strategy and planning, changes performed on IT systems, physical security (hardware and server rooms security), logical security (network and user security) and on-going monitoring of IT systems. This set of rules should rely on dedicated procedures, applied by the IT department, and regularly controlled and audited by IT auditors. For example, the IA department should regularly conduct a review of a user's access to the IFMIS in order to ensure proper segregation of duties.

### Strict adherence to these controls is necessary to mitigate fraudulent and unauthorized transactions.

The staff complement managing the system needs to be trained in the use of the information security protocols and products that are used to data and systems ensure security. Annex I details

[16] Source: International Software Testing Qualifications Board (**ISTQB**).

[17] Originally an acronym for "Control Objectives for Information and Related Technology," COBIT is a framework for developing, implementing, and monitoring IT practices.

### Box 2: Terminologies for Defects

**Severity**: It is the extent to which the defect can affect the software. In other words it defines the impact that a given defect has on the system. For example: If an application or web page crashes when a remote link is clicked, in this case clicking the remote link by an user is rare but the impact of application crashing is severe. So the severity is high but priority is low.

**Critical:** The defect that results in the termination of the complete system or one or more component of the system and causes extensive corruption of the data. The failed function is unusable and there is no acceptable alternative method to achieve the required results then the severity will be stated as critical.

**Major:** The defect that results in the termination of the complete system or one or more component of the system and causes extensive corruption of the data. The failed function is unusable but there exists an acceptable alternative method to achieve the required results then the severity will be stated as major.

**Moderate:** The defect that does not result in the termination, but causes the system to produce incorrect, incomplete or inconsistent results then the severity will be stated as moderate.

**Minor:** The defect that does not result in the termination and does not damage the usability of the system and the desired results can be easily obtained by working around the defects then the severity is stated as minor.

**Cosmetic:** The defect that is related to the enhancement of the system where the changes are related to the look and field of the application, then the severity is stated as cosmetic.

**Priority:** Priority defines the order in which we should resolve a defect. Should we fix it now, or can it wait? This priority status is set by the tester to the developer mentioning the time frame to fix the defect. If high priority is mentioned then the developer has to fix it at the earliest. The priority status is set based on the customer requirements. For example: If the company name is misspelled in the home page of the website, then the priority is high and severity is low to fix it.

**High:** The defect must be resolved as soon as possible because the defect is affecting the application or the product severely. The system cannot be used until the repair has been done.

**Medium:** The defect should be resolved in the normal course of development activities. It can wait until a new build or version is created.

**Low:** The defect is an irritant which should be repaired, but repair can be deferred until after more serious defects have been fixed.

the skills required in the technical team to ensure information security.

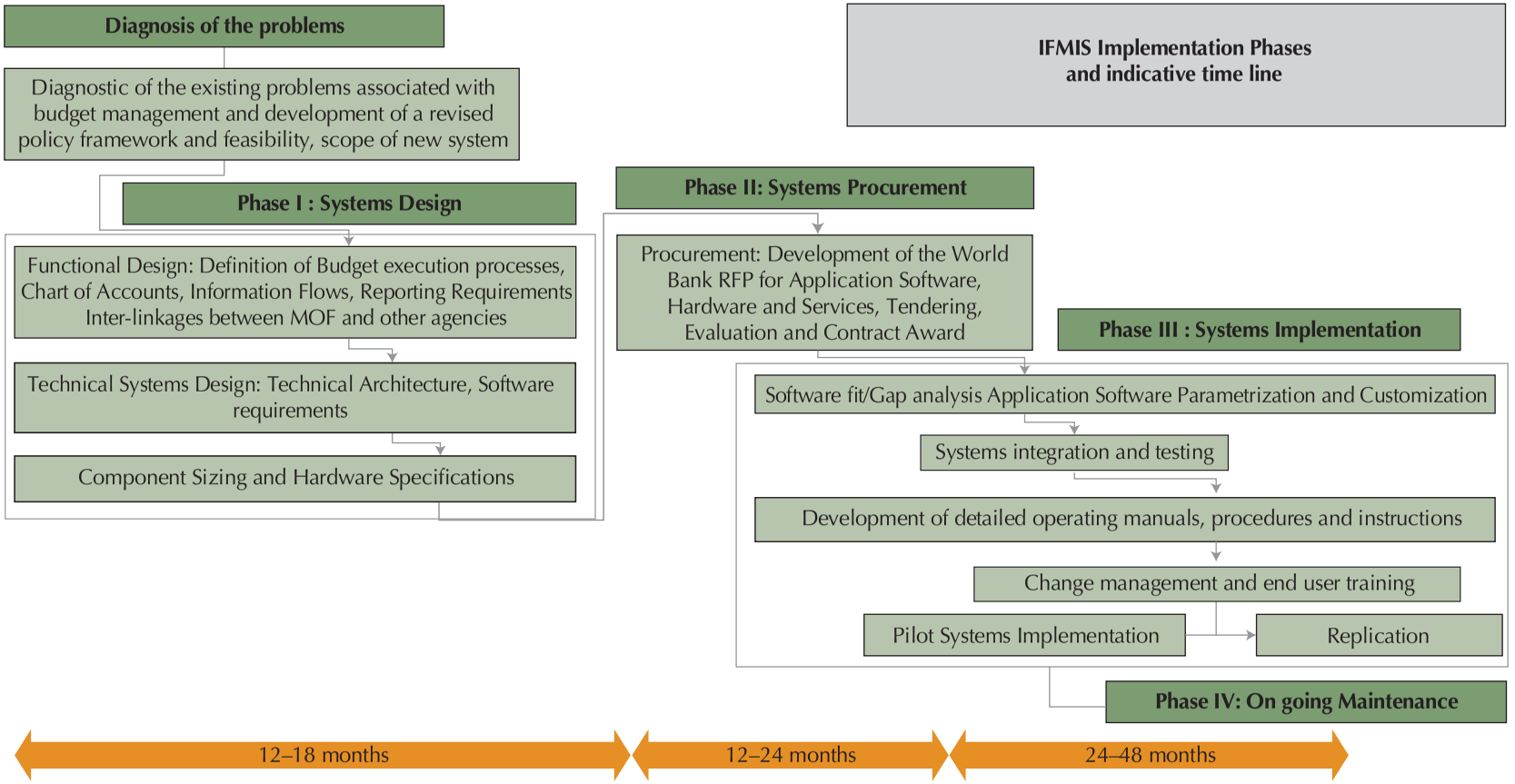
### *Indicative Time Schedule*

Figure 22 shows the sequencing of the various implementation phases and activities given earlier and an indicative timeline for the implementation of such systems.

### Typical Defect Severity Matrix

| | High | Medium | Low |
|---|---|---|---|
| **Critical** | 1,2 | 1,2 | |
| **Major** | 1,2 | 1,2 | |
| **Moderate** | | 3,4,5 | |
| **Minor** | | 5 | 7,8 |
| **Cosmetic** | | 5 | |

## Figure 22: Indicative Time Line for Systems Implementation



## Cost Elements of an IFMIS Project

It is important to recognize that in addition to the investment costs that are incurred in first setting up the IFMIS a provision also needs to be made to cover some recurring costs that will be required to be incurred on an on-going basis each year to keep the system operational. It is often seen that while Government make adequate provisions for the first category of costs, mainly because this is often financed by external donors, they fail to recognize the importance of the second category related to recurring cost elements and fail to make adequate budget provisions in the country's budget to finance these costs. This could lead to degrading systems performance over the medium term and in extreme cases to suspension of system operations with disastrous consequences for the day to day financial operations that the system supports. Each of these categories of costs is discussed below.

### *Investment Costs*

These include:

- ***Policy and Design consultancies*** required to define the legal and policy framework (the Budget law, institutional arrangements, COA, accounting policies), the functional design of the system (functional processes, information flows, documents, procedures) and the technical design and Architecture (S/W, H/W and Communications Specifications) of the system.
- ***Project management support***. This should cover the costs associated with maintaining the project secretariat, project monitoring and evaluation, and other administrative costs associated with the project. ***Procurement of the technology platform to operate the system.*** This includes costs associated with the procurement of servers, workstations, printers, office and systems software, Networking (LAN and WAN), Information security systems, Application software and tools (+ DBMS, application development tools) etc. and for Site preparation
- ***Implementation services*** include costs associated with procuring the Implementation services required for systems parameterization/ customization, and implementation.
- ***Training, change, and systems transition costs*** include expenses for End User training in the day-to-day use of systems and troubleshooting; technical training for technical staff in the use and maintenance of specific tools used; management level training in the use of the systems; and training for financial managers to use the information that will become available from the system databases. They cover costs associated with change management, and costs incurred as the system transitions from a manual system to an automated system. They also cater for costs involved in getting the end-user community and managers to familiarize themselves with systems capabilities and the advantages that the new system will offer them, and assuring them that adequate training and "handholding" resources would be made available during the transition period.

### *Recurrent Costs*

The main recurring cost elements are costs associated with:

- ***Hardware Maintenance / Replacement:*** Maintenance can be estimated to cost between 10–15 percent of the installed hardware costs per annum. Hardware life cycles vary between 3–5 years.
- ***Application Software and DBMS/ Tools License Fees:*** This is a very significant element and could easily be between 20–22 percent of the initial license fees per annum.

- ***Telecommunications Costs***: These are associated with use of the wide area network (WAN) for communicating between the remote and central sites. These costs vary with the telecom tariff operational in various countries but can be a significant amount.
- *Stationary, Utilities* including POL for generators etc. Office Premises.
- ***Staff Costs:*** Specific provision should be made for the costs of specialist technical positions that need to be staffed to ensure systems operation and maintenance. *This is a critical cost element.* In many countries, these positions are filled by contract staff hired directly from outside the normal civil service structure, since the remuneration required cannot be accommodated within government pay scales.
- ***On Going Training costs:*** These continue throughout the life of the system as trained end-users rotate out of their positions in most governments after a few years and these positions are filled up with new, untrained staff. Technical skills may also need upgrading as new versions of the application software and hardware are implemented.

# VIII. Systems Procurement

Procurement of information systems has often posed problems in World Bank projects and caused major delays. While a full discussion on contracting for consultancies and contracts involved in an IFMIS implementation is beyond the scope of this handbook we will discuss some commonly occurring situations associated with systems procurement in this section and try to provide some pointers on how to resolve the associated issues.



## Consultancies and Contracts Involved in Project Implementation

The two main contracting assignments that are normally involved in project implementation are: a diagnostic and design consultancy and a contract for actual system implementation.

The work associated with the diagnosis of the existing situation and the development of the design of the new system and its specifications is normally conducted by a consulting assignment with a firm with the required experience and expertise. This assignment also includes the development of the tender documents for the system components and helping the government during the tender evaluation process. The actual systems implementation work is done by the main contractor or contractors selected as a result of an international tendering process.

Several supplementary and specialized consulting assignments could also be given for areas such as training, change management, and re-structuring the technical organization required to support system implementation.

## Contracting for Consulting Support Required for IFMIS Projects

Bank projects normally include financing for the consultancies that are required for systems implementation. These consultancies are normally contracted after a competitive selection process specified by the Bank for hiring consultants. The rules and guidelines specified for consultant's selection are detailed in several World Bank documents.[18]

The major consultancy prescribed for the design, procurement and implementation phases is a diagnostic, design and project implementation /contract management consultancy.

Several models are used to design this consultancy package. The one that has found to be the most practical is one in which the same consultant was employed for all three phases—design, procurement and implementation phases. It is best to retain the services of this firm to also supervise systems implementation by the selected contractor since they would be in the best position to do so having developed the design. Assigning this task to a new firm would incur the risk associated with disagreements on the basic design formulated earlier.

[18] Guidelines: Selection and Employment of Consultants under IBRD Loans & IDA Credits & Grants by World Bank Borrowers January 2011 The International Bank for Reconstruction and Development/The World Bank.

The work of this consultant in the design phase is to review the existing business processes, recommend changes and develop functional requirements and systems specifications for the system to be procured.

In the procurement phase, the consultant is charged to assist the government in the execution of the complex World Bank procurement processes. Finally, in the implementation phase the task of the consultant is to help the government manage and supervise the work of the contractor hired through the procurement process, and ensure that the system that is implemented follows the design specified and approved earlier and help the government in contract management.

In order to do this in accordance with World Bank guidelines for procurement of consultants, the initial Terms of Reference (TORs) for these consultants need to detail all three phases. It needs to be stated clearly that each phase is separate, and the consultant contract will be extended to this phase only if the work of the consultant is found to be satisfactory in the preceding phase. Other subsidiary consultancies, for example, for change management and training, could be contracted separately).

In several Bank projects known to the author, the main consultancy was split into two or more and contracted separately. In addition, the consultancy for the supervision/implementation phase was called an Independent Validation and Verification (INV&V) consultancy. These consultants often misread the purpose of the hiring and saw it as an audit type of exercise where they were to critique the initial design and the implementation work, instead of actually helping the government to ensure that the contractor implements the system in accordance with the design which had been specified and approved earlier.

In some cases, the INV&V consultants thought their role to be partially to report to the Bank team supervising the project on any deficiencies in the design and implementation process instead of helping the government to manage the contract. This caused major difficulties, and these consultancies often did not achieve the purpose for which they were intended. The government was left with little or no consultant help in the contract management/ supervision implementation phase.

Normally the INV&V process is carried out by the government with the help of Bank support where the consultant's design is evaluated by the government and Bank team to ensure that it makes sense in the country specific circumstance. A consultant could also be hired for this process.

In the case of Russia and some other projects, the Government hired a separate INV & V consultant. This assignment, whose primary purpose was to review the design, was in addition to the main consultant's work, which continued throughout the various stages of the project. The latter consultant (INV&V) did not have any responsibilities for supervising the systems implementation or interfacing between the main contractor and the government and help the government in contract management/supervision of implementation. They merely advised the government about initial design, the systems specifications and implementation plan how it could be changed. It was up to the government, with Bank advice, whether to accept or reject the consultant's recommendations. If the INV&V consultant's advice was accepted, the government advised the main consultant to incorporate these suggestions in the design.

Since configuring the main consultancy assignments has proved to be a significant bottleneck for systems implementation in some countries, the consultancy package should be designed to mitigate these problems and ensure that appropriate consulting help is available throughout the various stages of the project and the TORs defined accordingly to make the tasks very clear.

## Options for Procuring the Technology Platform for Systems Implementation

Procurement of the technology platform required for systems implementation—the application software, the hardware and networking and associated integration services could be done in one of two ways. Each of these options is discussed below.

### *Single Responsibility Contract*

In this case all elements of the technology platform including the application software, the hardware and the networking, the implementation and integration services are bundled into one contract. Under this option, it is normal to define requirements in functional terms and volumetrics of various transactions and size of databases and the supplier is required to propose the appropriate software and hardware technology platform. In a single responsibility contract, systems integration is the responsibility of the supplier. Since it is easier to manage one contract, this option is recommended in cases where the government has limited contract management capacity.

It is necessary that during contract definition the government's and the contractor's responsibilities are clearly defined. In these cases, Government may need expert assistance for contract management. Here, it is especially important that the contract specifies clearly that it is the contractor's responsibility to size the hardware and other elements of the technology platform so that they meet the system's requirements and deliver the required performance. This is so since it would otherwise be in the interest of the contractor to undersize the hardware, etc. to come up with a low-priced bid.

### *Multi Tranche Procurement*

Under this option, the different elements of the technology platform are procured separately. Generally, the application software and implementation and integration services are procured first, and the contractor supplying the application software is required to define the hardware requirements. The hardware and technology platform are then procured separately in one or more tranches. The advantage here is that procurement packages are more specialized and can attract better responses for each area.

In such cases, since the first contract for software and implementation services also includes systems integration, it is the integrator's responsibility that the application software works with the hardware they have specified. The procurement of the first tranche of hardware would normally cover the test site and pilot sites hardware, and can commence once the application software choice has been firmed up. The integrator will also need to ensure that the various elements of the technology platform that have been procured separately work together smoothly and the system delivers its intended throughput as specified in the design. Further, since the hardware—for example, the servers—could be procured in several tranches it will be necessary to ensure that the application software (as finally configured for this particular application) works for example the various versions of the UNIX operating system that is available from the different suppliers.

It has been found in practice that porting the hardware to a different vendor's operating system could become a nontrivial task, especially if the application software has been customized extensively. This has important procurement implications since this would imply that further procurement of the servers in subsequent tranches, or for subsequent upgrades, would need to be restricted to the same brand as purchased in the first tranche. This would require an exception to the World Bank's International Competitive Bidding (ICB) procedures.

One way around this is to try to use operating systems like LINUX and versions of the application software that can operate under LINUX. Since all major hardware vendors provide hardware that can operate under LINUX, changing the hardware platform, or using a mix of hardware from different vendors for different sites, would be less difficult in this case. These systems are also a less expensive option than the proprietary operating systems marketed by the hardware vendors.

## Systems Procurement using World Bank Procedures[19]

The systems procurement process under World Bank procurement rules have suffered from major delays in several projects. The reasons for these delays are complex and some delays may be due to country specific reasons. Generally, World Bank procurement processes are designed to ensure completely transparent procurement practices and could be complex.

The prescribed World Bank process for complex systems procurement is the two-stage ICB process. The time taken to execute the various steps prescribed in this process even if everything goes like clockwork is between 12–18 months.

Bank approvals are required at various stages of the process and these approvals are given only if the rules are followed meticulously. In addition, the vendors have recourse to redress/complaint facilities available to them to complain to the Bank and/or their own Executive Directors on the Bank's Board whenever they perceive a violation of the fair procurement process.

The rules and procedures accompanying this process need to be understood very well by the government and the consultants tasked with designing the procurement package and tender documents for the system and who would be responsible for the actual procurement. This is seldom the case and many times the bidding process, or parts of it, have to be re-done before approval is obtained.

It is therefore essential that (i) adequate training in the process and the accompanying rules framework, etc. be given to the government team who will be responsible for this process, and that the same government team is maintained throughout the procurement phase and during contract implementation; (ii) Experience with the Bank's procurement process should be mentioned as a specific requirement for the consultants hired to assist the government in the design, procurement and implementation phases. Sometimes a procurement agent is hired for this work. Adequately fulfilling these responsibilities helps to mitigate delays

## Some pointers on Designing the International Competitive Bidding (ICB) Package

As mentioned, systems procurement in World Bank-financed projects is normally done through a two-stage ICB. While a full discussion of the 2-stage ICB process is beyond the scope of this book, this section gives some pointers on how to design a two-stage ICB package for systems procurement which can mitigate some commonly-occurring problems.

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[19] These procedures are described in the following publications. Guidelines: Procurement of Goods, Works; and Non-Consulting Services under IBRD Loans and IDA Credits & Grants, January 2011 The International Bank for Reconstruction and Development/THE World Bank, 1818 H Street, N.W. Washington, D.C. 20433, U.S.A. Both publications are available on the World Bank website: (http://go.worldbank.org/1KKD1KNT40).

First, the functional specification document should specify the overall business objectives of the purchaser. The specification should primarily adopt a process-based approach, instead of a feature based approach. The specification should focus on the processes which the system will support and derive the functionality required from them The bid documents should clearly specify core functional processes and information flows to be covered and which departments/entities will be connected online and how many users in each; what transactions will be recorded; which departments will send transactions off-line and how these will be captured in the system. The bid should clearly document estimated volume of the transactions and high volume sites.

The government should use stringent screening criteria in the first stage to avoid spurious bids—for example firms with insufficient relevant experience in the public sector and software packages which have not been used successfully for similar systems (both in terms of functionality and scale size). The screening criteria would accordingly be designed to: (i) Screen firms on the basis of financial viability and previous relevant experience in the public sector; (ii) screen proposals on the basis of whether the Application Software proposed has been used successfully for implementation of Treasury/IFMIS systems and whether the firm has proposed staff with experience in the implementation of this software.

System specifications should be defined in terms of clear mandatory requirements which demand that the system meets the needs the key functional processes used by government for budget execution, specific features that would be required in the software for carrying out these processes, the performance requirements of the system in terms of the response times of transactions, the number of users, requirements for the hardware, the firm's experience and staff. This ensures that the evaluation of the bid proposals would be mainly price-based.

The following points should be kept in mind while designing the package:

- The scoring scheme should clearly identify quantifiable factors to avoid subjectivity in scoring. Divide requirements into Mandatory and Desirable (M and D). If a bid fails on any M requirement it is rejected. Normally, only desirable requirements are scored in technical scoring. The desirable requirements can be scored as present or not present as indicated by supplier in the bid. Subjective scoring schemes in which different scores are given for fully compliant, partially compliant, etc. are not recommended. The weight of technical score should be low (< 30 percent). High weights for technical scores will drive the bid price upwards. It has been observed in several ICBs that after bids have been screened with a robust set of mandatory criteria, the technical scores for the remaining packages are not very different. This means that the final evaluation is mainly price-based. A high weight for technical score would therefore only be inviting suppliers to quote premium prices for a few desirable features. If such a bid wins the contract, the government could be paying out large amounts for a few features that are not critical for systems performance.
- A test script of basic transactions should be a part of the bid and the bid should require the suppliers to demonstrate how the software proposed will meet these requirements (in stage I). During these presentations and bid examination the government should try to determine how much of the core functionality can be met out of the box with parameterization of the software—not customization.
- The functional specifications should specify which external systems will need to be interfaced and what is the exact nature of information that will be transferred/exchanged (Tax and Customs/Debt, for example). It should state the nature of the Banking interface: Will payment be electronic or manual/ check based? How will bank reconciliation be done?
- For application software, the government can ask the bidder to state how the specified requirements will be met. Out-of-the-box purchases (only with parameterization) require

some customization, such as development of specific functionality within the package, or requirements cannot be met. The items that can be met out-of-the-box can be tested and confirmed during the package demonstrations in stage I of a two stage ICB.

- The government should investigate costs associated with Named User vs. Concurrent user licensing for application software and explore site license options.
- In a single responsibility contract, the government should state its requirements in functional terms and specify key performance requirements and volumetric of transactions. The contractor should have the responsibility to size the equipment and propose all components to cater to the specified functional requirements and projected transaction load. Additionally, the supplier should be required to deliver all necessary licenses configured as needed for proper operation of the system for the requested duration. It is also important to check whether technical support for standard software is indeed needed and its costs, and if so, how application software modifications which may need to be carried out would affect this.
- Supplier's key staff should not be scored but instead included in the Technical Requirements under team composition—it is then a contractual mandatory requirement. A General Conditions of Contract (GCC) clause in the standard bidding document defines the suppliers' responsibilities: The Supplier shall provide and employ only technical personnel who are skilled and experienced in their respective callings and supervisory staff who are competent to adequately supervise the work at hand.
- Under Bank Contracts the supplier has the responsibility to provide the latest version of the equipment and pass on any financial savings to the government. Since this type of projects can extend over several years, and both hardware models and software versions can change quite significantly over this period, a clear understanding of any limitations on the applicability of this clause is very important—for example, whether the supplier will supply an entirely new version of the software if it is released during contract execution. All such limitations should be clearly specified in the Standard Conditions of Contract.
- The government should state its requirements in terms of concurrent and named users, and give its preference.
- Care should be taken that there is a performance security and that all advances are secured by a Bank guarantee. Warranty Clauses should be comprehensive and ensure that warranty coverage continues until a defined time after the entire system is operationally accepted.
- Generally, it is best to minimize changes in scope after contract signature—the supplier will always come out ahead in such a transaction.
- The government/consultants should develop broad cost estimates for the systems procurement package which can be used as a guideline for assessing bid received.
- The bid should specify the total amount of resources available under the loan to restrict spurious and very high priced bids. This has proved very useful in restricting offered bid prices.
- The procurement plan should be prepared carefully and made available to the public.
- It would be best to bundle only those elements in the bid which are closely coupled, can be specified clearly and whose delivery can be verified, for example, application software, main and DRC servers, WAN/LAN networks and Implementation services. Elements like change management which are more difficult to measure are best left out of this procurement and contracted for separately.
- It needs to be noted that a lot of the training will need to be done separately. The government can obtain unit prices for the training of staff in key areas such as certification in the use of the package/DBMS /Systems/Network administration, etc. and costs for training a clearly specified number of staff in each area.

### *Contract Management*

- For large turnkey contracts, it is essential that Government has the capacity to manage contract implementation. Governments often use international consulting companies to assist them in managing contract implementation.
- In a single responsibility contract, the government states its requirements in functional terms. The contractor then has the responsibility to size the equipment and to propose all components to meet the specified functional requirements and projected transaction load.
- In Bank contracts, the supplier has the responsibility to provide the latest version of the equipment and pass on any financial savings to the Government.
- Payment schedule should be linked to specific milestones and not be front loaded.
- Care should be taken that that there is a performance security and all advances are secured by a Bank guarantee.
- Provide for liquidated damages clauses. However, the government should ensure that it fulfills the responsibilities that it has assumed in a timely manner.
- Warranty Clauses should be comprehensive.
- Minimize changes in scope after contract signature—the supplier will always come out ahead in such a transaction.

# IX. Implementation Experience

## Major Groupings of Projects

Broadly speaking, reform projects involving implementation of IFMIS type systems can be divided into two major groups. First, projects in transition economies, such as countries of the Former Soviet Union, Eastern Europe and countries which transitioned from centrally planned to a market economy post-1990 and second, projects in other countries where the basic principles and institutional structures required for expenditure management in a market economy were already present but required repair and modernization.

In general, it has been found that reform and associated systems implementation has been easier at the "green field" sites in the first group as compared to those in the second. In both cases Government commitment and support of the MOF has been critical for progress of reform initiatives.

We will discuss the characteristics of each of these situations further in the following paragraphs.

### *Transition Economies.*

The pre-reform situation in transition economies was characterized by a lack of an appropriate legal framework, institutional structures and accompanying systems required for management of Government finances. Spending units were allowed to open up Bank accounts outside the control of the MOF and the MOF transferred money to these accounts periodically. As a result sizable idle balances could build up in spending unit bank accounts while the MOF was in deficit in overall terms. MOF had no means to exercise control to ensure that expenditures are in accordance with budget appropriations. This resulted in other problems, like lack of timely information on expenditures and revenues required for economic management, statutory reporting, base line data for budget. In these economies, Treasury projects required setting up institutional structures and accompanying systems, *ab initio*, as these countries moved from centrally planned to market economies

**In other countries** the legal and institutional structures for management of Government finances did exist but were in need of repair since they were frequently by-passed. The pre-reform situation in these countries is characterized by an erosion of controls (e.g. appropriation control), blurring of the roles and responsibilities of participants (SU – Treasury), and multiplication of bank accounts outside the control of the Treasury—for example, personal ledger accounts. This resulted in essentially the same situation as that in transition economies with regard to lack of MOF control over government finances, expenditures and availability of timely information for economic management. In these countries reform projects tried to build on and repair existing financial management arrangements and systems—plugging the leaks.

### *Post Conflict Economies*

A set of post-conflict countries such as Afghanistan, East Timor, and Kosovo, in which implementation of systems had also to be done *ab initio,* can be considered as a subset of the first group. The experience of this group is similar to that of the transition economies in so far as policy structures and systems had to be set up afresh but with the added complication that a new set of systems had to start functioning quickly so that donor aid and contributions are tracked and

accounted for as soon as possible. This required that some systems support became available very quickly and in some cases this meant that tried and tested solutions were installed without carrying out a country specific full functional requirements analysis. The results of these cases are mixed, with some countries such as East Timor and Kosovo being quite satisfied with the chosen system, and others such as Afghanistan and Iraq discovering that the fit between the chosen system and the requirements was not as good as required.

## Implementation of an IFMIS has Resulted in Significant Advantages

The implementation of IFMIS type systems, along with the appropriate policy and institutional reforms has resulted in significant advantages such as:

- Rigorous application of appropriation controls thereby enabling good fiscal controls
- Better cash management and reduction in idle balances/borrowing requirements
- Ready availability of financial information for economic management
- Up to date and comprehensive fiscal reporting for MOF
- Regular budget execution reports for spending units
- Increased efficiencies in bill tracking and payment processing (vendor bills/civil service payrolls/retiree pensions)
- Better management of Government programs and delivery of government services; Better management of Capital Projects
- Increased accountability and transparency
- Ready availability of financial information to public
- Efficiencies in auditing-less time required for transaction audits giving more time for performance audits
- Earlier production of certified annual accounts and placement before legislature
- Reliance on Country Systems by Donor and/or Rating agencies

Some examples which show the order of magnitudes of the savings involved are given below:

- Implementation of the TSA and bringing all Bank accounts under Treasury control in Ukraine resulted in a very significant reduction of idle balances' borrowing costs. In addition, the ready availability of information on the total financial resources available to Government enabled it to allocate them efficiently. This contrasts with the pre-reform situation where health workers and other government employees often stayed unpaid for several months, and Government had to resort to serious cash rationing to meet its day-to-day obligations.
- The implementation of the Project for the Improvement of Financial Reporting and Auditing (PIFRA) system in Pakistan resulted in improved and timely access of actual transition data to the Auditor General of Pakistan. In one year, the audit process uncovered financial irregularities to the tune of Pak Rs.19 billion, which was recovered. This would pay for the total costs of the entire PIFRA reform program spread over ten years.

Some other significant observations are given below.

### *Project Completion Times*

A recent study conducted by Dener *et al.* (2011) covering about 60 World Bank-financed projects, has shown that project completion times range from 7–14 years to finish (from Board approval to completion) with an average completion time of approximately 7.5 years. Many ongoing projects are expected to take similar times for completion. Obtaining consensus

within government and implementing the policy reforms that are required has been a major factor contributing to long implementation times (especially at green field sites). Systems procurement, using international competitive bidding procedures has also contributed to long gestation periods. The time taken for actual systems implementation for a COTS solution from contract award to completion is between 3–6 years, depending on scale size of the implementation.

### *Implementation Costs*

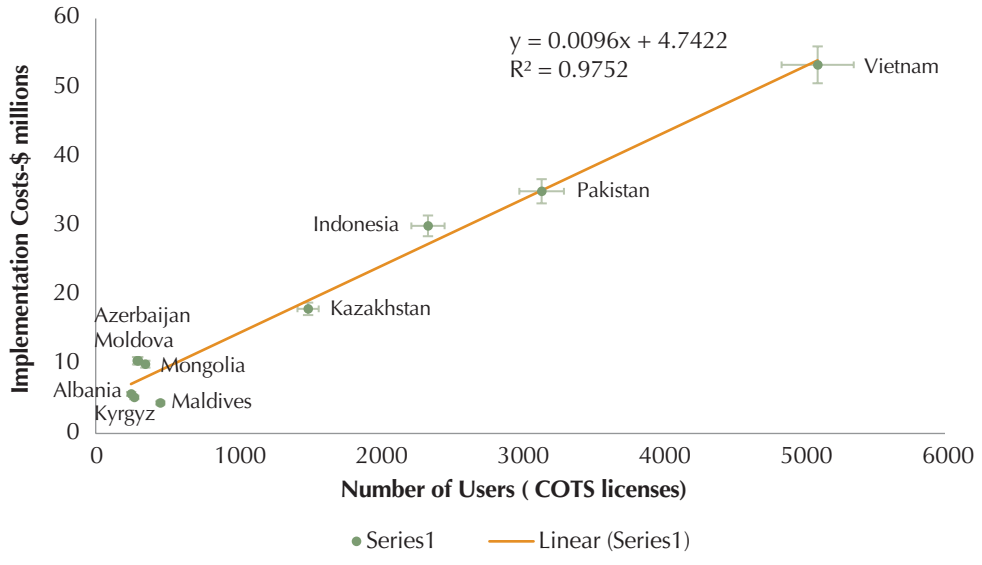
Implementation costs vary with the scope and scale size of the implementation. However, it is possible to get an approximate idea of the costs to be expected for implementing a system with a given scope, from existing data on completed projects, by plotting the contracted cost of actual systems implementation against the number of end-users (used as a proxy for scale size of the system) that are connected to the system. (Figure 23).In this exercise it is necessary to use comparable numbers. Thus, the cost elements should cover the same elements for all projects, and if this expense has been incurred in various phases of the project, say for pilot implementation and rollout, then these costs should be summed.

We have done this for 10 World Bank financed IFMIS projects that involve implementation of a COTS package and the results are shown in the attached diagram. Here we have plotted the contracted costs covering the H/W, S/W, Implementation services, WAN/LAN networking and training against number of COTS user licenses acquired (used as a proxy for end users).

It is possible to use this data to predict approximate costs for, say a 1000 User COTS implementation. For example, since the costs are represented by Y = 0.0096x + 4.74; if x = 1000, then y = US $ 14.34 million (+ / –) 20 percent.

Therefore, as a broad parameter it is safe to assume that implementation costs for a COTS implementation would be about $15,000 per user.

**Figure 23: Contracted Systems Implementation Costs Plotted Against Number of Users**



The results of a comparable exercise for custom-developed implementations may not be as reliable, since the software development is often done by a combination of local government staff and consultants, and the associated costs are not captured accurately over the long systems development life cycle. In these cases, the implementation is often incremental and constantly changing, with many iterations done over period of several years, with each iteration yielding a slightly better functionality, eventually leading up to a working solution.

### *Recurrent Costs*

Comparable data across several countries is not available for actual recurrent costs associated with ongoing system operation and maintenance. An indication of the magnitude of the typical recurrent costs that would be involved is given in Box 3. for the PIFRA project in Pakistan.

### *Project Scope*

Initial projects in the centrally planned economies have focused on the implementation of Core Treasury Reform and Functionality. As new institutional structures and reform measures have stabilized newer projects have had a wider scope and include systems features to support upstream and downstream features, such as budget preparation, human resource management, debt management, and auditing.

### *Technology Choices*

In the 1990s, Treasury processes were still in transition. The major COTS packages had not transitioned to the public sector. There was a need to develop core functionality so that the reform could start yielding results. Many countries therefore started out with the implementation of interim custom developed systems. These were used as a means of firming up requirements—a first step of a two-step transition. These have been or are now being replaced by COTS applications. New projects are mostly starting off with COTS software.

### *System Architecture*

Telecommunications infrastructure was not well developed in many countries in the early nineties. Interim systems were first implemented on a distributed architecture, and then migrated to centralized architecture as telecommunications infrastructure improved. All new systems are being implemented on a centralized architecture. New systems use web-based versions of the application software.

The increasing availability of open source software has opened up another set of possibilities. Open source software is widely used for middleware—operating systems, application development tools—Linux, Java, etc. Application software built using these tools needs to be investigated further for Treasury system use.

**Box 3: Recurrent Costs – Actuals**

**Pakistan PIFRA –** Approximate numbers

| **Item per annum** | **US $ millions** |
|---|---|
| Software license Costs | 1.50 |
| Hardware replacement Costs | 1.00 |
| POL/ Stationary | 0.75 |
| Telecommunications | 0.75 |
| Specialist Staff costs | 0.75 |
| **Misc.** | **0.25** |
| **Total** | **5.00** |
| **Investment Costs** | **Approx. 35 million** |

**Recurrent costs are about 15% per annum of investment costs in this case.**

## Implementation at the Sub-National Level

Implementation of IFMIS type systems has posed problems in many countries. There are significant issues that impact the design and implementation of IFMIS at the subnational level that need to be considered before making a recommendation.

The intergovernmental fiscal systems architecture of a country, especially in large federal countries such as India or Brazil, determines the roles and responsibilities of the central, provincial and local governments which, in turn, is relevant to decide on the relevance and design of an IFMIS.

Then there are technical issues such as – if the IFMIS is designed from a Central Government perspective to aggregate expenditure figures, how useful is it for a local government's fiscal management, since the functional requirements may be quite different?

Finally, for some countries there are significant logistical issues. For example, how will an IFMIS be implemented in a complex country such as India with 24 or 25 State Governments and more than 10,000 local governments? Therefore issues relating to subnational governments need more research and analysis.

Nevertheless, at there are some generic issues which can be discussed here.

- Sub-national levels of government normally like to be able to control payments without reference to a functionary of the center.
- Lower capacity for systems implementation exist at the sub-national level

The first set of issues needs to be addressed in the context of the intergovernmental fiscal systems architecture in place, as mentioned above. The solution to this problem has to be found in the context of the local political economy and the relationships between the central and subnational governments.

The capacity problem can be encountered at both the second tier and lower levels of government. Use of the Central System and Central Government Treasury offices for payment processing can alleviate capacity constraints at sub-national level. However, care should be taken to ensure that this system use is provided as a service rather than an attempt to control local government budget execution by the center.

Two types of solutions are possible. First, it is possible to use of the same system across multiple levels of government. An alternative is to use common standards, COA and data exchange protocols and different systems from those used at the national level. The advantages in using a simpler solution at the lower levels of government will need to be balanced against the attendant issues that come up with the use of multiple packages—especially in low capacity environments. Some examples are:

Russia: The regional (oblast) treasuries are required to use the central system for payment processing, but control is exercised by Local Governments. Moneys are banked in the central bank but money is not co-mingled.

Ukraine and Kazakhstan: Central and Regional Governments use the Central Treasury system. Moneys are banked in the Central Bank.

Pakistan: Central and Provincial governments are required to use the same system. Moneys are banked at the Central bank/ National bank in separate accounts.

## Implementation in Low Capacity Settings and in Island Economies

These projects often have the following characteristics:

- Basic institutions, systems and procedures do exist but are in need of repair.
- Small numbers of qualified staff in functional and technical areas—especially in government.
- Under-developed telecommunications infrastructure—low bandwidth
- Low capacity to sustain expensive projects

Often multiple donors/development partners are active and involved in implementing several projects with different goals and objectives. It has been observed that in these settings emphasis on policy reform issues is still paramount. In these settings also some of the institutions and structures for budget execution may need to be set up afresh or repaired to remove aberrations that may have crept in over time. But a more incremental approach may be called for while designing both the policy framework and systems.

### Keep it simple – Implement the basics first – Allen Schick

It should be noted that even in several major countries, the reform started with implementation of software for core budget control and payment/receipt processing before moving on to support line item budgeting.

The design lessons given above apply here also.

- Systems should be designed along functional and not organizational lines
- Define the contours of the system clearly to avoid duplicative investments—resist disparate efforts to set up multiple systems along organizational lines

It is preferable to look for simpler off the shelf packages. Several are available on the market: Free-Balance, Agresso, Navision, Technology-1, etc.

In the past many of these vendors have not responded to major ICB notices. It may be necessary to try a Limited International Bidding notice. However, it should be assured that selected vendor has or is willing to establish required support capability in-country or within easy access.

Systems implementation could start with a basic bespoke system that could be used to firm up requirements. Centralized architecture is still the architecture of choice to the extent it is possible—but a country could start with a distributed architecture.

In most countries the telecommunications network has improved significantly over the last few years and further improvements are planned over the next few years.

## Island Economy Settings

In this case, normally a major part of the transactions in terms of volume and amounts of money are carried out at the center with a smaller number of transactions at other sites. Therefore it is preferable to set up a central system for the bulk of the transactions and locate it at the center and set up off-line processing arrangements for remote sites if good telecommunications are not available. Imprest accounts can be set up for these remote sites. Transactions from remote stations will be entered in the system ex post at the time of recoupment of imprest. The Imprest accounts could be managed manually or by a simpler/bespoke application.

The advantage of a centralized operation is that the numbers of technically trained staff is smaller for a centralized architecture setting. Thus e.g. a core team is required at the center for software maintenance.

It is advantageous to train a group of power users to act as change agents/ experts. As mentioned earlier, most staff need to know only specific features of the system. Since more expertise is often available in the private sector, it would be best to hire specialist IT staff on contract at private sector salaries and hire international experts to work alongside local teams. One should try to ensure that transfer of knowledge to local staff does take place, and gradually transfer responsibilities to local staff.

Note: Several island economies in the Caribbean and South Pacific have made significant progress in implementing small off-the-shelf packages for core treasury functions and some fairly complex systems have been successfully implemented in some low capacity environments. The Smart Stream package, for example, is in use in the Caribbean while a number of similar small packages are in use in the South Pacific Island Economies.

# X. From Core Treasury Systems to a Broader IFMIS: Some Sequencing Considerations

The basic elements of Treasury Reform are in place in many countries, with a functioning Treasury Organization and a TSA. At least a basic, interim Treasury System has been set up that enables the MOF to exercise some degree to control on government financial resources. In some countries, these arrangements are comprehensive; in others their coverage is incomplete. In some countries, the interim systems are proving inadequate in terms of capacity and functionality. They do provide basic transaction processing and control facilities, but lack the full functionality required for budget execution, including the capacity to provide overall information required for economic management.

Some Governments feel that the scope and coverage of the systems needs to be is extended to upstream and downstream areas of the GFM cycle such as Budget Preparation, Payroll and Position Management, Debt Management, Auditing. There is also a desire to introduce performance criteria in budgeting and to move from accounting on a purely cash basis to more advanced standards, including elements of accrual accounting. This could entail significant changes in the systems. Figure 24 illustrates a full IFMIS and its principal users.

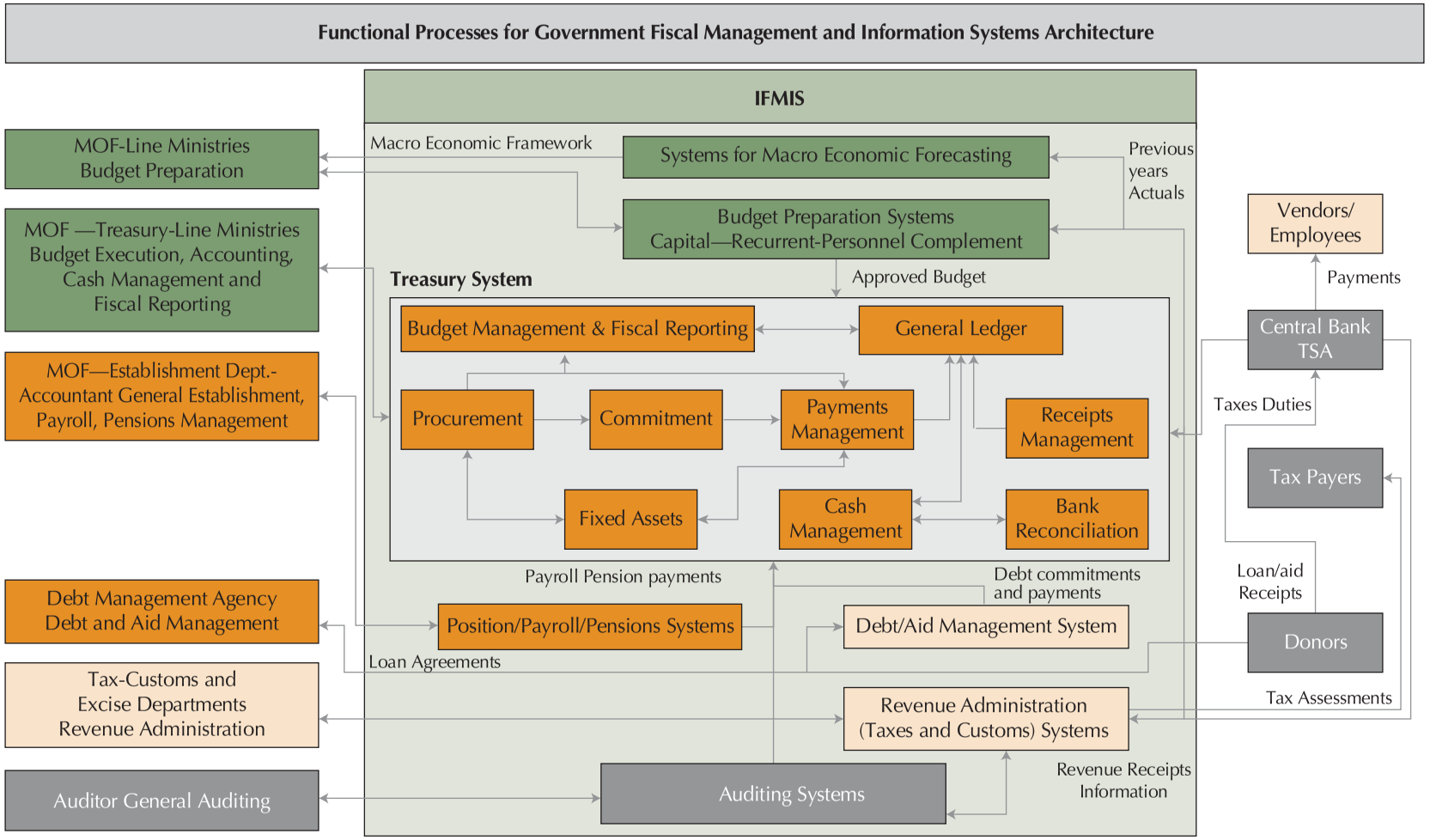
In this section we will discuss possible sequencing options for further reform and related issues.

The diagram in Figure 25 shows that IFMIS implementation can be viewed as a set of layers with the basic transaction data and the systems modules that are used to process this data, as components of the first layer. On top of this layer there is a financial operations layer that enables production of budget execution reports, determination of the cash position in Government bank accounts, the ways and means position, and production of monthly financial statements. Finally, on top of the financial operations layer is the management and statutory reporting layer, which enables production of overall fiscal reports, audited financial statements and statutory financial reports.

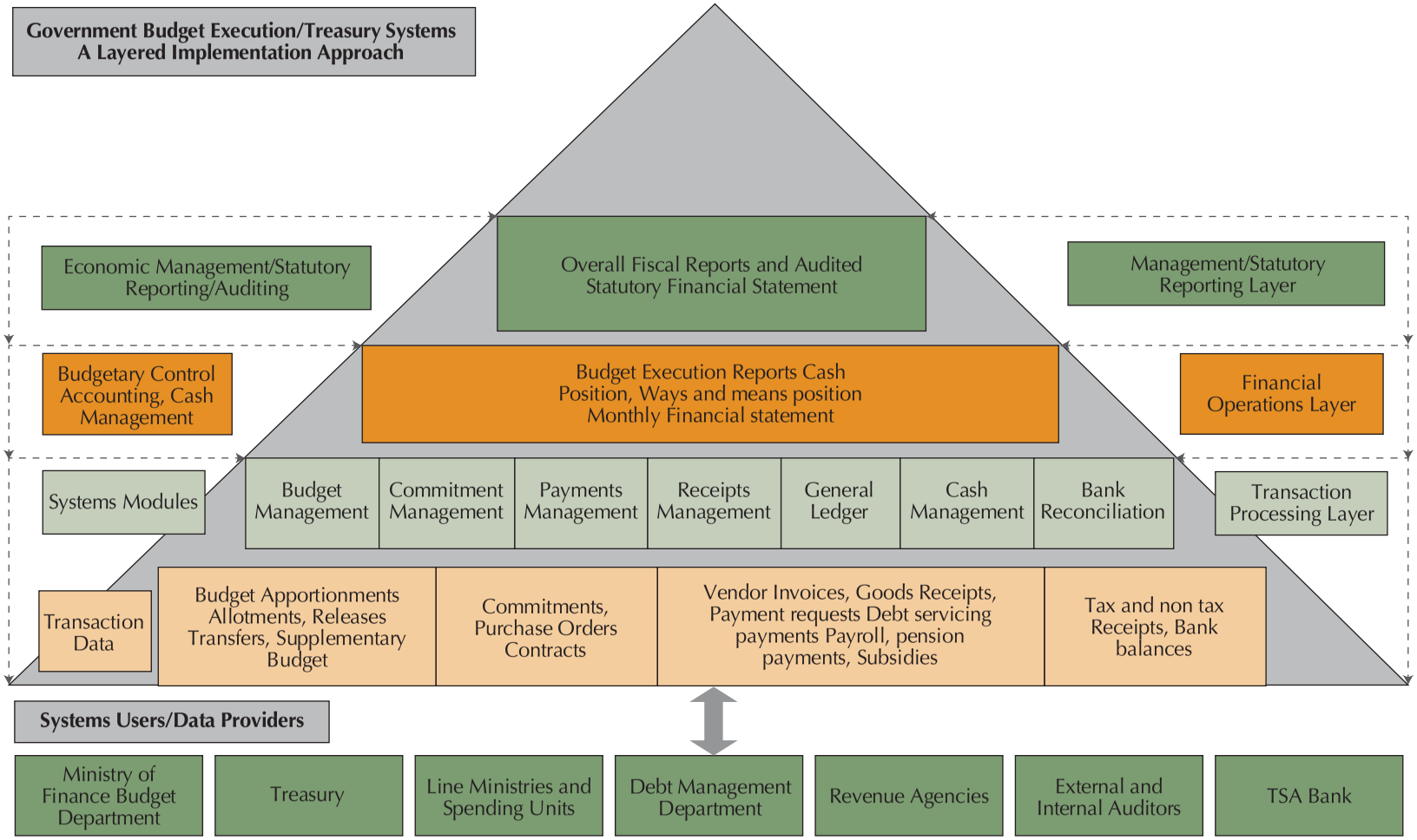
In practice, it is necessary to first have the transaction processing layer in place to be able to get good and credible information to be used for financial operations and for management reporting. Other layers would be built on top of this layer.

The implementation of the transaction processing layer is the most difficult and time consuming and the quality of information available from the financial operations and the management

**Figure 24: An IFMIS and its Principal Users**



## Figure 25: Treasury Systems – A Layered Implementation Approach



reporting layer will depend on the quality, timeliness and comprehensiveness of the transaction data that is captured by the transaction processing layer. Once a comprehensive transaction processing layer has been set up the implementation of the other layers is relatively quicker and easier.

## Systems Module Sequencing

The information architecture for GFM described in chapter II specifies the overall systems framework and the information flows between the modules. As mentioned earlier for practical system implementation, it is essential that various system elements be developed in a modular way and are integrated in the sense that they can share and exchange data, For this it is necessary that there is a clear understanding of which functional organizations have the primary responsibility for collecting and maintaining the databases related to specific data entities. Other participants need to share this data according to specified security protocols for data access and exchange.

Systems sequencing is important for a successful outcome of a systems implementation program. This is discussed below.

In order to achieve significant outcomes such as good budgetary control and cash management, it is necessary to first implement modules to cater to Core Budget Execution Processes, that is, to capture payments and receipts transactions, across government, before going on to other non-core elements, like fixed assets management, HR management.

In this stage one has to ensure comprehensiveness of transaction capture. Transactions related to all budgetary, extra-budgetary and internally generated revenues are routed through the system in *ex-ante* mode and no payment can be made outside the system. Individual line ministries should not develop separate payment systems and should use the central Treasury system for all payments and receipts.

It is most effective to first implement the core system in Treasury-centric mode in which spending units are required to bring/transmit via a web portal expenditure and receipts transactions to designated treasury offices, and subsequently to decentralize transaction entry to spending units—if necessary and/or possible.

Non-Core systems modules should be built around this Treasury system and should share databases with it and not duplicate the functionality of the core system. Thus, to start with, budget preparation can be done outside the system or by another system. The final approved budget can then be loaded in the system and used to control expenditure.

An important point to be understood here is that ideally there should be a seamless interface between the budget preparation module and the budget execution modules, which means that they should share the system databases. However, if these two modules need to have data transfer between them, then there are a few prerequisites for these two modules. First, the two should use the same budget classification structure and COA Second, after the budget has been finalized in the budget preparation module, it should be loaded into the budget execution module and all in-year changes to the budget, including budget releases, virements, and changes need to be made directly in the budget execution module. Third, the databases of the budget execution module are the primary databases of the IFMIS; all reporting should be done from these databases.

Payroll and pension management systems should be interfaced with the Treasury system. The payroll and pension systems can calculate the individual salary and allowance and pension

payments for employees and retirees. But all payments should be routed through the Treasury system, which should perform a budget check before releasing a unit's payroll for payment. The payroll system should use the position management system as a control system to ensure that payments are made only against authorized and budgeted positions so that the payroll does not fail the budget check at the time of payment.

Debt service payments can be calculated by the debt management system. All debt/grant receipts should be recorded in the Treasury system at the time of receipt. All debt service payments should also be routed though the Treasury system, and not made directly by the MOF through separate instructions to the TSA Bank.

Revenue receipts need to be deposited directly to the TSA Bank account and recorded in the appropriate sub account of the TSA. The amounts recorded in the TSA represent the official receipt figure. Revenue agencies need to reconcile the amounts with the figures from taxes and duties that their systems show as assessments.

## Some Considerations for Implementing Advanced Budgeting Methodologies

The implementation of Medium Term Budgetary Framework (MTBF) and Medium Term Expenditure Framework (MTEF) requires that the Treasury system provide access to budget and expenditure data for more than one year and that some controls and reporting is done against the three year totals rather than individual years. The Treasury system's horizon can be expanded to a multi-year time frame to accommodate this.

Program budgeting requires that budget resources are allocated to Government programs which can span many departments. This can again be accommodated by including program codes in the Budget classification structure.

While implementing such a system, one must specify the part of the program resources that are allocated to the participating departments and the economic items on which these resources will be spent. If this is not done, and control is exercised only by program, then during the year a first–come, first-served situation will develop. The departments that are the first to draw down these resources would be able to get more than their anticipated share, while those trying to do so later in the year would face shortages as program budget limits are reached.

On the other hand, if resources are allocated at too detailed a level such as activities and tasks, this increases the volume of the transactions associated with budget apportionment and allotment, and raises budget releases and transfers to unmanageable levels. In these cases, it may be best to allocate resources at a higher level such as for a program or sub program, but track the costs at a more detailed level such as activities and tasks. This too will require that the activity and task code are correctly coded on each transaction and recorded, since the transactions are posted by the system.

Performance budgeting requires that budget formulation also specifies performance indicators and that costs incurred are allocated to these indicators. It is obvious that such a system can only work if accurate cost data has been booked in the General Ledger. Implementing a performance based budgeting system without having the capacity in place to book accurate cost data is therefore quite meaningless.

A possible IFMIS sequencing scenario is shown in Figure 26.

**Figure 26: IFMIS Sequencing – One Possible Option**

| IFMIS—Sequencing | |
|---|---|
| Set up Policy Framework | Budget management law/Treasury decree that provides a legal Basis for Operation |
| | Banking arrangements: Consolidation of bank accounts in a Treasury Single Account (TSA) at the central bank |
| | Institutional Arrangements: Treasury organization; Re-engineered Payment and Receipt processes |
| | Chart of Accounts and Budget Classification structure (BCS) conformant with GFS; Uniformity between CoA and BCS |
| IFMIS Phase I:<br>• Implement Core Functionality for Budget Execution | Includes: Budget Management; Commitment Management Recoding all commitments relating to intended government expenditures, Payment Management-Processing all government expenditures relating to: Procurement of goods and services from current/capital budgets; Salary and Pension Payments; Debt servicing payments; Subsidies/Fiscal transfers to sub-national levels or SOEs; Receipts Management; Accounting; Cash Management; Fiscal Reporting |
| | Load Budget from Legacy system; Apply Budget and commitment control; Comprehensive transaction entry on ex-ante basis; First Centralize then de-centralize |
| IFMIS Phase II:<br>• Implement Payroll/Pensions Systems;<br>• Interface with Dept Management and Revenue Systems;<br>• Assets Management Systems | Includes: Position management, Employee records, Calculation of Spending Unit Payrolls, Employee entilements, Provident Fund Accounting; Calculation of pension entilements for Government retirees |
| IFMIS Phase III:<br>• Implement Budget Preparation Systems | Calculation of program and project costs; Compilation od budget proposals from Spending agencies; Printing Budget Documents |
| IFMIS Phase IV:<br>• Implement Systems to support Auditing | Auditing—Use of Transaction data in IFMIS data bases for auditing |

## Sequencing Reforms

The following extract from a presentation by Mr. Jack Diamond of the IMF and some advice by Professor Allen Schick of the University of Maryland, lays out a possible set of practical sequencing scenarios.

If we look at advanced countries we see a progression in objectives:

- First, financial compliance = emphasis on inputs
- Second, aggregate fiscal discipline = emphasis on fiscal aggregates over time.
- Third, efficiency/effectiveness = emphasis on outputs and outcomes

It is also observed that as each new objective was added, it did not replace the previous one and the reform process took time

The first priority is to create a PFM system that delivers financial compliance/fiscal discipline e.g. Comprehensive input-based budget, delivered as approved, a TSA, commitment control, regular calendar, timely year-end accounts etc. Once achieved, the PFM system is developed further to adjust fiscal aggregates to ensure macroeconomic stability/sustainability—the ability to do macroeconomic forecasting, monitor and adjust fiscal aggregates, set fiscal policy in medium term budget framework, etc. Having achieved this, a move can be made to getting better value for money spent, for example, by introducing strategic planning, program budgeting, performance indicators to monitor and evaluate, and more decentralized management.

### What not to do in the early stages – Allen Schick[20]

According to Professor Allen Schick areas that should be left until later in the reform process are: program budgeting, accrual accounting, and decentralization.

It has been observed in many developing countries, mainly in Africa, that foreign consultants have in the 1990s and 2000s recommended the implementation of advanced models for budget preparation, management and accounting, such as performance based budgeting and accrual accounting.

This was so, despite the non-existence at the time of a basic budget execution system which could capture costs by line item and organization unit. Such recommendations have led to wasteful investments that have had very limited outcomes and which should be avoided. This situation has improved as basic transaction processing systems are being progressively implemented in African countries.

[20] Schick, A., 1998. Why Most Developing Countries Should Not Try New Zealand Reforms.

# XI. Lessons learned

The following important lessons can be derived from previous systems implementation experiences.

## Hierarchy of Requirements

In **order of importance** for successful Treasury reform, requirements can be listed as follows:

- Political will to implement sound PFM policies and procedures, and support within government—the MOF and others—for reform measures
- Realistic Budget Formulation
- Institutional arrangements to implement Fiscal Control
- Control of Treasury over all Government Financial Resources – Consolidation of Bank Accounts in a TSA
- Routing of Transactions through a Treasury office/ Treasury staff
- HR Capacity within implementing agencies to implement reform measures and associated systems
- Appropriate Technology to support transaction processing and data management
- Application Software which can reflect functional processes
- Technology Platform to implement Software, Hardware, Networking, Middleware

It is important to note that emphasis on policy reform issues is paramount. Some of the institutions and structures for budget execution may need to be set up afresh or repaired to remove aberrations that may have crept in over time. If deficiencies in the basic legal and institutional framework are not repaired, even very large investments in systems may not yield desired results. The technical aspects figure lower down in his hierarchy, whereas sometimes, much more time and effort is spent on arguing about the technology choices than those elements in the hierarchy that are more important.

As is described in the case studies in Annex I and mentioned previously, the setting up of the Treasury organization and introduction of a TSA has had a very significant impact on the effectiveness of fiscal control and cash management in many countries, even with the quite rudimentary systems that were implemented in the initial stages to kickstart the reform program. Ukraine, Russia, Kazakhstan and Nepal are good examples.

On the other hand, in some countries very significant investments in modern technology have not been able to tackle the basic fiscal problems confronting Government, since the policy framework and institutional structures required for effective fiscal control have not been reformed. *In fact, setting up such a system without adjusting the policy and institutional architecture may well result in a situation where the system increases the speed of the hemorrhage on government fiscal resources instead of controlling it.*

## Strong Government and MOF Commitment

This has been a key factor for the success of Reform Projects. Since these projects can take over 7–8 years or longer for completion, it is necessary to maintain this commitment over a long

period which can extend beyond one country election cycle. It has been found that this commitment can be achieved better if projects are framed as public expenditure management (PEM) systems reform, which is normally high on the agenda of most politicians and governments rather than just accounting systems reform, which has a more specialized and limited focus and may not figure as prominently on the agenda of political leaders.

Senior level policy makers in MOF and donor organizations also relate to this better. Linkages can then be established between project and requirements under policy based lending to ensure that senior government functionaries continue to take interest in ensuring that project milestones are met.

## Continuity in the Bank's Project Team

In many countries, Government functionaries are transferred and/or replaced quite frequently, and the membership of the Government's counterpart team changes several times during the course of the project. The adverse effect of this change is compounded if the Bank team's composition also changes simultaneously. It has been observed that when some key members of the Bank team who were involved in the design of a project continue on the team until the project's completion, this contributes significantly to achievement of project development objectives.

## Project Design

It is important that project design be driven by functional rather than technical considerations. It is necessary to focus priorities on reforming the budget execution processes, setting up the appropriate institutions and their associated systems and procedures.

Some key implementation pointers regarding systems design are:

- Systems should be designed along functional and not organizational lines.
- Define the contours of the system clearly to avoid duplicative investments
- The Budget Department, Treasury, and Line Ministries should use the same system to process their transactions, and should share databases
- Budget Preparation and Budget Execution should use the same Chart of Accounts. The economic classification segment should be a subset of the Accounts line item segment.
- Transactions should be captured in real time as they occur.
- Financial controls should be applied in *ex-ante mode* to all transactions processed by the system. For example, checking on availability of funds for budgeted expenditures prior to committing funds or making payment.
- *Ex-post* transaction posting should be avoided.
- No expenditure transaction should be processed outside the system. Data is captured only once as an accounting transaction progresses through the system. The scope of the system should include: Budget Funds – Payroll, Debt, Subsidies, Fiscal transfers, EBFs, Donor Funds and technical revenues
- To reinforce the requirement of comprehensiveness of transaction processing, it may be useful to mention here that there have been cases where very significant investments have been made in a system which also works quite well for a subset of the total government financial resources—the budget resources. However transactions related to all or many extra-budgetary funds (EBFs) and internally-generated funds/technical revenues are processed outside the system and lodged in bank accounts outside the TSA. Since these funds constitute a major chunk of the government's resources, the basic objectives of fiscal control and good

cash management have not been fully realized. In effect, a $50 million modern system is being used to control 40% or less of the of the total government resources. This expenditure could be considered at least a partially wasted investment unless these gaps are filled.

- The IFMIS databases should be treated as the primary source for financial reporting within Government – There should be no second set of books.

## Business Process Engineering

It needs to be recognized that the primary processes that need to be reengineered before systems implementation are the processes related to ensure good fiscal control and cash management.

For this, the roles and responsibilities of the department of budget and that of the Treasury need to be defined and a treasury organization with branches across the country, needs to be set up.

All spending unit bank accounts need to be closed and all government financial resources brought under the control of the Treasury and placed in a TSA at the Central Bank.

The major business process re-engineering required is that the transaction now needs to be routed from the spending units to the Treasury office instead of directly from the SU to the Bank.

Secondly all stages of the transaction needs to be recorded in the system in ex-ante mode, as mentioned above.

Streamlining of all other processes, e.g. for transaction approval within a SU, or subsequently within the treasury would improve efficiency but are not really pre-requisites of systems implementation.

In fact most COTS packages already provide for standard best practice processes and it may not be a bad idea to actually use these as a starting point unless there is a specific legal requirement that needs to be fulfilled.

In the case of several projects it was found after embarking on a costly and time consuming detailed BPR exercise that 90% of the business processes offered by the COTS solution were in accordance with the results of the detailed BP engineering exercise which took a very long time and significant costs to complete.

A lesson from this experience is the need to distinguish clearly between which part of the business process re-engineering is actually required prior to systems implementation, and which part can be best addressed by using the processes incorporated in the COTS system in use and which can be adjusted as systems implementation proceeds.

## Importance of Internal Control Procedures and Information Security

It is important to note that adhering to prescribed internal control procedures normally specified for financial transactions continues to be critically important as these systems transition from a manual to an automated platform.

As countries started implementing these systems, there have been cases where lax internal controls have led to significant fraudulent activity. There was nothing wrong with the application software or other elements of the technology platform in use; the fraudulent activity was simply

the result of breach of internal control procedures. *Strict adherence to these controls is necessary to mitigate fraudulent and unauthorized transactions.*

## Complexity of Charts of Accounts

As mentioned earlier, the design of the Budget classification structure is determined by the information requirements. In principle, this structure should at least have the following elements: Function, Organization and spending unit, object of expenditure (economic) classifications. Function codes and the economic classification codes should be consistent with the IMF GFS. Also the economic classification codes should be a subset of the account codes used in the Chart of Accounts (COA) to ensure integration of budgeting and accounting.

Additionally, codes such as source of funds, program and project codes could be added to track expenditures by source of fund and for specific programs and projects. Normally it is possible to breakdown the organization codes to a level where a specific unit is carrying out a specific sub function. If this is done then it may not be necessary to specify the function sub function codes in the BCS and COA but use a cross walk table to report on expenditures/ receipts by function/ sub-function.

The temptation to have an overly complex COA/BCS, which enables allocating every transaction to the lowest level, needs to be balanced by the fact that the complete COA/BCS will need to be coded on every transaction. This is cumbersome and can lead to allocation errors. Therefore, a balance needs to be struck between the level of detail required on the transaction and the quality of the data entry that is possible in a given circumstance. It has been observed that an overly complex COA could also increase transition processing times on the server, especially when the number of active users is also large.

## Implementation Prerequisites

### *A Good Quality Telecommunications Network*

Minimum bandwidth of 128kbs is an important prerequisite for IFMIS implementations to enable remote sites to connect directly to the central server. Many countries now have implemented or are in the process of implementing good wide area telecommunications networks covering the major cities, town and districts where the remote IFMIS sites would likely be located. This is therefore becoming less of a constraint to system implementation.

### *Availability of Technical Expertise*

An IFMIS type system is an integrated government-wide system with multiple users. The Treasury and its subordinate offices are responsible for the bulk of the transaction processing that is carried out through the system. End-user groups upstream and outside the Treasury such as the MOF and the Budget administrators, Line Departments/Ministries also use the system for the performance of their day to day financial operations.

Usually, a central organization is responsible for maintenance of the integrity of the databases and for ensuring smooth and uninterrupted operation of the systems network. End-user technical support is also provided through this organization. The functional responsibilities of such a central technical organization are detailed in Annex IV.

This central organization is required to be staffed largely by technical experts. It has been observed that in many countries the technical skills required for these jobs are not ordinarily available within government at present and are unlikely to be available in the future at the normal government salary scales. *Pay and remuneration in Government for technical staff for such an organization, coupled with the lack of career prospects for technical IT staff within Government, has been a major area of concern for sustainability of IFMIS projects.* Examples are, Pakistan, Maldives, Nepal and others.

The IFMIS is an operational mission-critical financial system used by all government accounting and budgeting entities within government for the day-to-day performance of their functions. Therefore, any disruption in the operation of the system can cause significant disruption in the Government's financial operations. The setting up and staffing of the supporting organization is therefore critical for the long term operational sustainability of the system and the continuity of the Government's budget management and financial management operations and reporting.

It is therefore necessary that Government plans and decides on the organizational structure of the central institution to be set up to perform the key technical tasks associated with the operation and maintenance of the IFMIS system and develop strategies to attract and retain the technical skills required in this unit.

Retention of highly skilled technical personnel within Government is a common problem faced by many governments and options chosen by countries include:

- *Option A: Set up an organizational unit within Government, staffed with employees paid at special market-based salary scales* (for external personnel as well as qualified civil servants), designed to attract professionals on long term contracts.
- *Option B*: *Hire the technical skills directly from the market on year to year contracts and manage them through regular mainstreamed civil servants*. This is essentially a short term measure usually adopted in development phases of some projects such as during the Pakistan PIFRA FABS implementation, but may not be suitable as a long term solution. Without good in-house technical management expertise, the tendency may be to hire short term consultants to fulfill immediate needs, limiting the development of a long term vision/plans for systems and technology platform and requirements. This can leave serious gaps in the skills/expertise required to run a mission critical system in a stable mode and plan for its future growth and enhancement.
- *Option C: Outsource the technical maintenance and operation of the systems to specialized firms.* Used mainly by countries such as the USA who have a developed market for such services and firms who regularly cater to these needs. This option may be the easiest to implement but could be the most expensive since firms charge a significant overhead for providing the technical skills and expertise required. This option also requires good in-house technical contract management capacity and consideration of issues such as information security.

  In this context another option that reduces the need for technical staff within the government agency is now becoming commonly available. With the advent of *cloud technology* it is now possible to house the primary and / or Disaster recovery servers on external sites. Many firms host such "cloud services". However, application development and maintenance continue to be the agency's responsibility. This option has the additional advantage that the government agency is freed from the responsibility of periodically upgrading or replacing the technology in response to changing needs or outdated technology since such firms offering such services can supply the necessary computing power, memory and disk storage and bandwidth on an as required basis.

*Option A* would be the preferred option for many developing countries since it would build permanent in-house capacity within government and provide a career path for government employees appointed to the organization. Government should develop job descriptions for the positions listed in the chart and, more importantly, specify the technical qualifications and experience that are required for the positions. Officers within the government who fulfill these technical qualification and experience criteria could be selected for these positions. The key requirement is to match the skills of individuals with the required skills and experience profile of the positions.

It would be highly desirable for Government to have the organization structure reviewed by an external consultant (engaged on a short term local consultancy). The review would validate the requirements for the central technical organization, ensure that it caters for all aspects and technical requirements for setting up the organization to run the mission-critical systems and help Government in obtaining the necessary endorsements from the MOF.

## Training

Training needs can be divided in to several categories:

- Technical training in the application software, system software databases, networking systems LAN/WAN, information security systems, selected for systems implementation.
- End user training in the use of systems,
- Training of managers in the use of information available from the systems databases.

Arrangements need to be made for imparting training to staff in each of these categories. Technical training will need to be provided for a select group of technical staff who are or will be responsible for the maintenance and operation of the technical aspects of the system. This training is usually available through courses offered by the vendor of the hardware and software tools that are acquired for system implementation. Training could be expensive but is readily available.

Under the second category needs the most attention, because large numbers of staff will need to be trained to operate and manage the new system. It is this category of training that needs the most attention. The large numbers involved can appear be overwhelming, and needs to be properly planned so as not to seriously disrupt ongoing regular activities handled by staff. Many governments have training institutions which have been used successfully to impart training. It is important that the training program is matched to requirements.

It should be noted that most staff need to know only specific features of the system, and training, at least in the initial tranche, can be limited to those features. Training should be coordinated closely with implementation plans and focused to specific requirements of a given site and should be imparted just before site implementation. The greater majority of staff need to know only specific features of the system and training, at least in the initial tranche, can be limited to these features. It is important to set up a help desk, hand holding clinics, and to train a group of power users thoroughly who can be used subsequently be deployed as trainers or technical resource persons for other staff.

Experience has shown that that even in situations where staff have had little or no previous exposure to computer-based systems, operational end-user staff have readily transitioned to the use of these systems. In Pakistan, for example, it was observed that during the initial stages of the FABS implementation under the PIFRA program, staff who had spent all their lives using manual systems for accounting in the office of the Accountant General, adapted to the use of the new

SAP system easily and quickly progressed to the power user stage where they could impart training to other staff.

Further, use of a centralized architecture ensured that the most specialized technical staff such as database administrators, and systems programmers need only be stationed at the center where the server was located.

## Change Management

Several types of change management initiatives may be necessary. First, implementation of such systems is often resisted by staff who considers them to be a threat to their jobs. This resistance often comes from staff responsible for operating the legacy systems. To overcome such opposition from vested interests, MOF Management must be fully convinced of the advantages of the new system. They will then have to assure the affected staff that their jobs will change but not be eliminated, and explain as well as lead the transition process.

The second type of resistance comes from staff who are used to doing their regular work in a given way and are reluctant to change. This resistance can be overcome by good training and some handholding during the transition phase. An important aspect here is to ensure that that staff in the implementing agencies recognize the inevitability of this change. The MOF management has a major role to play here. For example, for salaries, it should be emphasized that the only way a payment will be processed is through the system, and only those staff will be paid whose data is on the payroll file. Similarly, all transactions from revenue agencies would henceforth be processed through the system.

Despite initial resistance, it is often surprising to see how quickly staff adapt to the changed environment once the rationale and inevitability are clarified. In order to reduce the pain of the change, governments need to take special measures that as the system roll out occurs handholding support from super users, "cheat sheets" and more formal training are available to staff as they transition to the new system.

Resistance could also come from areas where corruption thrives, such as under chaotic systems. This needs to be met with resolve and a firm hand from the MOF management. We should also note that sometimes there is lack of incentive for change in a civil service setting. Bureaucracies are normally risk averse. It is therefore necessary to share with senior staff as well as rank and file examples about where new systems have successfully been installed and operated.

### *Plan for Realistic Time Frames for Project Execution*

The whole process of setting up the legal and institutional framework, systems design, procurement and implementation can easily take 8–10 years as mentioned earlier. Sustaining management support over long periods can be a problem. Sometimes a linkage to IMF program and/ or SAL operations has often been used to reinforce commitment. Adopting a two-step implementation strategy, in which interim technical solutions have been implemented to support the reforms, followed by full function systems, has proved useful in some cases.

### *Resist the Temptation to Blame the Technology and Start Afresh in Mid-Stream of an Implementation Effort*

In several Bank projects, unsatisfactory or partially satisfactory outcomes are often blamed completely on technical failures of the system. The most commonly identified culprits are choice of

technology or faulty design. Recommendations are then made to change the technology platform underlying the system or to embark on a complete redesign to solve the problems being encountered. Such recommendations are often made after a very significant amount of time, effort and financial resources have already been spent on installing and operating the system. Cases in point are:

- The Pakistan PIFRA system, where a recommendation was made by external advisors that the systems implementation effort, which had already been completed in two out of four provinces, and was ongoing in the remaining two should be stopped midway, a complete redesign be undertaken, and the software platform changed from SAP to a local custom developed package.
- A second example is that of Zambia, where external advisors recommended that a systems implementation exercise which had run into contractual problems with the contractor, be stopped and a review be conducted, including a review of the application software platform (SAP) which was deemed to be too complicated for implementation in Zambia

  This recommendation was made notwithstanding the fact that SAP was already in use in Zambia for running the Government's payroll system, and was the software platform being used by the Revenue Administration Agency for the Tax system.

In these cases, such a course of action is incorrect and, if adopted, highly wasteful. Such recommendations are often the result of a lack of understanding of systems-related issues by the staff carrying out the evaluation or are motivated by political rather than technical reasons.

It must be understood that the Government/MOF and related agencies spend a very significant amount of political capital to embark on a reform of the public expenditure management system after overcoming resistance from vested interests who are benefitting from the current situation. The process of diagnosing the problems that reform would deal with, and systems design are complex. After completion a consensus needs to be reached amongst all stakeholders before systems procurement and implementation can commence. The next stage, systems selection and procurement of the contractor and the technology platform, are by themselves a time-consuming task that often takes 1–2 years, if everything goes well. At the completion of each stage the Government and its donor partners review and sign off on the results. The first 9–12 months of the actual implementation stage are spent on configuring the application software and testing it to ensure a match with functional requirements. It is only after a pilot site implementation is complete and signed off that systems rollout can commence. This last process can take several iterations, where corrections are made to the systems configuration, before the pilot is declared successful.

Therefore, it is highly unlikely that the choice of the technology would be grossly inappropriate in terms of a complete mismatch between the sizing required and chosen, or in terms of the ability of the application software to replicate functional processes, at this stage of the implementation.

Technology choices are often not the primary problem. This is so since in most professionally-managed World Bank financed projects, technology choices are made by professional technical staff or consultants. Technology choices consist of scalable hardware and software technology platforms. The application software is normally chosen after a careful evaluation process where both scale size of the system required and its functionality are matched with available options by qualified consultants and government staff.

Faulty design can occur as a result of an incorrect or incomplete understanding of functional processes by the computer professionals configuring the application software and this can lead to problems. This can be resolved by involving staff from the functional areas in the design team who are familiar with the full scope and purpose of functional procedures that are being

automated. In any case, these types of errors can be corrected easily without changing the technology platform or embarking on a complete redesign. This even includes situations when a complete reconfiguration of the application software is required.

In cases where the system is already in the rollout stage, implementing a recommendation to start afresh with a new technology platform would therefore be highly wasteful in terms of time and resources. It could well mean losing several years of effort and several million dollars of investment and the results after implementing this recommendation would be unpredictable. In fact, technical failures of systems implementation initiatives are more often than not due to a combination of failures of relationships between participating institutions and technical reasons. Therefore, it is necessary to diagnose causes of systems failures objectively—whether they are technical or institutional and take appropriate remedial actions instead of blaming it on a failure of technology. This is important since merely carrying out a technical fix will, in these circumstances, not solve the problem unless accompanying institutional issues are also analyzed and corrected.

# XII. Concluding Remarks

In conclusion, it is important to realize that an IFMIS type system is not a panacea to all of Government's financial problems. These problems are often a result of the prevailing state of governance and the political economy which constrains corrective action even after the issues have been clearly identified.

Setting up PFM information systems is a necessary pre-requisite, even essential, for improving budget management, but is not sufficient. For significant outcomes to be achieved many other areas of governance need to be addressed in addition to PFM system issues.

Resolution of governance, political economy and institutional issues requires strong Government commitment and a will to reform. Technical inputs such as introduction of a state of the art IFMIS system only provides government with a set of tools to manage its financial resources. The outcomes will ultimately depend on whether and how well the tool is used.

In practice, it is found that these tools are often used quite effectively by agencies responsible for the day-to-day transaction processing and other routine financial operations of government simply because it is not possible to perform these functions without some degree of automation, in view of the large transition volumes involved and dispersed nature of the sites where these operations are carried out. At this level, the systems are in effect integrated with the day to day operations and these operations can be disrupted severely if there is a disruption in the systems operation. Therefore most governments quickly recognize that it is critical to keep the systems operational.

Such systems are often less effectively integrated in the performance of higher level strategic functions—budget policy formulation and other related functions—where decisions are not just based on cost effectiveness and efficiency, but are also determined by the political mandate of the government and the needs of the country. The information provided by the systems is just one of many inputs that finance managers require to formulate policy and make strategic resource allocation decisions. This, by itself, is not disruptive to system implementation. It just determines the limits on the scope of operation of the system.

However, it is disruptive when government agencies try to bypass normal systems operations to cater to special situations dictated by the political economy. These need to be identified and corrected immediately since they would otherwise limit the comprehensiveness of and disrupt the basic integrity of the systems databases. Issues such as these are more difficult to resolve than technical issues.

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# Annexes

## Annex – I

### Case Studies

In this Annex we will discuss the implementation of IFMIS systems in a number of countries with varying initial start off conditions. IFMIS implementation experience in these countries, amongst others, has been used to derive the overall lessons that have been presented in the previous pages. The cases have been selected to focus on specific areas of emphases as indicated.



### Case I: Implementation of Treasury/IFMIS Systems in Transition Economies

**Case Emphasis:** The World Bank has financed the implementation of Treasury systems in the mid 1990's in several countries that were part of the Former Soviet Union – the so called CIS (Commonwealth of Independent States) countries. In this section we will discuss the cases of Treasury Systems implementation in Kazakhstan, Ukraine and Russia, starting in early to mid-90s, as these countries moved from a centrally planned to a market economy. In all of three countries, Treasury systems supporting core treasury functionality are now operational. In some cases further work has been initiated to broaden the functionality to include other areas such as budget preparation, HR and Debt management.

#### *Pre-Reform Situation*

The pre-reform situation in each of these countries in the mid-1990s had broad similarities. The main features that characterized this situation were:

The fiscal situation was under stress**;** Government deficit exceeded its targets and a weekly/monthly system of cash rationing had to be instituted; there was an accumulation of expenditure arrears; there were periods in Ukraine in the 1990s when government workers in the health and education sectors did not receive a paycheck for several months.

*Several Bank and IMF missions carried out during this period diagnosed the cause of the problem to be the absence or weaknesses in the legal framework, institutional structures and accompanying systems required for management of Government finances.*

At independence from the former Soviet Union in 1991, these countries like other CIS countries, had inherited a weak budgetary system and ineffective budget execution processes. *The MOF lacked the capacity and information to develop the macroeconomic framework needed for formulation of the budget and making of revenue* and expenditure projections. The national budget was not prepared in a transparent format. Large lump-sums were allocated to the "State Apparatus" without any breakdown by ministries or administrative units. The budget classification in use did not allow *meaningful budget monitoring.* The system of functional budget classification was not in conformity with standard international classification systems such as the UN Classification of the Functions of Government (COFOG) and the IMF classification of Government Finance Statistics (GFS).

The Central Bank was responsible for cash execution of the budget through its network of branches. Spending units had Bank accounts outside the control of the MOF and the MOF transferred money to these accounts periodically. Sizable idle balances could build up in spending unit bank accounts while the MOF was in deficit in overall terms. The MOF had no information on balances in these accounts nor had any control or means to exercise control to ensure that expenditures are in accordance with budget appropriations.

Monthly budget execution reports were prepared by the MOF from reports received from the Central Bank. Reports on expenditures, classified by institutions and economic composition, were not available until quarterly reports were received from the budget organizations through their controlling ministries. These were received and collated with substantial lags.

The MOF had no means of ascertaining actual government expenditure vis-à-vis the budget allocations in a timely manner and could not effectively monitor compliance with strategic priorities or initiate in-year remedial measures. There was a lack of reliable, comprehensive and timely accounting information and administrative capacity to adjust the budget in response to changing circumstances or base line data for budget preparation. **There was a clear indication of the critical need for more effective budget execution and expenditure management systems capable of exerting fiscal control.**

Accordingly, the IMF and the Bank worked with these governments to help them formulate policies and assist in setting up the legal framework and institutional structures required for financial management.

**Project Design:** Since the problems encountered in each of these countries were broadly similar, the solution suggested to address these issues in each of these countries also had similarities. Basically, the reform projects in each of these countries had two elements:

- First, it was necessary to, formulate p**olicies and set up institutional structures required for management of government finances *ab initio*** to enable the MOF to regain control over the financial resources and ensure that expenditures are in accordance with budget appropriations.
- Second, it was necessary to s**et up automated systems that ensure that these policies are implemented without exception.**

Key policy actions that were pursued during the projects are detailed below:

- The development of a comprehensive Budget Management Law which provides a framework for the proper management of public moneys and property with specific emphasis on: (a) the establishment of the Treasury and its functions (b) budget preparation and budget execution procedures and responsibilities for the receipt and custody of public moneys (including the banking arrangements); (b) public expenditure management (including control processes and the linkages with appropriations); (c) the accounting system; (d) the role and responsibilities of officials; (e) control and management of public property; (f) borrowing and investment (specifically the management of the public debt); and (g) reporting and audit.
- The adoption of a GFS consistent budget classification system and design of a treasury chart of accounts embodying this budget classification for implementation.
- Creation of a Treasury Ledger System (TLS) based on a new chart of accounts (COA). This ledger system, which is also called a Treasury General Ledger (TGL), and is kept by the Central Treasury, included ledgers for financial accounting as well as for monitoring of budget implementation. The new COA reflected the new budget classification of revenues and expenditures. The TGL also had provisions for recording data on original budgets, revisions

as approved by the Budget department, warrants issued by the Treasury and sub-warrants by line ministries at regional level.

The program of setting up the Treasury Department included centralization of all Government payments through the Treasury and consolidation of bank accounts to a single account at the Central Bank—the Treasury Single Account (TSA). All receipt processes would be re-engineered to ensure revenues are directly deposited in the Government account. A network of Treasury offices would be established at the regional (oblast level) and district (rayon level) which would take over budget execution and primary accounting responsibilities from the Central Bank. Fiscal monitoring and control functions would be centralized in the MOF. All SU bank accounts would be closed. The regional offices were made responsible for *ex-ante* control of all payment orders raised by SUs against their sub-warrants, and for calculating the division of designated tax revenues between the central government and the local governments, and for advising the Central Bank regional branches of the allocation of revenues.

The second element of the project design envisaged the design and implementation of a modern, automated and integrated Treasury System for government financial management to support the re-engineered Treasury processes and procedures**.**

The system would encompass the functional requirements for the budget implementation and accounting processes and would cover the appropriation, commitment, funds allocation, and payment processes for both the investment and current budgets. The Core functional processes and information flows associated with the system have been discussed earlier in Chapter III and IV. These two elements of the reform program taken together would ensure:

- **Better fiscal control**
  - By ensuring that expenditures are in accordance with budget appropriations, commitments and cash allocations
  - Close monitoring of outstanding bills, cash in Government bank accounts, arrears and fiscal deficits
- **Better cash management**
  - By bringing all government accounts under the control of Treasury and consolidation in a **Treasury Single Account (TSA)**
  - By reducing **idle balances** in Government Accounts and improved planning for cash
  - Timely and accurate reporting for Economic management and for Preparation of statutory financial statements
  - Improved quality of baseline data for budget preparation

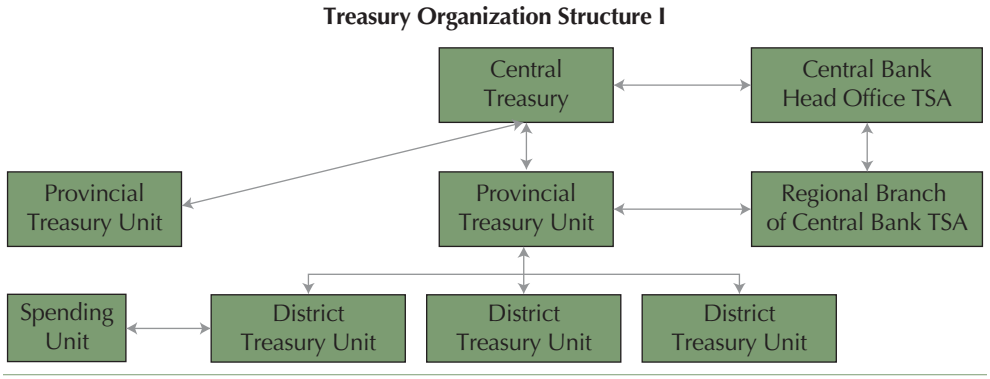
The organizational structure for the Treasury as implemented in these three countries is shown below in Figure 27.

### *Project Development Objectives (PDOs)*

The overall objectives of these projects were broadly to:

- Support on going Government efforts to establish a Treasury Department and implement associated systems and procedures.
- Assist the Government to design and implement a fully functional, automated treasury system that (i) provides comprehensive reliable and timely financial management information; and (ii) helps manage government expenditure effectively and serve as an effective instrument for budget execution and cash management.

**Figure 27: Treasury Organization Structure – Russia, Kazakhstan and Ukraine**




- Provide a transparent system of accounting that shows the utilization of the financial resources of the Government and enables management and audit of these resources

### *PDO Indicators*

The achievement of these was to be measured by:

- The degree to which the payment processes have been centralized;
- Timely presentation of fiscal accounts for external audit
- Training of adequate numbers of financial and technical staff to operate new system
- **The establishment of a Treasury Single Account** established at the Central Bank; and closure of SU bank accounts at commercial banks.
- The degree to which the new management processes and expenditure controls for budget execution were in place and functioning.
- **Adoption of Revised budget classification system** and budget prepared according to new classification.
- **Establishment of the Treasury ledger systems** with required functionality rolled out to all oblasts and associated rayons.
- Timely and reliable budget reports produced for MOF / Treasury / Budget Agencies by end of project.

### *Project Implementation Strategy*

In each of these countries, it was necessary to pursue a two pronged implementation strategy. Since the implementation of a new Treasury system across the whole country would be a major undertaking—possibly taking 8–10 years—there was the need to set up interim systems that could yield immediate results.

Work on the implementation of the key policies related to setting up the Treasury started in these countries in 1993–94. As the ideas related to the basic policies and institutional structures of the Treasury took hold, the respective Governments established a Treasury department and a network of Treasury offices in each of the provinces (oblast) and district (rayon) offices. A TSA was set up at the Central Bank and SU bank accounts were closed. Gradually, all expenditure and receipt transactions started being routed through the Treasury offices and the coverage of the Treasury extended to almost 100 percent. The so called "power ministries" resisted bringing their budget execution processes and bank accounts under control of the

Treasury, but this was overcome due to Government commitment regarding the implementation of these policies.

Systems implementation in all of these countries started with setting up basic Fox-Pro based systems with limited functionality at rayon/oblast offices to process expenditure and receipt transactions. Often the different oblasts and rayons used different systems and some continued to work manually. The quality of these systems improved over time in terms of the application software development tools used and the uniformity of the systems across the landscape, but the functionality remained limited to core processes (checking for the budget and payment processing).

The country specific features of the World Bank interventions in each of these countries are described below.

### *Kazakhstan*

Preparation of the Bank Treasury modernization project started in 1994. The Bank loan of US$15.8 million was approved in July 1996. In the first phase the Bank-financed the setting up of an interim system, through funds from an existing project based on a locally available software package—CORVUS). This improved the quality and uniformity of the basic Fox-Pro based systems that were operational at the rayons and oblasts at that time but had limited functionality as mentioned above.

Work started simultaneously on the development of the design and procurement of a full function treasury system. The functional design of the system and development of the specifications of the new system was done by an international firm—Barents, selected after a competitive process, and financed through the Bank loan. This was followed by the procurement of the application software and technology platform through a two stage ICB. A consortium headed by Hewlett-Packard and partnered with Oracle won the contract; Oracle Financials was selected as the application software. After parameterization and pilot testing (in one oblast and all associated rayons) the system was gradually rolled out to all rayons and oblasts. The system was originally designed as a partially distributed system with servers located in each of the oblasts which were to serve all rayons under its jurisdiction. This was done in view of the state of the telecommunications network available at that time (1998–99). The Government insisted on moving to a centralized architecture, with the main servers being located at the Treasury Headquarters in the capital (Astana), and connecting all remote offices via a satellite based telecommunications network. This was done. However, due to response time problems from remote sites caused by the latency delays encountered in a satellite-based connection, this was later replaced by land lines—mainly fiber optic based connections. This replacement took place after the closure of the bank project in 2002.

The coverage of the system and the number of users increased from about one thousand to start with in the early 2000s to several thousand now. The main servers have also been upgraded as required. The latter investments have been financed by the government from budget resources.

The Kazakhstan project represents the first case of the use of the Oracle Financials application software package as the basis for systems implementation. At this time Oracle Financials had not developed a software version specifically designed to meet government budget execution needs, and work-arounds had to be implemented in the basic package to meet these requirements. The Kazakhstan Treasury project served as the test case for implementing off-the-shelf software for Treasury systems. Oracle used the experience gained here and documented in a Bank document—the Treasury Reference Model—to develop a government version of the software that is now widely used.

The success of the Kazakhstan Treasury Modernization project can be measured by the fact that the policies procedures and system developed in this project introduced major changes in the way budget management is handled in the country, and enables the Government to achieve control of the budget process and the government's financial resources. The Treasury system developed in this project continues to be the core Government application that supports budget execution processes. Work on enhancement of the coverage of system and implementation of a full function IFMIS has continued since then, and is now well advanced.

The key success factors for this project were:

1. The project design focused on a specific key government requirement which was diagnosed as being critical by the IMF and the Bank at that time and tried to provide a solution to that problem. It did not attempt to solve many problems within the scope of a single project, for example,. those related to tax administration, /customs administration, human resources management, Debt management, auditing, etc. This enabled the Government and Bank team to focus attention to all issues related to the specific problem instead of dissipating efforts and scarce resources across multiple others.
2. The project focused on Treasury reform and the underpinning legal and institutional framework and the systems that were required to put this in place. It was not viewed as an IT project either by the Bank or the Government. The project manager from the Government's side was a key Treasury official from the functional side.
3. The Government showed tremendous commitment to overcome the political economy and other challenges including those in the implementation of the system and stayed the course for the Bank and the IMF worked closely together. An IMF advisor was stationed in Kazakhstan throughout the duration of the project, and continued to provide policy guidance and ensure that the project did not stray from the core issues that it was designed to address. The Bank's key technical staff also stayed on the project throughout its duration.

Among **the key vulnerabilities** for the project, one could list the lack of adequate capacity during the implementation stage within the MOF to manage and maintain the new Treasury system. At project end, the government outsourced much of the systems implementation aspects to an outside firm.

### *Ukraine*

Work on the Ukraine Treasury reform started almost in tandem with that in Kazakhstan and again in response to the Bank and IMF diagnoses of what needed to be done to enable Government to regain control over its finances.

The first intervention in Ukraine was attempted under a broader Institutional Development Project, which attempted to address several institutional issues within the Ukraine Public Sector. However, the Treasury component of the Integrated Budget Law (IBL) could not achieve much traction. A foreign consulting firm hired to do the design work on policies could not get the Government's attention. Work on Treasury reform continued outside of the ambit of the project component and it took several years before ideas like the requirement for a Treasury, a TSA and related systems could take hold in Ukraine.

The Bank attempted a second intervention a few years later that was more focused on Treasury problems and the new Treasury Development Project (TDP) was approved by the board in 1998. Which provide for US$16.8 million for setting up the policies, procedures and systems for the Treasury. The new project focused on the implementation of polices and institutional structures required for the Treasury and much of the Bank-Fund dialogue over the initial years

focused on the policy aspects. In view of the failed attempt under the IBL, and also in accordance with advice from other donor partners working in the country—USAID and ADETEF—the Bank project had more modest objectives in Ukraine as regards the type of technical solution to be implemented. It was decided that it would be best to first set a up a robust interim system that could serve Ukraine for the medium term and which encompassed the core functionality of the Treasury. This could be the take-off point for a full function system which could be procured later.

In contrast to Kazakhstan, the political economy in Ukraine was such that vested interests in the country could launch a serious challenge to the Treasury reforms and the project. For example, the banking sector lobbied Parliament to convince them that the concept of the TSA would be disastrous for the sector that relied mainly on government funds for liquidity. Once these problems were overcome and the project proceeded to implement policies to ensure good fiscal control, and the TSA was actually implemented, it had a very significant positive impact on the fiscal deficit and the government's ability to manage its finances.

In Ukraine there was a good pool of technical staff that could be used for systems development, although their skills needed upgrading. The various government agencies insisted that these staff could develop any systems required and that a Western off-the-shelf package was not necessary. Nevertheless, the Bank continued its efforts in assisting the government in setting up the Treasury as an institution and gradually improving its systems. Eventually, a custom-developed system, which was partly based on a locally developed package, was completed and deployed. This system was rolled out to all Treasury offices by 2002, and continues to this day to be the basic system used by the treasury for budget execution. On closure of the TDP, the Bank started to design a more comprehensive Public Finance Modernization Project (PFMP) to address multiple problems in the sector. This project was finally approved by the Bank's Board in 2006. However, due to various issues mainly related to the political economy in the country, progress has been slow.

The Ukraine experience once again underlines the need for focused intervention and limiting the project scope to achieve key policy reforms in a difficult environment. Compromises cannot be made on the core policies, but for subsidiary issues like the quality of the system—whether commercial-off-the-shelf (COTS) or custom-developed. The other Kazakhstan lessons also apply here.

### *Russia*

Work on the Russia Treasury project started in late 1998. The IMF had worked in the 1990s to assist in setting up the legal framework and institutional structures. However, at start of project preparation, the coverage of the Treasury and the TSA was minimal and Treasury systems were a patchwork of very basic Fox-Pro based systems with inadequate functionality and coverage. The Budget framework, including the Budget Classification Structure, also required additional work. The legal framework and institutional structures required to enable the MOF to regain control over the financial resources and ensure that expenditures are in accordance with budget appropriations needed improvement as well as increased application and coverage.

As in Ukraine and Kazakhstan, there was need for a two-pronged strategy, because the implementation of a new Treasury system across the whole country would be a major undertaking lasting 8–10 years.

The first stage of this strategy would require that Government continue with implementation of policy initiatives, the TSA, Budget reform with IMF and Bank advice, and continue with the implementation of an Interim Treasury system with improved functionality and capacity. This

meant improving the existing custom-developed system and additional hardware. The Government would continue to finance this.

As part of project preparation activities the Bank financed an institutional review of the Treasury through a Policy and Human Resources Development (PHRD) Grant in 2001–2002, which highlighted the institutional weaknesses and improvement required.

The second stage of the strategy included: The design of a full function Treasury System and associated procedures (2002–2003); Procurement and development of application software and implementation services (2004–2005); Parameterization testing of the application software (2006–2007); and procurement of the hardware in line with implementation requirements (2008–2012).

The new systems were then implemented at 3 pilot oblasts and associated rayons during 2009 and then replicated systems across all sites—in 5 waves with 10–15 regions in each wave—over the period 2010–11. To implement the system country wide, Government financed a major upgrade of the telecommunications network over the period 2005–2010. It also financed a massive upgrade of all Treasury offices across the countries and implementation of required infrastructure as embedded in engineering support systems.

### *Systems Functionality*

The Treasury systems set up by the project in Russia support Budget Management, including, Budget Apportionment; Budget Allotment; Budget Releases; Budget Transfers; Commitment Management—recording all commitments relating to intended government expenditures; Payment Management—processing all government expenditures relating to procurement of goods and services from current/capital budgets; Salary and Pension Payments; Debt servicing payments; Subsidies/Fiscal transfers to sub-national levels or SOEs; Receipts Management—recording revenues and other receipts; Accounting (posting all transactions as they occur); Cash Management; and Fiscal Reporting. The core functional processes and information flows are shown in the Figure 28.

**Systems Architecture**: The interim systems that had been set up were configured to rayon-based distributed architecture due to a bad telecommunication network. The final systems set up under the project were based on an oblast-centric architecture, with a central system which consolidates information across the country.

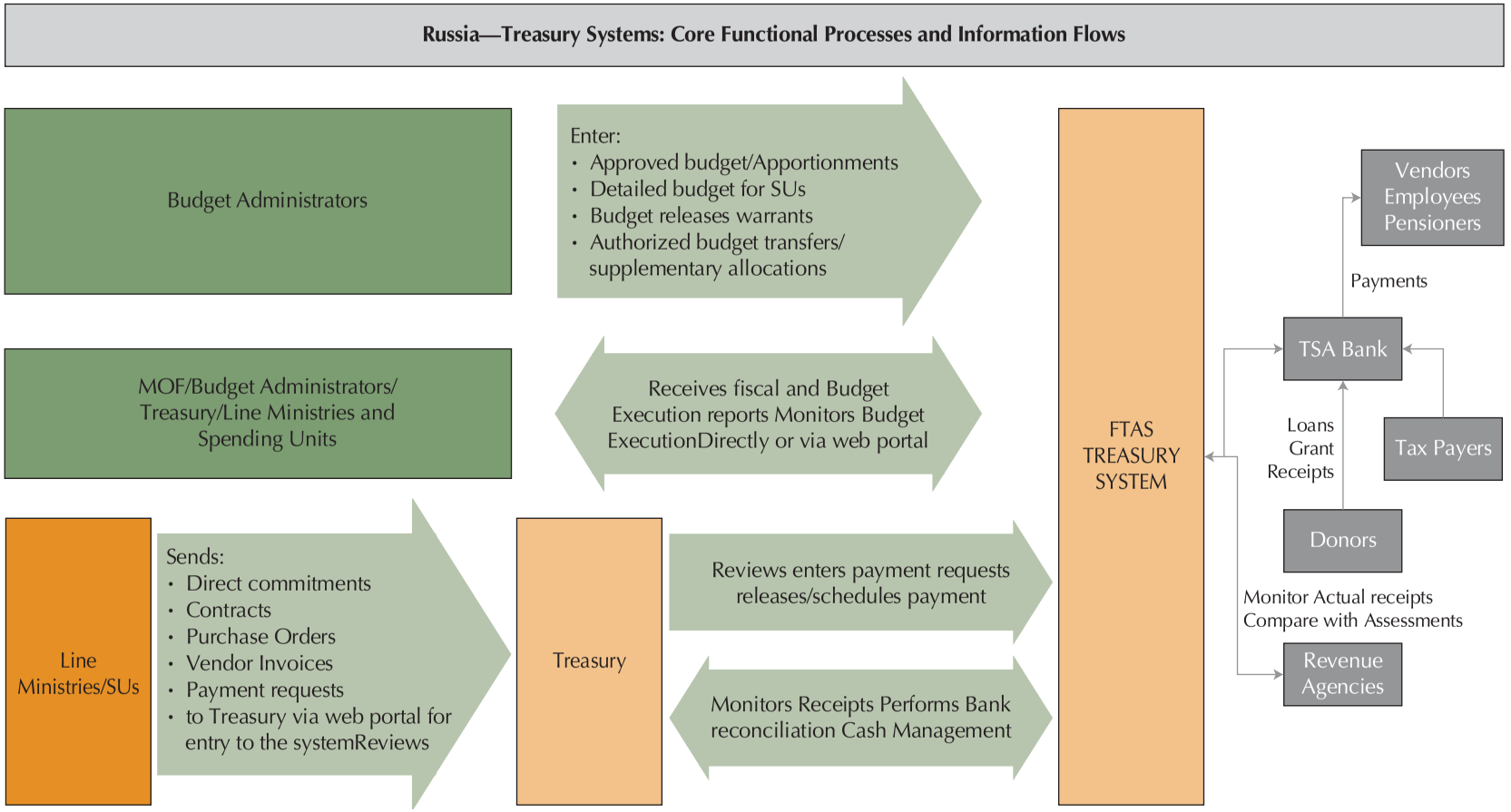
**Application Software**: The interim systems were custom-developed. The FTAS is based on a COTS package – Oracle Financials acquired through an ICB.

**Spending Unit (SU) connections**: Initially, SUs brought hard copies of documents to Treasury. They gradually moved to electronic transfer of documents. Now a web portal is used for transfer of information between SUs and Treasury.

**Technology Requirements**: The project required significant investments in technology in the following areas:

- **Application Software** to support functional processes: **Hardware** – Servers located at various processing centers, Work stations, peripheral hardware; **Middle ware** – Operating systems, RDBMS, application development tools, and system management tools.
- **Telecommunications Infrastructure**: WAN-Links between various Treasury offices via telecommunications network—public switched network, leased lines, dial up lines; LANs—connections between work stations at a particular site, and Network management systems,

## Figure 28: Russia Treasury Systems – Functional Processes and Information Flows



- **Back up/Disaster Recovery arrangements**: Business Continuity Strategy, Power back up systems, and information security systems.

### *Infrastructure*

The project required very significant upgrades in infrastructure. The Government **modernized the telecommunications network** with investments in excess of US $100 million to ensure that high bandwidth connections were available from each local Treasury office to its parent Regional office and then on to the Main Treasury department in Moscow. 2,500 regional and local Treasury offices.

**Appropriate and adequate security protocols and backup power arrangements** have been implemented. These include network access and physical access mechanisms to secure areas in Treasury offices.

**Electronic signature facilities**: Public key infrastructure (PKI) has been implemented.

**Scale Size**: The number of active users on the system ranges from 25,000 to 30,000. Active users in similar systems in countries with similar populations such as Indonesia, Pakistan, Vietnam, etc. are 5,000–8,000 with costs in the range of $30–$50 million.

The size of the country required that the system be implemented across 83 provinces spread across 9 time zones. The total number of transactions processed through the system is 30–40 million a month. about 30,000 Treasury staff were trained in the use of the system. The total number of offices where the system is implemented is approximately 2,500 spread across the country. About 300,000 federal government spending units are serviced by the system. In addition, regional and local governments also use the system to process approved payment requests as part of measures to ensure that these payments are made through similar TSAs established for their respective areas.

### *Costs*

The main cost elements of the project are listed below. Financing came from the Government of Russia and the World Bank.

### *Bank Financing*

**Policy and Design Consultancies** cost about $10 million. This includes legal and policy framework (Budget law, budget management, institutional arrangements, COA, accounting policies); Functional design (functional processes, information flows, documents, procedures); Technical Design and Architecture (software, hardware and Communications Specifications).

**Application software, hardware, and implementation services –** about $200 million, to cover Servers, Networking (LAN and WAN), Information security, Application software and tools (+ DBMS, application development tools), etc., and Implementation services (parameterization/ customization, implementation).

**Training –** about $14 million, including End-User training in the day to day use of systems and trouble-shooting, Technical training for technical staff in the use and maintenance of specific tools used, and Management level training in the use of the systems.

**Implementation support and operating expenses and fees**: about $7 million.

### *Government Financing*

Additionally, Government made very significant investments in:

- Development and implementation costs for Interim Systems including hardware, software, and their upkeep over 8 years until such time that the new system was ready.
- Upgrading/setting up WAN telecommunication networks – over $100 million.
- Upgrading physical facilities at Regional and Rayon Treasury offices – over $100 million.
- Work stations and peripherals etc. for all offices and some servers for system replication – over $100 million.

### *Procurement Strategy for Hardware and Software*

The functional and technical design of the system was developed first and used as a basis to procure the technology platform, including, Application Software and implementation services were procured first through a 2 stage ICB—Oracle Financials selected as the application software. The sizing and specifications for the hardware were developed on the basis of requirements given by the software supplier to operate the application software and prepared in generic terms. H/W was procured in several tranches through ICBs in line with implementation requirements.

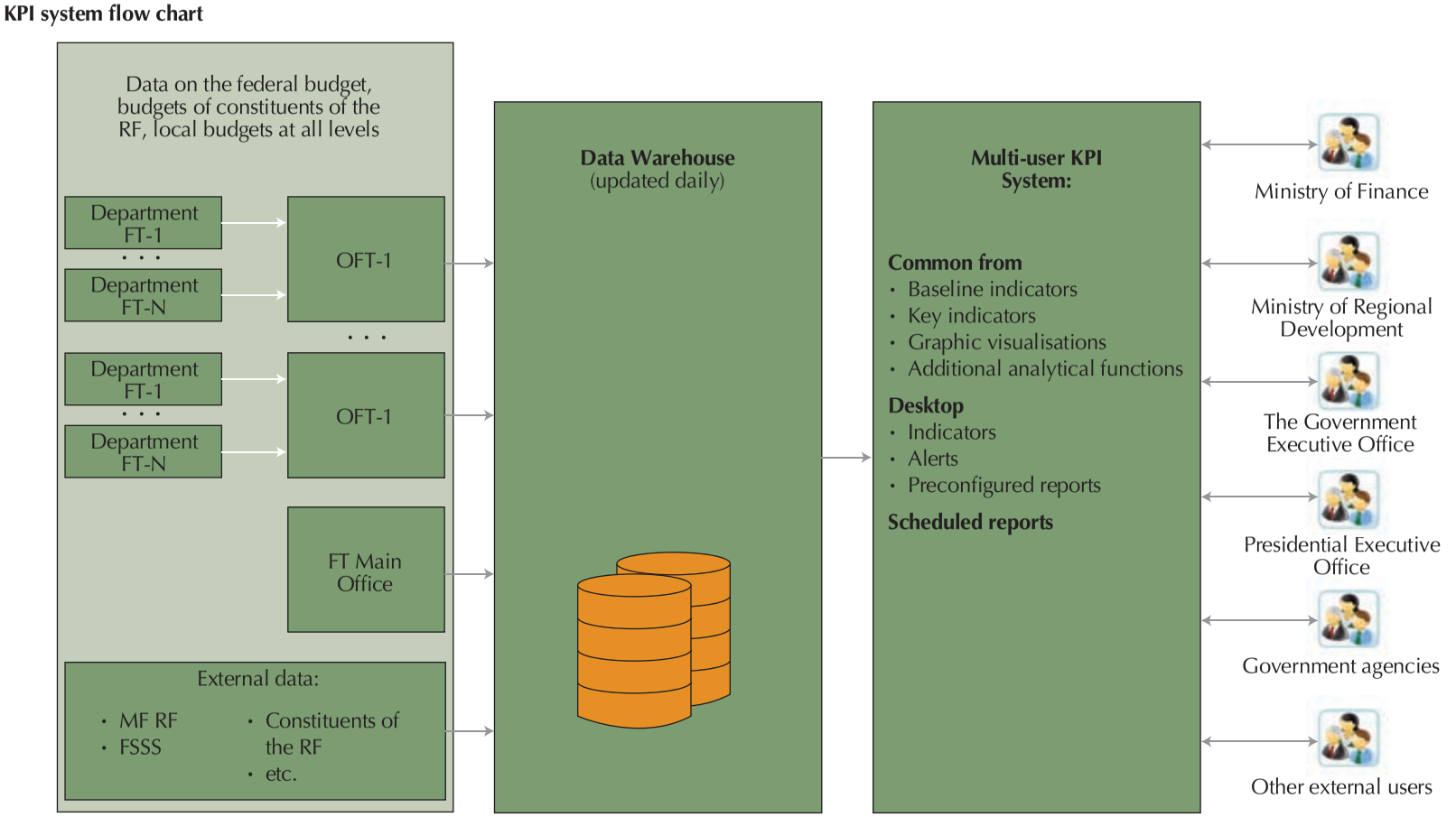
### *Critical Success Factors:*

1. **Government Commitment and Support of the MOF.** The most important lesson that can be learned from this project is that it has required the consistent and complete support of the Government of Russia and the MOF/Treasury at the highest levels over the duration of the project (10 years). This was possible because the project was framed as a public expenditure management (PEM) systems reform initiatives rather than just accounting systems reform.
2. It is necessary to maintain **continuity of critical staff with appropriate skills in the Bank team** to assist in project supervision and by provision of good, high-level technical advice based on experience in similar projects in many other countries.
3. Changes to the legal framework and operational procedures should be introduced at fixed times (say start of a new FY) and not arbitrarily throughout the year.
4. Customization of the Application Software should be restricted to essential and unavoidable items. Additions of custom scripts/code on top of application software to cater to minor idiosyncrasies of the existing system is time consuming, costly and troublesome when porting to a new version.
5. To begin, set up the transaction processing layer of the systems. This is the most difficult and time-consuming stage. It is necessary to have this layer in place in order to access useful and credible information for financial operations and management reporting. Other layers would be built on top of this layer. In Russia, the Government has now developed a reporting and monitoring system that provides information on Key Performance Indicators (KPIs) to enable the MOF and all budget participants to monitor and control the budget execution process.

### *Summary of Implementation Considerations*

1. **First implement** modules to cater to **Core Budget Execution Processes, payments and receipts transactions** across government before going on to other non-core elements, such as fixed assets management, and human resources management.
2. **First implement Treasury Centric System then De-Centralize to spending Units.** An attempt should be made to first capture payment / receipt transactions at Treasury offices then decentralize to Spending units—if necessary/possible.

**Figure 29: Russia System to Monitor Key Budget Indicators**



3. To start with, budget preparation can be done outside the system or by another system, and the final approved budget can then be loaded in the system and used to control expenditure—However, all subsequent in year budget transactions, like budget releases, transfers etc. should then be done in the Treasury system.
4. Systems should be designed along functional and not organizational lines.
5. Define the **contours of the system** clearly to avoid duplicative investments.
6. Budget Administrators/Vote Controllers, Treasury, and Line Ministries **should use the same system to process their transactions and should share databases**.
7. **Budget Preparation and Budget Execution should use the same Chart of Accounts**.
8. Transactions should be captured in **real time** as they occur.
9. Financial controls should be applied in ex-ante mode to all transactions processed by the system. (e.g. funds availability checking on budgeted expenditures prior to committing funds or making payment).
10. *Ex-post* transaction posting should be avoided.
11. No expenditure transaction should be processed outside the system. Data captured only once as an accounting transaction progresses through the system. This includes Budget Funds-Payroll, Debt, Subsidies, Fiscal transfers, EBFs, Donor Funds, Technical revenues.
12. The FMIS database should be treated as the primary source for financial reporting within Government—no second set of books.
13. Project Management arrangements: Project Manager – senior official from functional side with stature within bureaucracy, adequate financial and administrative powers. This has been the case in many successful projects; Core Team – Group of trained professionals from core functions, who can act as change agents; Representatives of major stake holders need to be represented on the team to manage the interface with their agencies. Project Secretariat – should have specialist staff with experience in the installation of large scale IT systems and IT procurement; Familiarity with IT projects and good contract management expertise has been an advantage.

## Case II – Pakistan – PIFRA – Project for the Improvement of Financial Reporting and Auditing

**Case Emphasis:** This case illustrates the experience of setting up an IFMIS systems in a country with several distinguishing characteristics:

- The legal and institutional structures required for management of Government finances such as a Treasury and Accountant General (AG) organization, Treasury-based transaction processing, and TSA arrangements (consolidated fund accounts) do exist but are in need of repair. Over time mechanisms to by-pass these institutions, such as personal ledger and assignment accounts in the name of spending units officials have been set up, ostensibly with purpose of expediting transaction processing. This has eroded control mechanisms. The reform project needs to repair existing financial management arrangements and systems—plugging the leaks.
- The Pakistan case is typical of some other South Asian countries, where the expenditure and receipts processing has been departmentalized for parts of the government (such as the Defense establishment) by placing AG staff directly in these departments. These staff do not use the central transaction processing system for their day-to-day work but periodically loads summaries of transactions processed by them into the central system which then produces consolidated accounts.
- This example also illustrates a system implementation exercise in which the scope of the system spans the functions of the MOF (Budget Department) and the Treasury and includes, budget compilation, budget preparation and modules for payroll, pension calculations, and

interfaces to the auditing organization. This is largely due to the fact that in several South Asian countries including Pakistan, the functions of the Accountant General include central payroll and benefits processing, unlike the functions of the Treasury in other countries where these functions are handled by the spending line ministries or a central establishment division.

- Another aspect of interest is that the system implementation extends beyond the central budget and separate but identical systems modules have been implemented for the provincial and district budgets also. This again reflects the fact that in several South Asian countries a single cadre of accounting and auditing staff is responsible for carrying out these functions for all levels of government.

### *Background*

The process of improving fiscal and financial reporting in Pakistan was initiated in the early 1990's after observations by both the World Bank and the IMF, and a diagnostic study undertaken by the Auditor General of Pakistan (AGP), that the (then manual) accounting and reporting system did not meet adequate standards for either financial or fiscal reporting. Notably, both accounting and auditing were directed by the Auditor General of Pakistan (an anomaly from pre-1947), budget reports by the Ministry of Finance (MOF) were not fully reconciled with accounting reports by the AGPR and provincial AGs, the Chart of Accounts (COA) was not compliant with IMF Government Finance Statistics (GFS) standards for fiscal reporting, and neither financial nor fiscal reports were timely or reliable. To meet these challenges, the Pakistan Audit Department (PAD) launched the PIFRA Program in 1995 with World Bank support. Under this program two projects have been executed, PIFRA I and PIFRA II. PIFRA I was completed in 2005, and PIFRA II, launched in 2005, is currently ongoing and scheduled to close on December 31, 2014.

### *Objectives*

The PIFRA program aims at: (a) Modernizing the institutional framework for budgeting and accounting, strengthening financial management practices, tightening internal controls to minimize occurrence of errors and irregularities in processing of payments and receipts; (b) Introducing modern, automated systems to support budgeting and accounting processes; (c) Establishing a capacity to generate complete, reliable and timely financial information to fulfill statutory reporting requirements and facilitate informed government decision-making; and (d) Modernizing government audit systems and procedures and adopting internationally accepted auditing standards.

### *Policy Reforms*

The main policy reforms introduced under the project include:

- Separation of the Auditing and Accounting Functions and creation of a position of the Controller General of Accounts (CGA).
- Introducing:
  - A New Accounting Model based on Modified Cash basis
  - Redesign of functional processes and accounting procedures.
  - Introduction of a New Chart of Accounts (COA) and GFS conformant budget classification structures.
  - Introduction of a unified system of budgeting and accounting across all levels of Government—National, Provincial, District and Sub-district

### *Design*

As part of the project, a major mission critical country-wide integrated system, the Financial Accountability and Budget System (FABS) is being implemented to spearhead the reforms and assist the Government in the functional processes associated with Financial Accounting and Budgeting at the Federal, Provincial and District levels.

FABS – Functionality includes:

- Budget Preparation: Assists in compilation of budgets, prints the budget book and associated reports, maintains a record of initial budgets, revisions, and budget releases.
- Budget Execution:
  - Records commitments, receipts of goods and services
  - Ensures expenditures are in accordance with budget appropriations, commitments and budget releases
  - Authorizes payment after checking for controls; gives payment instructions to bank
  - Records revenues and other receipts, enables better control over fiscal deficits and arrears
- Accounting and Fiscal reporting:
  - Enables accurate and timely posting of all transactions
  - Comprehensive reporting
- Calculates Payroll for Civil servants
- Maintains General Provident Fund Accounts for Civil servants
- Calculates Pension payments and maintains pension accounts for government retirees.

FABS has been implemented using an internationally well-known off-the-shelf application software package, SAP, that was acquired after international competitive bidding. FABS includes Modules for:

- Budget preparation
- General ledger
- Accounts payable
- Accounts receivable
- Payroll
- Pensions
- General Provident fund
- Cash Flow Forecasting

The Functional requirements of the system were developed by an international consulting firm. Total direct costs related to systems implementation have been about US$40 million, comparable with costs for similar projects in other countries.

The main system users are:

- Budgeting organizations across all levels of Government including the Federal MOF; Provincial Finance Departments ; District Finance Departments
- Accounting organizations across all levels of Government including the Office of the CGA; AGPR and Sub Offices; Provincial AGs; District Accounts Offices – DAO (105); Sub-district and Tehsil offices; Government of Azad Jammu and Kashmir (AJK)
- Line Ministries and Provincial Line Departments

The system has been implemented in a **partially distributed architecture** and interfaces with the Planning Commission, the Central Board of Revenue, the State Bank, the National Bank, and the Debt Management Office. Five separate systems have been implemented as follows: (a) Federal Government Budgeting and Accounting transactions are carried out on a central server located in Islamabad. (b) Provincial Government Budgeting and Accounting transactions are carried out on servers located in each of the provincial capitals, Lahore-Punjab, Karachi-Sindh, Peshawar-NWFP and Quetta-Baluchistan. (c) District government budgeting and accounting transactions are carried out on the respective provincial servers. The systems architecture and the institutional interfaces with the systems are shown in Figure 30.

### *Implementation Status*

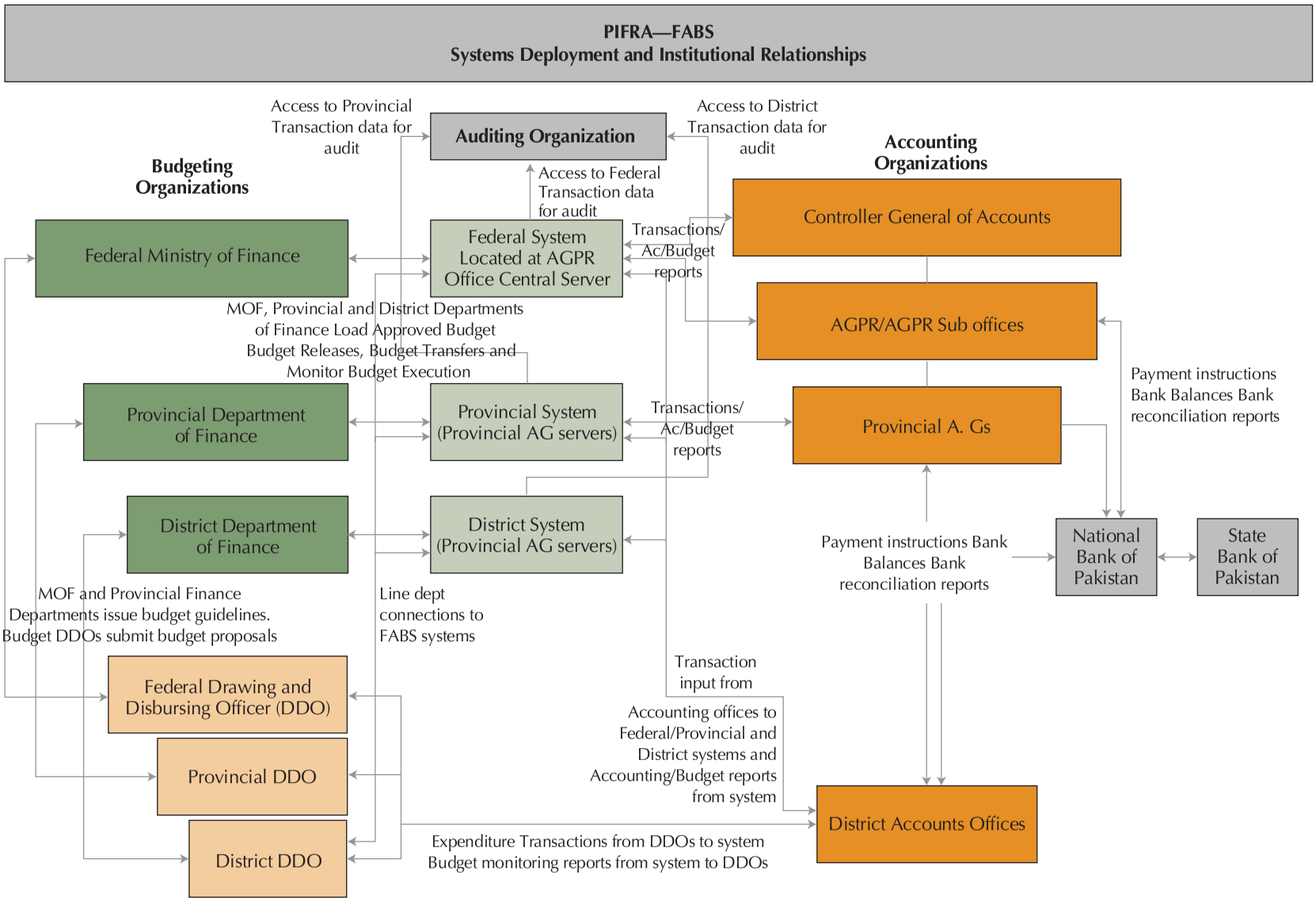
The project is managed by a PIFRA Directorate in the office of the Auditor General. Policy guidance is provided by a Steering Committee with representatives from all principal stakeholders including the MOF, the provincial Finance Departments, and the Controller General of Accounts. FABS is now used by the Federal, Provincial and District governments to: (i) prepare and compile the Annual Budget Estimates and fulfill associated reporting requirements; (ii) exercise ex-ante budgetary control on and enable processing of all government expenditure and receipts transactions; (iii) implement commitment controls on contract amounts exceeding PKR 0.5 million; (iv) make payments (currently by check) against Bank accounts where Government funds are held; (v) prepare the payroll for some 1.9 million Government employees across all levels of Government; (vi) make pension calculations for all Government pensioners; (vii) maintain the GPF accounting for all Government employees; (viii) preparation of periodic budget execution and fiscal reports for all stake holders including the MOF/Provincial Finance Departments/Line ministries and departments.

A large number of government staff, approximately 35,000 state functionaries (including executives, financial managers, and accounting and auditing professionals), working on assignments related with accounting, auditing and finance at all tiers of the government (federal, provincial, district and tehsil) have been trained to perform their day-to-day operations using the new systems. Training interventions, coupled with change management initiatives, have been used to facilitate acceptance of new policies, business processes, procedures and systems at all levels of management. With the implementation of the FABS-based GFMIS, a repository of all Government expenditure and receipt transactions is now available to the Government's audit organization to perform their audit functions. The audit organization has deployed a number of automated tools to perform their work which includes ACL and other software. The application of computer aided audit techniques (CAATs) and modern performance and systems-based audit has made the national external audit system both timely and more effective.

### *Impact*

PIFRA I and II have introduced major changes to government budgeting, accounting, and financial reporting, as well as auditing. The PIFRA program has effectively addressed all of the key issues identified in the diagnostic study and the World Bank /IMF reviews. The first project accomplished the policy goals of: (a) Modernizing the institutional framework for budgeting and accounting processes and separating accounts and audit (and placing the former as an attached department of the MOF); (b) Designing a New Accounting Model ( NAM) and introducing a Budget classification structure and COA that was compliant with international accounting and GFS standards; and (c) Designing and implementing an automated information system to support budgeting and accounting;

## Figure 30: PIFRA FABS Systems Deployment, Information Flows, and Institutional Relationships



PIFRA II, has built on this base and introduced modern accounting, reporting, and audit methodologies that cover core government. As a result, financial reporting of accounts has become timely and reliable. Audit reports and financial statement certifications that hitherto were completed and submitted to the legislature in 18–21 months are now completed and submitted within 8 months of the end of a fiscal year. Transparency has improved due to strengthening of internal controls and access of stakeholders to the financial information. Accounting and Payment processes have now been fully automated and the objectives of accuracy, completeness, reliability, and timeliness of accounts have been substantially achieved. Specifically, PIFRA has enabled: (a) preparation of IPSAS-compliant cash basis financial statements for audit within 2 months of year-end; and audit reports to the President (or provincial assemblies), based on international standards, are now presented to the President and Governors for onward submission to the respective legislatures within eight months of year-end; (b) Establishment of system-generated monthly and quarterly fiscal reports for macro-economic review and analysis by the MOF and international community; (c) The timeliness of audit reports has increased effectiveness of parliamentary oversight.

### *Lessons Learned*

1. Commitment and support of the MOF is Critical. Such Projects should be framed as public expenditure management (PEM) systems reform initiatives rather than just accounting systems reform. Senior level policy makers in MOF and donor organizations relate to this better. Linkages can then be established between project and requirements under policy based lending.
2. The Project manager should be a senior official from the functional side, with stature within the bureaucracy, and with adequate financial and administrative powers.
3. A core team of officials from the core functions should be involved in design, who can subsequently act as change agents.
4. Institutional and political economy issues are more difficult to resolve and take more time for resolution than technical issues.
5. Reform of underlying fiscal management processes should be the basis for systems design.

### *Main Problems faced*

They relate to: (a) Political economy Issues – Resistance from Provincial Governments over Federal control of the payment function for Provincial expenditures; (b) Dearth of project management capacity and technical capacity within government for Implementing modern computer based automated systems; (c) Resistance to separation of Audit and Accounts – feeling of loss of career prospects for PAAS cadre officers and (d) Lack of career prospects for technical IT staff within Government.

### *Continuing Vulnerabilities*

These include: (a) Continuing lack of a career path for Technical IT staff; (b) Non-inclusion of detailed transactions for Defense expenditures in FABS; (c) Continued use of assignment accounts; (d) Resistance in the MOF to routing all expenditures through the system on an ex-ante basis e.g. debt related transactions and fiscal transfers; and (e) the continued gray area in the separation of accounting and auditing due to a single cadre of officials manning both functions.

## Case III: Indonesia-GFMRAP

**Case emphasis**: *This case illustrates the importance of ex-ante transaction entry and the importance of picking up the transaction at the start of the expenditure cycle.*

### *Diagnosis of the Pre-Reform Situation and Institutional reforms*

Fragmented and overlapping structures in the MOF were identified by the IMF and other related studies as the major constraint on sound PFM in Indonesia with a resulting inadequate focus on aggregate fiscal discipline, good resource allocation and reliable fiscal reporting.

Under the Government Financial Management and Revenue Administration Project (GFMRAP), the government decided to reorganize the MOF reflecting these recommendations.

The major changes were the consolidation of budget development activities in a new DG budget and the creation of a new General Directorate of Treasury (DG Treasury). The Treasury functions currently handled at the General Directorate of Budget (DG Budget), financial institutions (DGFI), the Secretary General, the Agency for Government Accounts (BAKUN), and the many field offices of the DG Budget and BAKUN delivering payment, verification, and accounting functions were transferred to the new DG-Treasury.

### *Policy Reforms*

Key policy actions that were pursued are detailed below:

- A new Law on State Finances (No. 17 of 2003) and a new State Treasury Law were passed by the Indonesian Parliament. The new laws provide a framework for the proper management of public moneys and property with specific emphasis on: (a) the receipt and custody of public moneys (including the banking arrangements); (b) public expenditure management (including control processes and the linkages with appropriations); (c) the accounting system; (d) the role and responsibilities of officials; (e) control and management of public property; (f) borrowing and investment (specifically the management of the public debt); and (g) reporting and audit. In support of these laws, subsidiary regulations and decrees are being drafted. These include: regulation of budget preparation; budget classification; and budget implementation.
- Progressive consolidation of government cash resources leading to establishment of a Treasury Single Account (TSA) at Bank Indonesia (BI).
- The adoption of a GFS-consistent budget classification system and final design of a treasury chart of accounts embodying this budget classification for implementation over several years beginning on January 1, 2005.
- Implementation of a transaction based modernized treasury system embodying the new chart of accounts.
- Centralization of all Government payments through the modernized Treasury and consolidation of bank accounts to a single account at the Central Bank (Bank of Indonesia). It was initially expected that consolidation of bank accounts and automation of payment processing would be progressively implemented across Government during 2004–2007.
- The reliance on a core treasury system for recording and reporting on all relevant central government financial transactions.

The GFMRAP project provided a means to take this set of coherent reforms forward. In particular, the project financed the design and development of a modern treasury system, and the procurement, testing and installation of the necessary hardware and software and related implementation

services. It also provided an umbrella for provision of the related technical assistance, advice and training to assist with design and implementation of the related set of policy reforms.

The Treasury system's function would be to regulate budget execution by ensuring that payments made are in accordance with the budget, within spending limits, and within cash constraints.

The Treasury system would be designed with the two basic objectives of:

(i) controlling the state budget and (in time) the assets and liabilities of the central government; and (ii) providing comprehensive, reliable and timely information on the financial position of the general government of Indonesia so as to facilitate government financial management.

Adopting the strategy and progressing in the manner outlined above would ensure the implementation of an essential element required for fiscal management and control and, would facilitate central ministries'/other entities' connection to the Treasury system and processes and access to their financial information and reporting, pertaining to their organizations.

The core functional processes and information flows associated with budget execution using the Indonesia Treasury System are shown given in Figure 31.

Initially, the Government planned to identify, select and implement the Treasury system over the period 2004–2008. The project would first assist in the design of the systems. The system will then be implemented at a set of pilot sites and after a successful pilot exercise, replicated across the country.

This was, however, delayed and the implementation is now in its final stages. We shall examine some of the reasons for the delays in the following paragraphs.

### *Project Status*

The Indonesia GFMRAP project was delayed considerably and is still in its implementation stage and is expected to be completed in 2014.

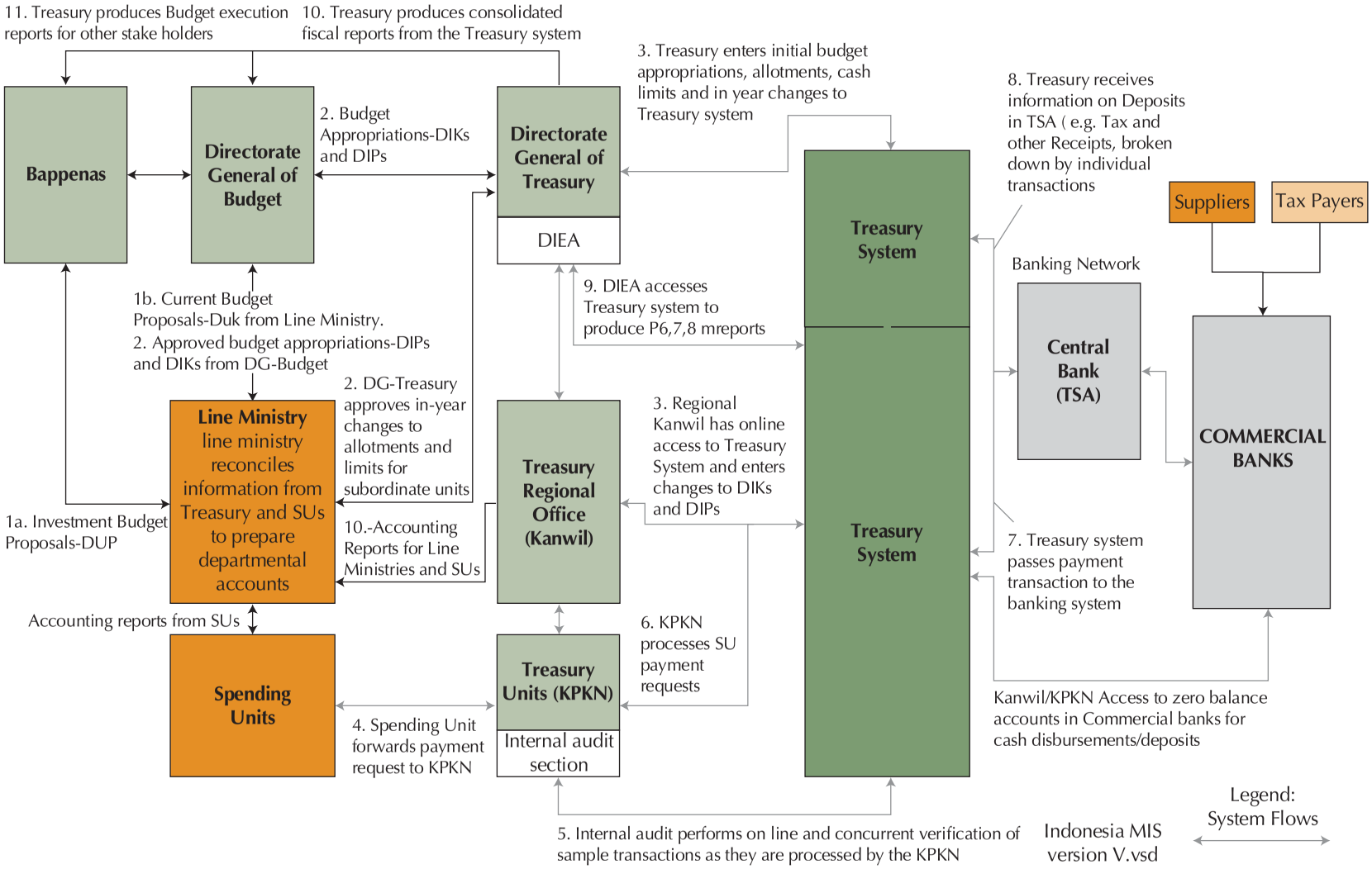
The loan agreement was signed in December, 2004. It was an $80 million project of which $55 million was from the World Bank.

After the design consultants had completed the systems specifications, the Government embarked on a two stage ICB process to procure the hardware and software and implementation services in through a turn-key contract. The procurement process prolonged for almost 4 years from 2005 until mid of 2009 due to a number of reasons attributable to the combination of the inexperience of the MOF officials to procure a large scale IT system and the capabilities of the bidders to understand and follow detailed administrative requirements in compliance with the World Bank procurement guidelines.

The bid evaluation for the SPAN[21] Systems procurement could be completed only in February 2009, and by the second half of 2009, the contract was signed and operationalized. The applications software selected was Oracle Financials (Oracle eBusiness Suite and Hyperion). The software includes budget preparation, spending authority, budget commitment, payment management, cash management, government receipts, and general ledgers modules.

[21] SPAN is Financial Management Information System in Indonesia.

## Figure 31: Indonesia Treasury Systems – Core Functional Processes and Information Flows



It was expected that work would commence in late 2009 and be completed in 2013. However, at the end of 2013, only the configuration and development of the system is over and additional time is needed to gradually roll out the system to 216 locations (177 District level Treasury offices (KPPN); 31 regional offices; and 9 Treasury HQ units) across Indonesia during the first semester of 2014

### *Important Takeaways from the Indonesia Experience*

These relate to the following areas:

- Implementing the changes to the institutional arrangements for budget execution and the necessary legal framework and a reorganization of the MOF before the system design.
- The stage in the budget execution cycle at which the transaction is picked up by the system.
- Issues related to the introduction of detailed business process re-engineering
- Module sequencing – budget preparation and budget execution
- Procurement issues which are also common to other projects;
- Configuring the consulting assistance packages required for such projects.
- Spending unit connections to the system

Each of these areas is discussed below:

1. It needs to be noted at the outset that the GFMRAP/SPAN system effort described in this section is not the first time that an IFMIS implementation had been attempted in Indonesia. In the 1990s, two major Bank-financed projects attempted to set up systems which could improve the accounting capabilities of the Government. These projects made very little or no attempt to change the policy and legal framework, and the institutional arrangements for budget execution that were the cause of the problems; they merely concentrated on accounting systems reform under existing arrangements.

   As mentioned above in the new project fundamental changes were made to the institutional arrangements for budget execution and a reorganization of the MOF was undertaken and introduced before the system design along with the necessary legal framework. The significant feature of the new project was that it recognized that *the problem that needed to be tackled was primarily an expenditure management problem and only secondarily an accounting problem. This is an important lesson from the Indonesia project.*
2. *A second important difference* was that these projects envisaged picking up the transaction in ex post mode after the payment had been made by the payment offices — KPPNs. These attempts were not successful since once the payment is made there is no fool proof way in which one can guarantee that all transactions are picked up by the system. The only way this can be done is by ensuring that no payment is made outside the system and that the transaction is picked up by the system before a payment can be initiated.

   *Ex-ante transaction pick up is a key requirement of IFMIS systems for such projects.*

   Accordingly, in the new project, the budget administrators, the treasury offices were envisaged to be connected to the system and all stages of the *transaction were supposed to be picked up ex-ante mode (before payment is made) by the system (at the PO stage* (with a resulting commitment) followed by the Invoice and the goods report and the payment).
3. Introduction of detailed business process engineering.

   Unlike the plan in the original design as detailed in the World Bank Project appraisal document (PAD), the Project consultants embarked on a detailed business process re-engineering exercise where every little business process is reviewed and improved. This is a very time-consuming task and delays systems implementation.

   It needs to be recognized that the major business process re-engineering required is that the transaction now needs to be routed from the spending units to the Treasury office, instead of from the spending unit to the Bank.

Secondly all stages of the transaction needs to be recorded in the system in *ex-ante* mode, as mentioned above. Streamlining of all other processes, for example, approvals, would improve efficiency, but are not really prerequisites of systems implementation. In fact, most COTS packages already provide for standard best practice processes and it may not be a bad idea to actually use these as a starting point unless there is a specific legal requirement that needs to be fulfilled.

In the case of the Indonesia system it was found that 90 percent of the business processes offered by the COTS solution were in accordance with the results of the detailed BP engineering exercise. A lesson from m this experience is to distinguish clearly between which part of the business process re-engineering is actually required prior to systems implementation, and which part can be best served by using the processes incorporated in the COTS system in use and which can be adjusted as systems implementation proceeds.

4. Module Sequencing: Unlike the original project design the Indonesia project placed initial (or at least simultaneous) emphasis on the budget preparation module instead of first completing implementation of the Budget execution/ treasury modules.

   The Budget Planning (Hyperion) and Budget Execution (EBS) systems were procured under a single contract. The design and implementation of these modules were linked and new business processes and COA were simultaneously adapted in both.

   The project team insists that for the implementation (pilot and rollout), these modules were decoupled and transition strategies were developed such that each could go live as and when they were ready and therefore this implementation approach did not contribute to delays of EBS.

   However, implementing the new Budget preparation package, Hyperion, is a major exercise, which has inevitably resulted in diversion of the implementation effort to the budget preparation module and away from core Treasury/Budget execution modules that are the main part of an IFMIS application. The Hyperion implementation has as yet not been fully accomplished. It is understood that currently the Treasury system is still operative only at the center, and has not been rolled out to all the KPPNs.

   In order to achieve significant outcomes such as good budgetary control and cash management, it is necessary to first implement modules to cater to Core Budget Execution Processes, to capture payments and receipts transactions across government, before going on to other non-core elements. It is most effective to first implement a Treasury-centric System in which spending units are required to bring / transmit (via a web portal) expenditure and receipts transactions to designated treasury offices and subsequently de-centralize transaction entry to spending units if necessary or possible.

   To start with, budget preparation can be done outside the system or by another system, and the final approved budget can then be loaded in the system and used to control expenditure—However, all subsequent in year budget transactions, like budget releases, transfers etc. should then be done in the Treasury system. This is the model that has been implemented in Russia, Kazakhstan, Pakistan and other countries.

   *Adopting this implementation path may have expedited the Indonesia implementation—a useful lesson.*

5. Systems Procurement: Procurement processes in the Indonesia case suffered from major delays. This is not specific to this project but has also occurred in other systems procurements using the WB procurement guidelines/processes. Other examples include Russia and Pakistan.

   As mentioned in the chapter on procurement in the main text the World Bank rules and procedures accompanying this process need to be very well understood by the Government or the consultants who design the procurement package and tender documents for the system, and who would be responsible for assisting the Government in managing the procurement. This is seldom the case and many times the bidding process, or parts of it, have to be redone before approval is obtained.

It is therefore essential that (i) adequate training in the process and the accompanying rules framework, etc. be given to the Government team which will be responsible for this process, and the team needs to stay with the project throughout the procurement and contract implementation stages; and (ii) experience with the WB procurement process should be mentioned as a specific requirement for the consultants to be hired to assist Government in the design, procurement and implementation phases. Sometimes, a procurement agent is hired for this work.

This is an important lesson from the delays encountered in these projects and the ways to mitigate those delays.

6. Consulting support required for GFMRAP.

Again, as mentioned in the chapter on procurement the packaging of the major procurement consultancy to assist the Government in the design, procurement and implementation of the system procurement strategy should be done in a manner in which the same consultant is employed for the design the procurement and the implementation phases. It is best to retain the services of this firm to also supervise systems implementation by the selected contractor since they would be in the best position to do so having developed the design. Assigning this task to a new firm would incur the risk associated with disagreements on the basic design formulated earlier.

However, in several Bank projects including the Indonesia GFMRAP, the main consultancy was split in to two or more and contracted separately. This was done ostensibly with a view to address issues of conflicts of interest and enabling a better estimation of the consulting costs for procurement and implementation.

In addition the consultancy for the supervision/implementation phase was called an Independent Validation and Verification (INV&V) consultancy. These consultants often misread the purpose of the hiring and saw it as an audit type of exercise where they were to critique the initial design and the implementation work, instead of actually helping the government to make sure that the contractor implements the system in accordance with the design which had been specified and approved earlier.

In some countries, the INV&V consultants thought part of their role was to report any deficiencies in the design and implementation process to the Bank team supervising the project, instead of helping the government to manage the contractor. This caused major difficulties, and these consultancies often did not achieve the purpose for which they were intended. The government was left with little or no consultant help in the contract management/supervision implementation phase.

Normally, the INV&V process is carried out by the Government with the help of Bank support where the consultant's design is evaluated by the Government and Bank team to ensure that it makes sense in the country specific circumstance. A consultant could also be hired for this process.

However the job of this consultant is to merely advise the government about initial design, the systems specifications and implementation plan and how it could be changed. It is up to the government with Bank advice whether to accept or reject the consultant's recommendations. If the INV&V consultant's advice is accepted, the Government would advise the main consultant to incorporate these suggestions in the design.

In view of the fact that configuring the main consultancy assignments has proved to be a significant bottleneck for systems implementation in some countries, it would be useful to specify at the start of the project that the consultancy package should be designed to mitigate these problems and ensure that appropriate consulting help is available throughout the various stages of the project and the TORs defined accordingly to make the tasks very clear.

A collaborative approach to the project should be adopted at the outset by the client, with the World Bank as independent adviser. Collaborative practices should also be explained in detail to consultant teams during kickoff and mobilization meetings.

7. Connecting Spending units to the system.

As mentioned above it is best to pick up the transaction as close to its point of origination as possible. Therefore a spending unit based deployment option would in principle be preferable. However there may be significant cost implications involved in such a deployment. The number of spending units in a country can be quite large (often several thousands) compared to typical sub-Treasury office numbers which would normally be of the order of 100–200. This means that the number of end users connected to the central server and using the application software directly would be correspondingly higher as would be the hardware requirements for providing systems access to all these users across the network. Thus, for example, the hardware and software license costs for a typical remote user could be about $2,000. If there are 10,000 such users across the network the additional cost involved would be $20 million.

Therefore, normally spending units are required to send their transactions to a designated Treasury office either in hard copy or electronically and the designated treasury office then enters the transaction in the system. The main line ministry head offices could still be connected to the system directly to enable them to monitor the status of their budgets, etc.

This is the model that is implemented in many countries (Russia, Kazakhstan, Pakistan) in the initial stages of systems implementation. It is noted that this model is normally the one that is used anyway, when the systems have not been automated.

Once the system is operational, SUs could be provided access to the system via a web portal. This would enable the SU to send a transaction to the system. However, this transaction would not update the databases and would only create a file that would subsequently be used by the Treasury office to update and process the transaction.

In Indonesia the web portal model is now being implemented with the development of a SAKTI[22] web-based interface to the system. However, it needs to be noted that the implementation of SAKTI is NOT a pre-requisite for the implementation of SPAN. Spending units can continue to send transactions to the KPPNs manually as they do at present until such time that the SAKTI system is operational. The web based interface can be phased in overtime.

With the implementation of Hyperion, a web-based interface is being developed to enable SUs to submit budget proposals to the Budget directorate and communicate changes during the budget preparation phase.

An important point to be understood is that if there is a seamless interface between the budget preparation module and the budget execution modules which means that they share the system databases then it is fine. If these two modules need to have data transfer between them, there are a few prerequisites.

First, after the budget has been finalized in the budget preparation module, it should be loaded into the budget execution module and all in-year changes to the budget, including to budget releases, and virements need to be made in the budget execution module. The databases of the budget execution module are the primary databases of the IFMIS and all reporting needs to be done from these databases.

## Case IV: Nepal

**Case Emphasis:** This case illustrates the importance of placing primary focus on policy reforms rather than technological issues.

A specific feature of the Nepal case is that it shows the criticality of placing primary emphasis on the institutional and policy reforms. The case illustrates the fact that once the policy framework is put in place then it is possible to achieve very significant outcomes with quite limited

[22] SAKTI is an application to support SPAN (IFMIS) in Indonesia.

technological investments. Thus, the total cost of the system in Nepal is about $5–7 million. On the other hand if attention is not given to the policy side then very large investments would result in very limited outcomes.

### *Pre-Reform Situation*

The Government operated a decentralized payment and revenue remittance operation. The Financial Controller General Organization (FCGO) has 75 district level branches of the District Treasury Controller's Office (DTCO) staffed by trained accountants. The spending units (approximately 3500) directly processed and administered government payments and record receipts. The spending units maintained their own bank accounts (approximately 14,000) and make payments against these accounts. Similarly, the tax authorities maintained their accounts and received and recorded revenue. These accounts were held at the Nepal Reserve Bank (NRB) regional branches and several agency banks. The SUs compiled transaction level accounts. These were progressively consolidated at the line ministries and the FCGO – The role of the FCGO was only to consolidate the accounts. At the start of the fiscal year, the DTCO authorized the agency bank by mean of a Bank order to credit the expenditure accounts maintained by the SUs with 1/6$^{th}$ or 1/3$^{rd}$) of its budget appropriations. The SU incurred budget expenditure against this account. At the end of the month SU submitted an account of payments made and the DTCO issued a replenishment order to the agency bank restoring the balance. At the end of the year the unused balance was remitted back to the Treasury main account at the NRB

Inland and Custom revenues were credited into accounts operated by the Inland Revenue and Customs departments. Non-tax revenues were deposited in the SU Bank accounts. The Inter-bank clearing operations are manual and are managed by the NRB and its 7 branches. Checks issued by the SU reached the agency bank through the clearing system for settlement .Checks received toward government revenues were first cleared by the receiving agency banks and then the proceeds were credited to the appropriate revenue account of the tax authorities and SUs. The clearance process could take 3–5 days or even more for remote areas

### *Problems with the System*

FCGO did not have adequate control over the budget execution process. MOF did not have data to prepare accurate and up to date fiscal reports. Retail payment and receipt operations of SUs were not overseen by the DTCO. They are open to ex-post audit. However, Audit resources did not permit adequate audit coverage. Serious instances of embezzlement and financial irregularities often surfaced.

The FCGO and DCTOs did not exercise control over government cash flows and balances

The banking arrangements fragmented Treasury balances into thousands of bank accounts which operate outside Treasury control and generated significant idle balances. All the 100 or so bank branches were not able to send their reports to the NRB before the end of the day therefore the NRB and FCGO did not have up-to-date information on the amount of money in bank accounts.

There was little control over the float between receipt of revenues and its deposit in the main government accounts.

### *IMF Recommendations*

Payment and revenue recording need to be controlled by the DTCO. All SU accounts need to be closed and brought under the control of the DTCO. A progressive consolidation and

rationalization of these accounts would take place. The SU will bring their payment requests to the DTCO who will perform routine checks (not a full pre-audit) and issue a check in the name of the supplier of goods and hand it over to the SU accountant (not supplier). The Bank will prepare a list of payments/ receipts made by/in favor of the DTCO. Based on the aggregate numbers for the disbursement/ payments, the DTCO will determine cash requirements at the agency Bank and issue appropriate instructions to the NRB.

### *Bank Assessment of the Systems Upgrade Required to Implement IMF Recommendations*

Under the regime proposed by the IMF, the basic role of the DTCO would change from that of *ex-post* consolidation of expenditure/ receipt transactions to that of *ex-ante* control. To be able to perform these functions, the DTCO offices will need to be equipped with the technological infrastructure and information systems to support basic treasury operations.

The DTCO offices would need to have access to a Core Treasury System which processes the functionality required to support Treasury operations.

This system could be implemented at each DTCO under a distributed architecture, or the system could be implemented centrally at the FCGO office, for example, and the DTCOs connected to this site via telecommunication lines. The choice would be dependent on the availability of adequate telecommunication connectivity between the DTCO and the central site. To operate satisfactorily, there needs to be adequate telecommunication connectivity between the DTCO and the FCGO/ MOF. For a centralized system operated at the FCGO with the DTCOs connected to it, it would be necessary to have telecommunications connection between the DTCOs and the FCGO with a bandwidth of at least 64 kbps. (128 kbps preferred). The less preferred alternative is to implement a distributed architecture with the application software installed at each DTCO and periodic data transfer facilities between the DTCOs and the FCGO.

Since the SUs would have to bring their expenditure transactions to the DTCO for processing they would either need to have direct connections to the DTCO, or at least have reasonable manual access. Since expenditure transactions would be processed at agency banks and periodic reports required from these banks to the DTCO, there needed to be either a direct telecommunication link between the DTCO and these Banks or reasonable manual access.

The proper operation of these systems is also conditional on the availability of a reasonable interbank clearing mechanism. Ideally this should be automated, but in the interim a good manual system would also suffice.

Finally, staff at the DTCO would need to be trained in the restructured payment and receipts processes and to be able to perform ex-ante control of transactions.

Since the role of the staff at the DTCO would change significantly under the new regime, from *ex-post* consolidation of transactions to *ex-ante* control, adequate training needed to be incorporated to staff. Also, staff augmentation may be necessary at the DTCO for it to be able to perform the transaction processing functions that would be transferred to it under the proposed scheme.

### *The Project*

The United Kingdom's Department for International Development (DFID) and the World Bank expressed an interest in supporting the Government of Nepal in the implementation of the TSA system and to finance the required upgrade/ changes to the information systems and other

technical infrastructure and the training of staff that would be necessary for the implementation of the TSA system.

### *Implementation strategy*

In view of the Bank's experience that the implementation of a full function Treasury system across the country could take several years, it was proposed that it would best to move on a two track strategy. First make a quick assessment of what is required to be able to initiate the TSA pilot at the pilot DTCOs and make the necessary changes/upgrades so that the pilot could be started as soon as possible. Then, following this, to carry out a more detailed analysis of the requirements for a more full function Treasury system in terms of the application software, hardware, and other requirements for extending the system to other DTCOs and Treasury offices in the country, and initiate a more comprehensive project. The lessons learned during the pilot implementation could be incorporated in the more comprehensive project.

It was decided that the system that had been developed by IMCL under a DFID grant would be used as a basis to start off the interim system. For this, the module that was being used by the DTCOs for consolidation of the payments from the spending units would be modified to incorporate the essential features of *ex-ante* budget control and payment and receipts processing transaction processing that are core elements of a treasury system. The revised system, called the DEC-TSA, would be implemented at each of the DTCOs spending units would send their transactions to the DTCO which would process them using the DECTSA and generate checks drawn on the Bank branch that was used to service the DTCO. The SU would no longer have direct access to the Bank and all SU Bank accounts would be closed. Initially, the system operated in a distributed mode at each DTCO, but as the Telecommunication facilities between the DTCO and the FCGO office improved the DECTSA started operating under Centralized architecture on servers located in the FCGO office. Budget approval and release data was loaded into the central servers and used to control payments. Reporting modules would have the capacity to produce budget execution and other fiscal reports as required.

This home-grown bespoke system provides a reasonable basic general ledger, cash book and budget control functionality with reporting capabilities. The system is being rolled out to all districts.

The information flow associated with the payment and receipt processes in the new system are shown schematically in Figure 32.

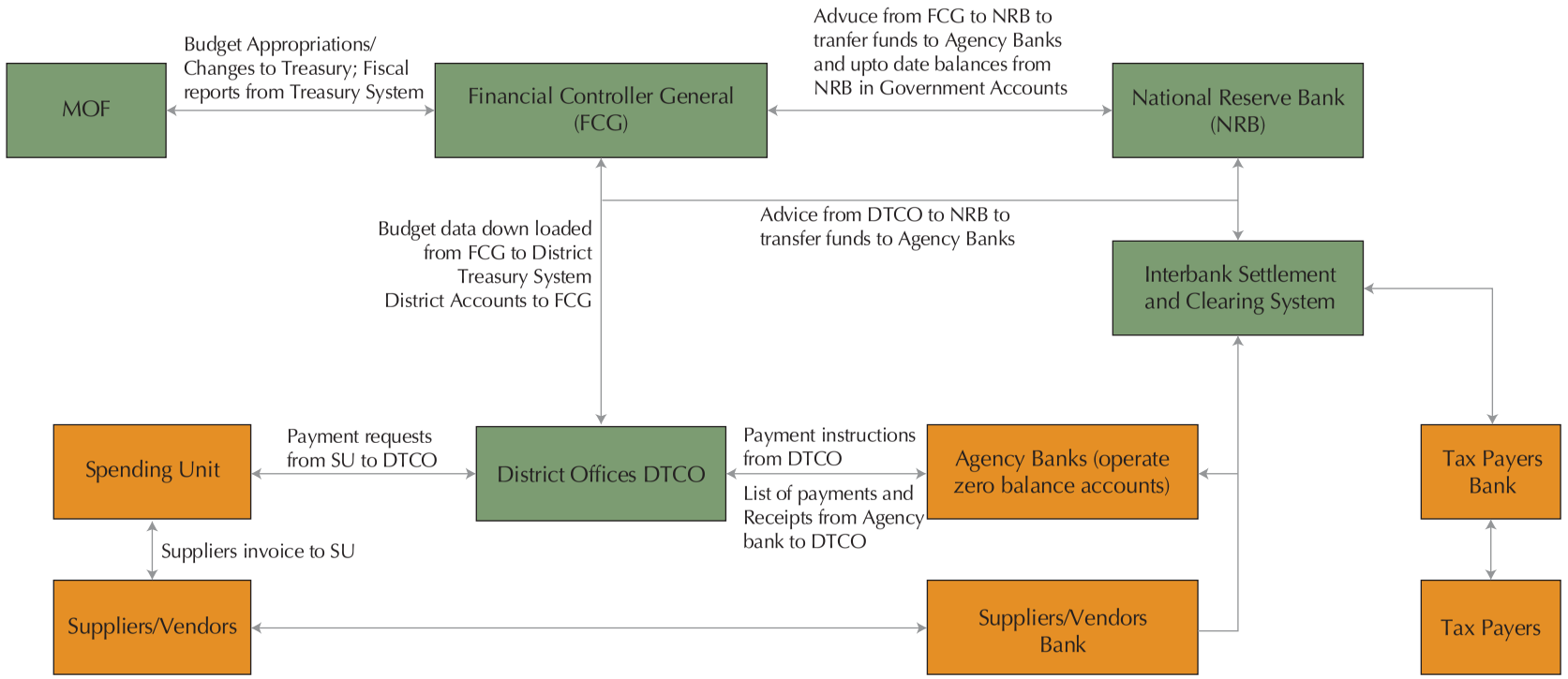
The key considerations for this proposed implementation phasing are the need for a planned and structured absorption of the system. In addition, and to support the ease of this roll-out, it is critical that the roll-out methodology in terms of technical, process, training and related skills transfer are tried out as pilots before each staged roll-out phase.

### *Implementation Progress*

Systems implementation has progressed remarkably across most of the 75 districts DTCO offices including the Kathmandu DTCO which is responsible for processing over 50% of the total government transactions.

System roll out to each DTCO has occurred in tandem with the closure of SU Bank accounts within the jurisdiction of each DTCO. Most of the 14,000 or so Bank counts have been closed and the balances consolidated into a TSA held at the NRB. The majority of the payment and receipt transactions of the central government are processed through the system (over 95%) These transactions include capital and recurrent expenditures and tax and non-tax receipts. Expenditure transactions are recorded after *ex-ante* budget control.

## Figure 32: Nepal Treasury Systems – Participants and Information Flows



The donor funded project expenditures as well as repayment of debt related transactions are also processed through the system on an *ex-ante* basis. In addition, expenditures of DDCs that receive funds from the 4 de-concentrated ministries—Agriculture, Livestock, Health and Education—through conditional grants are also processed through the system. The un-conditional grants to the local bodies and DDCs are recorded as expenditures at the time of transfer. These transactions contribute substantially towards the comprehensiveness of budget execution coverage within the system for better reporting and improved controls.

Gaps in the coverage are a very small portion of the overall general government expenditures. These gaps include, amongst others, direct payments by donors to third parties and CSOs, TA, internally-generated fund (IGF) related expenditures of the local bodies and DDCs, commodity grants.

Comprehensiveness of budget execution coverage through the system, as noted above, now provides a platform to support the compilation of **IPSAS cash flow statements** for individual ministries as well as for the general government. These statements can be compiled through mapping of the COA as developed in the system with the various items of the Cash flow statements.

**Budget Execution Reports**: The system is capable of producing ministry-wise budget execution reports. These reports are an important tool for more efficient budget execution management by the line ministries and contribute in strengthening public financial management. However, the dissemination of these reports to the line-ministries has not been institutionalized yet.

**Expenditure forecasts and budget ceilings**: The project team has developed expenditure forecast forms. Every ministry is required to submit monthly, quarterly and annual cash plans on Form 20 to the FCGO. These cash plans include both current and capital expenditures and are captured in the system on a regular basis for a more efficient cash management. A few expenditure forecast reports have also been developed, which aggregate data from these forms. These cash plans establish the budget ceilings for the ministries, departments and spending units. There is no subsequent release process by the Ministry of Finance.

**Reporting access to key line ministries**: The Ministry of Education has been given on-line access to a separate reporting server. 2–3 users of the Ministry of Education are accessing their financial reports for their management needs. The data from the FMIS is transferred to this server in a batch mode on a daily basis (6 pm daily) aggregated at line-item level—daily line-item totals.

The stability of the WAN network has also improved and remote users from DTCOs do not face extended down tines. The Government has implemented Fiber optic connections with most of the DTCOs. The remainder are connected via ADSL lines.

### *Remaining Work*

Notwithstanding the remarkable progress the government has made as noted above, the system still lacks functionalities to provide support for a more strengthened public financial management in some critical areas. These areas can be grouped in three categories:

**Priority items:** These items have visible immediate impact on the outcomes by leveraging existing state of system implementation and should be done on a priority basis.

- **Automatic bank reconciliation** through the development of an interface: To be developed on a priority basis.
- **Additional reports**, including cash forecast reports, fiscal operations tables on IMF format, IPSAS Cash standard reports, financial balance sheet, etc.

- (Cash forecast reports will incorporate data from multiple sources, including detailed debt-repayment schedule, revenue forecasts, expenditures forecasts (Form 20), capital receipts forecasts, etc. A simple forecast report is envisaged, instead of more sophisticated statistical forecast modeling reports).

**Medium term:** These areas include:

- **Commitment management**, including recording of purchase orders, multi-year contracts, goods receipts, invoices: Design of detailed procedures is recommended to be carried out as part of the development of the accounting manual, discussed in later section. The government plans to implement commitment accounting for high value contracts
- Direct payments, including third party payments
- Advances and fiscal transfers.

**Long-term:** To be considered for implementation on a COTS-based solution through a follow-on project. Key areas include:

- Comprehensive Commitment accounting
- Payroll and establishment control/position management: Currently, pays are processed as expenditure transactions on a lump-sum basis and distributed to the staff through the spending unit accountants. Given that more than 70 per cent of the current budget is spent on payroll, this is a substantial area of control weaknesses that needs to be improved.
- e-Payments: Electronic bank advice automatically pushed to the Banking systems when they have been upgraded for such an interface.
- Budget preparation and compilation on MTBF format through an integrated technology platform.
- Expenditure recording incorporating MTBF elements:
- Interfaces with the debt-management system after CS-DRMS has been upgraded, Revenue Accounting System and Pension Management System.
- **Asset registers:** Asset accounting in government should be started with establishing asset registers to record the assets codes, location, movements, custody, supplier, etc. Asset accounting in terms of valuation, depreciation is a huge task and should be contemplated only after necessary preparations.

### *Lessons Learned*

- In addition to the other aspects highlighted in the previous cases, a specific lesson that can be learned from the Nepal case is that it shows the criticality of placing emphasis on institutional and policy reform.
- Once the policy framework is put in place then it is possible to achieve very significant outcomes with quite limited technological investments. Thus, the total cost of the system in Nepal is only about $5–7 million. On the other hand, if attention is not given to the policy side then very large investments would lead to very limited outcomes.

### *Continuing Vulnerabilities*

**Critical need for an IT organization –**The Bank has repeatedly highlighted the critical importance of setting up a stable and fully-staffed technical organization within the government responsible for the sustainability of the IFMIS. After Implementation these systems become a mission critical government system on which the government depends for its day today financial transaction processing. *Any disruption in systems operations can lead to significant disruptions in a government's financial operations.*

*This is a key area that needs to be addressed in Nepal as in other countries in South Asia. In Pakistan, for example, there is no career path for technical IT staff in Government positions unlike in the private sector, where personnel are recruited on a national basis into recognized cadre structures.*

## Case V: Maldives Public Accounting System

**Case Emphasis:** ***Implementation in an Island economy***

### *Background*

The Maldives Public Accounting System (PAS) was proposed for implementation—initially to support the financial management requirements of the Tsunami Relief Fund, with a medium to long term plan for its implementation across the entire government. Financial management functions that would be encompassed include: Budget preparation, accounting, reporting, and treasury systems covering both receipts and payments) and a payroll system for government employees. A detailed diagnostic of existing systems and proposed reforms along with implementation strategy was conducted by Government of Maldives with the support of Stanton Partners, Australia financed by Asian Development Bank (ADB). This report would form the basis of implementation of the Public Accounting System of the Government of Maldives under this project.

### *Objectives*

The goals of the project are to (i) promote improved budget practices, thus enhancing financial management as well as the development of effective fiscal operations and macroeconomic policymaking; (ii) establish accurate, reliable, and timely financial reporting to meet international accounting standards (Cash-based International Public Sector Accounting Standards) by eliminating laborious manual financial reporting systems, promoting accountability, and providing appropriate financial information to the Government for economic decision making; and (iii) conduct more comprehensive and updated control over public funds and help develop a cash management strategy to rationalize cash movements and holdings, especially at the atolls and islands. The Project covers nationwide Government agencies involved in the PAS in Maldives including ministries, atoll offices, and island offices and would provide the financial reporting framework for public sector.

### *Scope*

The Maldives project envisaged implementing a full-function Public Accounting system (PAS). This project would include: (a) required enhancements to the legal and regulatory framework;[23] (b) incorporation of the functional and technical design of the full-function PAS as described in the Stanton partners' report referred to above, (c) development and implementation of the accounting standards, policies and operating instructions required for the new system; (d) development and implementation of the new system, across the Ministry of Finance, line ministries and Atolls / islands in the country; and (e) training of PAS related functional and technical staff in the use, operation and maintenance of the system.

[23] As recommended by Stanton partners, three separate legislations have been prepared by the Republic of Maldives for reforming the legal and regulatory framework which includes (a) the Public Finance Bill, which has been presented to the Peoples' majlis and currently under discussion by a sub-committee ; (b) Audit Bill, which has seen several iterations and a draft of which is currently with the Office of the Attorney General and (c) the Public Enterprise Bill which has been drafted. GoM plans to have other two acts presented to Peoples' majlis by June, 2006.

### *The Public Accounting System (PAS)*

The system would be used to assist the MoFT in all aspects of budget preparation, execution and management of government financial resources. The system would cover all spending units financed from the GOM's budget, and would include all expenditure transactions pertaining to these units. All steps in the expenditure cycle including, budget appropriations, financing limits, commitments, verification and payment transactions would be recorded by the system.

The overall design of the PAS is consistent with IMF recommendations; and the design features and best practices as defined in the *Treasury Reference Model* developed by the World Bank and the International Monetary Fund.

The design envisages that all government moneys would be lodged in a Treasury Single Account at the Maldives Monetary Authority (Central Bank of Maldives) All spending unit Bank accounts would be closed and all Government expenditure and receipt transactions would be routed through the Treasury Single Account.. This would enable:

- A reduction of idle balances and better cash management[24] by putting all Government resources under control of the Treasury;
- Better controls during budget execution. Treasury would check whether budgetary expenditures are in accordance with the approved budget, within the specified spending limits and funds allocations, prior to approving an expenditure transaction; and
- Comprehensive accounting and fiscal reporting, thereby contributing to better financial management.

The term PAS is used here to refer collectively to the systems modules that provide support for:

- *Budget Preparation and Approval:* The budget preparation system will receive details of ongoing and planned programs and projects from line ministries, consolidate them, and produce from them the documents that form the basis of the negotiations between the line ministries and central ministries. After finalization of the budget by the legislature, the system will produce the approved budget estimates. The finalized budget figures will then be loaded into the Treasury systems for budget execution, accounting and fiscal reporting.
- *The Treasury system will* maintain data on approved budgeted appropriations (both capital and recurrent), sources of financing for programs and projects. This information is transferred to these systems from the budget preparation systems after the budget has been finalized. During the course of the year as budget transfers, supplementary allocations, fund releases (warrants) take place, this information is also recorded in the system. The systems will process commitment, expenditure and receipt transactions as they occur during the course of the year and maintain a record of commitments and actual expenditures against budgeted allocations and details of receipts. The General Ledger will compile summary records for control and analysis. This system will provide the Government the capability to monitor the overall budget execution process and generate fiscal reports.
- *Payroll and Pensions*: In addition, the project would implement a payroll system for the government employees. This will ensure integrity of the GOM's personnel records and support human resource management. These systems will support functional processes associated

[24] Cash held in safes is estimated at Rf 20 million and the total held in the Bank of Maldives on the account of atoll entities is estimated at a further Rf 20 million (based on 31 December 1998 figures given in ADB's PAD). The total amount is considered to be at least twice the amount reasonably needed to fund expenditure in the atolls.

with staff complement control and payroll and pension payment management. For payment of salaries and pensions, the systems will be integrated with the core payment and accounting systems.

- *Systems to support Auditing:* These systems will assist internal and external audit agencies in their functions and enable direct access to the databases maintained by the other systems modules.

The system includes integrated external interfaces from/to the PAS as under:

- *Interface to the banking system:* This will be used for the electronic transfer of GOM payment transactions to the bank/MMA and information on revenue receipts from bank/MMA to the tax department. It will also be used for the bank/MMA to send end-of-day reports on payments and receipts which will enable the PAS to be able always to present an up-to-date picture of the GOM's cash and liquidity position.
- *Interface to the MMA:* This will be used for exchange of information on movements through the GOM account at MMA.
- *Interface to the Auditor General's Office:* This will provide consolidated information from the core accounting systems to the Auditor General's office (AG), to support external audit purposes.
- *Interface to other government systems* such as debt management, customs, tax administration

### *Phasing*

Under the proposed implementation plan for the Public Accounting System, the rollout of computerization was envisaged to occur in three phases as shown in Figure 33, as proposed by the project consultants

### *Phase 1 – Implementation at TRRF and Ministry of Finance and Treasury*

Phase I(a) of the implementation of PAS will focus on covering 100 percent of the Tsunami Reconstruction and Rehabilitation Fund (TRRF) to meet the immediate objective of improving the FM arrangements for Tsunami flows (subject to proof of concept described below).

In Phase 1(b), vouchers would be batched by ministries and atolls and submitted to MOFT for data entry to the computerized Central Ledger for payment. Output reports in hard copy would be distributed back to ministries and atolls.

### *Phase 2 – Enquiry from Ministries*

Vouchers would continue to be batched and submitted to MOFT for data entry, but ministries and atolls would have an online enquiry facility replacing the hard copy reports.

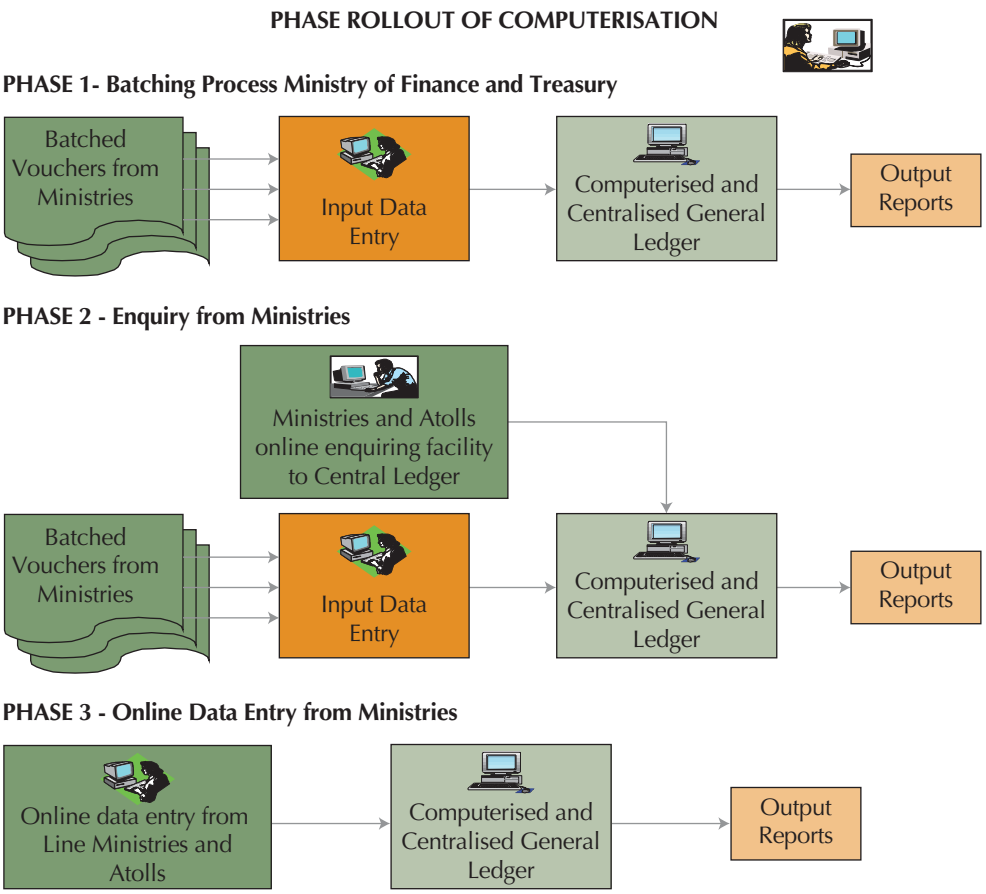
### *Phase 3 – Online Data Entry from Ministries and Atolls*

Ministries and atolls would have the facility to enter data direct to the Central Ledger, to replace the batching and submission of vouchers. This would be introduced sometime after the PAS has been fully implemented.

Implementation of the PAS was supposed to be completed in about 4 years.

The project also provided for financing for training staff and for consulting services required for assisting the Government in implementation of computerized PAS. Specific activities will include:

**Figure 33: Maldives PAS Roll-Out Phases**




- Assist the government in implementing policy reform initiatives envisaged as a part of the project.[25]
- Prepare the bidding documents including detailed technical specifications for the acquisition of the hardware / software and associated implementation services[26] required for PAS.
- Support tender selection of contractor responsible for providing accounting software, hardware and implementation services.
- Facilitate government in preparing financial statements of Republic of Maldives based on IPSAS (c-ash based) standards.
- Assistance to the government for monitoring the performance of the contractor and acceptance of the systems. This will involve overseeing the execution, and reporting to GOM on progress of the entire project and associated components, particularly for hardware, network and connectivity installation and physical site preparation.

[25] This would include those initiatives as recommended in the report by the Stanton partners, UK and other actions as may be needed like finalization of the Public Finance Instructions.

[26] Stanton Partners have prepared a draft functional requirements for PAS on the basis of which this consultant will prepare detailed technical specifications.

### Acquisition of application software, hardware, implementation support and training

The procurement of application software, hardware, implementation support and training for implementation of the PAS was envisaged to be carried out on turnkey basis, under which the successful consortium of firms will be expected to carry out all services and activities necessary to achieve a fully-working system—covering all functionality in all applicable GOM locations—according to an agreed Project Plan.

### *Project Management*

MOFT was the Executing Agency for the Project, with overall operational responsibility for project management. A project steering committee (PSC), chaired by the Minister of State for Finance and Treasury or the Minister's appointee, will be established prior to the commencement of the Project. The composition of the PSC will be small to avoid making it unwieldy and will include representatives from MMA; Audit Office; NCIT, large spending ministries like Health/ Education, Ministry of Atolls development, etc.

A Project Management Unit (PMU) was established in MOFT with day-to-day operational responsibility for project management.

The total cost of the project was estimated to be about US$7.5 million.

### Key Milestones during implementation:

- Appointment of the consultant (IMCL) by Early January 2006
- Preparation of bidding documents by late February, 2006
- Procurement of turnkey contractor (hardware, software, implementation service, training) by November 2006
- Implementation of PAS – Phase I (a) and Phase I (b) by April 2007
- Implementation of Phase II – December 2007
- Implementation of Phase III – October 2009

### *Project Status:*

The Functional requirements consultants (IMCL) were selected in 2006 and completed functional requirements analysis and developed specifications for application software / hardware required – 2007; Implementation Contractor (ATOS) was selected and systems implementation started in 2008. This contractor, to be responsible for application software, hardware and implementation services was selected through an ICB. The Application software selected was SAP.

The centralized payment system for all Male based spending agencies started working in an online real-time mode since May 1, 2009 using the new PAS with processing all transactions against the single Public Bank Account (PBA).

At the start of the year, the approved budget is loaded into the system. In year changes and budget releases are, however, still forwarded on paper (and not electronically through the system) to the Public Accounting Division (PAD) by the National Budget Office and are thereafter entered into the system using the financial module. Real time budget availability checks are performed before funds are released for any budgetary expenditure through the PBA.

Initially, payment transactions from agencies in Male were forwarded manually to the MOFT to be processed centrally. Now the Accounts Payable module of the PAS system has been successfully implemented at spending units in Male and these transactions are entered directly into the system by agency staff. This has eliminated the heavy transaction data entry load on the

central unit in the MOFT and also made the spending agencies fully responsible for all upstream processes related to payments with increased end user involvement. The responsible unit in the MOFT reviews these transactions and related documentation which is received electronically from the line agency before the release of payment request. For approved payments, a check is written in the name of the payee against the PBA. Since all spending agencies were connected in Male and all payment and receipt transactions routed through the central server, 80 percent of the transactions or more in terms of the money were being routed through the system even though the Atoll offices have not been connected.

As of late 2011, the payroll module had been rolled out to a number (26) of spending agencies and covers some 6000 staff out of a total public service staff of about 32,000. The Material Management module has been rolled out to 14 agencies.

***Connectivity to Atoll Islands:*** The National Commission on IT (NCIT) assured the Bank that connectivity at 256 kbps to the Atoll would be available. NCIT was in the process of entering into a single agreement with commercial suppliers.

Connectivity and PAS performance was tested from one atoll site in January 2010. However, no further implementation activity has taken place due to ongoing discussions related to decentralization of the government in Maldives and impending agreement on the eventual model for managing public finances in the regions and the atolls.

***Establishment of regional treasury offices in the Atolls.*** A decision has been taken to establish regional treasury offices in two Atolls to start with; others to follow.

### *Issues*

Several key issues that were highlighted repeatedly by the Bank missions, and which have adversely affected project progress and PAS implementation are:

- *The involvement of National Budget Office* (NBO): The NBO's involvement continues to be minimal in operating the Budget module of PAS. This is a serious issue. The Bank missions repeatedly urged that this situation needs to be rectified and the NBO needs to take on responsibility for performing its functions of budget monitoring, release and oversight directly through the system, instead of the current practice of passing on transactions to the PAD for entry to the system.
- *Acute staffing constraints in the Public Accounting Division (PAD):* This issue was highlighted repeatedly by the Bank and, despite its urgency, nothing significant has been done to address the acute staffing constraints of the Public Accounts Division (PAD) of the MOFT. Pay policies and hiring practices have led to exodus of MOFT staff and prevented the hiring of new staff. The Division lost 8 out of 12 key business area experts that had been trained under the project and were responsible for implementing the system in their functional areas both at the Central Office and the end user departments. None of them have been replaced due to salary constraints on the public sector side. This has put further implementation of PAS at very high risk. Perhaps more importantly, this situation also puts the day to day operation of this mission critical system (such as regular processing of government transactions and payroll payments through the system) into jeopardy and high risk of breakdown. The World Bank missions alerted the Government as to the criticality of the situation and urged the Government to address it but nothing significant was done. As an alternative the Bank urged the government to hire the services of International SAP experts. To get around the pay policies the Bank also agreed to finance local individual consultants who are conversant in the use of the SAP system for financial management and accounting at competitive salaries

from the local market for a period of two years initially. This will provide the necessary impetus and momentum to PAS implementation. The Government is moving on some of these suggestions to address the situation. However, progress on this front remains slow.

### *Lessons Learned*

- In addition to the lessons highlighted in other cases, the major take away from the Maldives experience is that the day to day operation of a mission critical system on which the government depends for its days to day financial operations can be put at risk if adequate attention is not paid to address the staffing shortages for critical technical staff required for operation of the system.
- Emphasis on policy reform issues is still paramount for island economies.
- Normally a major part of the transactions in terms of volume and amounts of money are at the center with a small number of transactions at other islands; Therefore a good way to proceed is to set up a central system for the bulk of the transactions and locate it at the center
- Off-line processing arrangements can be used for remote islands using imprest accounts as an interim step.

# Annex II – Treasury Diagnostic Questionnaire

## Introduction

Prior to start of a typical Treasury/IFMIS Development Project it is necessary to determine the current status of the Treasury in terms of its legal and institutional arrangements, functional processes, systems and procedures. Such an assessment would highlight any weaknesses in the underlying legal and institutional arrangements and existing systems, provide a list of areas that need attention, and a road map for further reform.

This annex presents a checklist of items that could be used to identify areas that need attention. This checklist could also be used to assess the state of implementation of the Treasury function and associated systems in an ongoing Treasury project.

This checklist is intended to serve as a list of functions and features that need to be examined covering various aspects of the Treasury function, ranging from the legal and institutional framework to the characteristics of the specific systems adopted in order to determine its current status and area of further reform.

### A list of areas to be checked for assessing the status of Treasury implementation in member countries

| Function/ Feature | Current Status |
|---|---|
| **Legal and Organizational Framework** | |
| ***Legal Basis*** | • Treasury has not been set up as yet – Is the Central Bank performing treasury functions?<br>• Treasury established under a Presidential or any other statutory decree giving it the authority to monitor and control budget execution<br>• Comprehensive Organic Budget Law prepared that defines the roles and responsibilities of the agencies involved in budget execution and is in Parliament for approval<br>• Budget Law approved and implemented |
| ***Treasury Organization*** | • No Separate Treasury organization exists.<br>• Treasury organization set up at headquarters<br>• Country wide Network of Treasury offices set up and in operation |

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## A list of areas to be checked for assessing the status of Treasury implementation in member countries *(continued)*

| Function/ Feature | Current Status |
|---|---|
| **Treasury Coverage** | |
| ***Treasury control over government financial resources (Budget resources) and expenditure transactions*** | • MOF Transfers Budget funds to spending agency bank accounts in central/ commercial banks; spending units have direct access to bank accounts; Treasury has **no *ex-ante* control** over expenditure from these accounts<br>• Spending agency bank accounts being progressively closed and corresponding resources being brought under the control of the Treasury.<br>  • (Status to date <25%). A TSA has been set up at the Central bank where these resources are banked. These spending units send their payment transactions to a designated treasury office for processing against the TSA and payment.<br>  • Most Budget funds are under control of the Treasury and banked in the TSA (>75%). These spending units send their payment transactions to a designated treasury office for processing against the TSA and payment.<br>  • All spending agency bank accounts under the control of the Treasury.<br>  • Bank accounts consolidated into a TSA held at the Central Bank and under the control of the Treasury. All spending units send their payment transactions to a designated treasury office for processing against the TSA and payment. |
| ***Coverage of Central Budget*** | • A Treasury has not been set up.<br>• Central government payment and receipt transactions originating at the Center are routed through Treasury.<br>• Most central government payment and receipt transactions are routed through Treasury. Includes those originating at the Center and in the provinces<br>• All central government payment and receipt transactions are routed through Treasury. Includes those originating at the center, the provinces and districts. |
| ***Coverage of EBFs- accounts and transactions*** | • EBFs operate accounts outside Treasury Control. Their accounts are not part of the TSA and transactions are not routed through the Treasury<br>• Some EBFs have been transferred under Treasury control and the corresponding Bank accounts are under Treasury control (<25%). These transactions are routed through the Treasury.<br>• Most EBFs have been transferred under Treasury control and the corresponding Bank accounts are under Treasury control (>75%). These transactions are routed through the Treasury.<br>• All EBFs have been transferred under Treasury control and the corresponding Bank accounts are under Treasury control. All transactions are routed through the Treasury. |
| ***Coverage of Technical Revenue – accounts and transactions*** | • Technical Revenue (spending unit earnings from fees, etc.) accounts are outside Treasury Control. Their accounts are not part of the TSA and transactions are not routed through the Treasury<br>• Some technical revenue accounts have been transferred under Treasury control and the corresponding transactions are routed through Treasury (<25 percent).<br>• Most technical revenue accounts have been transferred under Treasury control and the corresponding transactions are routed through treasury (>75 percent)<br>• All Technical revenue Accounts EBFs have been transferred under Treasury control and the corresponding transactions are routed through treasury. |

*(continue on next page)*

## A list of areas to be checked for assessing the status of Treasury implementation in member countries *(continued)*

| Function/ Feature | Current Status |
|---|---|
| ***Coverage of sub-national governments*** | • Sub-national government accounts are not part of the TSA Transactions are not routed Through the Treasury<br>• Some sub national revenue transactions covered. Some Sub national revenue/expenditure transactions covered; and/ or some sub national treasuries have been set up but operate independently of central Treasury<br>• Sub national revenue and expenditure transactions covered; or, sub national treasuries have been set up and operate under a set of national guidelines and exchange information with the center |
| **System Functionality** | |
| ***Budget Management*** | • ***Budget classification Structure***<br>• The Budget classification structure is not GFS(2001/1986) compliant<br>• A basic GFS compliant budget classification structure has been introduced with a Function and an economic classification segments (that are) GFS compliant, and an Organization segment.<br>• A comprehensive budget classification structure with capacity **to also** monitor expenditures on projects and programs is in use |
| *The use of the same classification structure for budgeting and for accounting –* | • The economic classification segment of the BCS is not a subset of the COA.<br>• The economic classification segment of the BCS is a subset of the COA |
| *The use of the same BCS and COA across all levels of Government* | • The BCS and the COA are not the same for all levels of government<br>• The BCS and the COA are the same for all levels of government |
| ***Budget Transactions*** | |
| ***Initial Budget Load*** | • No Treasury System<br>• Treasury loads budget in system<br>• Budget administrators are connected to the system and directly load budget in the system |
| ***Apportionments/ allotments/releases*** | • Treasury loads apportionment/allotment transactions in the system<br>• Budget administrators are directly connected to the system and load apportioned/ allotment transactions in the system |
| ***Transfers/virements*** | • Treasury loads in year changes to the system<br>• Budget administrators load in year changes to the system |
| ***Supplementary allocations*** | • Treasury loads supplementary budgets in the system<br>• Budget administrators load supplementary budgets in the system |
| ***Commitment management*** | • No commitment control is practiced.<br>• Selective commitment recording is in place for major contracts or for selective line items, but payment control against these commitments is not automatic.<br>• Selective commitment recording in place and also used for payment control. Treasury loads commitments transactions in the system.<br>• Request for commitment checked against annual budget allocation;<br>• Request for commitment checked against periodic commitment ceilings (cash ceiling/funds ceiling)<br>• Comprehensive commitment control is in place. Spending units and line ministries enter commitments directly in the system Outstanding commitments automatically lapse at year end<br>• Outstanding commitments can be carried forward to future year(s) |

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**A list of areas to be checked for assessing the status of Treasury implementation in member countries** *(continued)*

| Function/ Feature | Current Status |
|---|---|
| ***Payments management*** | • Goods and Service related payments<br>• No control exercised by Treasury<br>• Payment requests sent to the Treasury along with PO/Contract/GRN/ Invoice. Treasury examines documents manually, system checks payments requests against budget appropriations, and releases /warrants<br>• Treasury also enters PO contract/GRN and invoice in the system. Treasury checks payment request against commitment/PO/GRN/Invoice and releases for payment.<br>• Spending units have the capacity to enter PO/contracts/GRN directly in the system or via web portal. Treasury reviews and schedules payments<br>• Direct payments<br>• Payments requests sent to Treasury; Treasury enters payment requests<br>• SU enters payments requests directly in the system Treasury reviews and schedules payment<br>• Payroll related payments<br>• Payment request based on a calculated payroll ( by SU) sent to Treasury;<br>• Changes to the payroll file sent to the Treasury. Treasury operates central payroll |
| ***Receipts management*** | • Treasury has no role<br>• Some receipts routed through Treasury<br>• Most receipts are routed through treasury;<br>• All receipts routed through Treasury;<br>• Miscellaneous receipts<br>• Taxes and Duties<br>• Customs and tax receipts are deposited in bank accounts controlled by tax and customs and deposited periodically to the TSA.<br>• Tax and customs receipts are deposited in bank accounts controlled by Treasury. Treasury informs tax and customs departments of details of receipts<br>• Time duration between collection of receipts and transferring the same into Treasury |
| ***Cash management*** | • Treasury has no control over spending agency Bank accounts; Treasury gets periodic information on balances in bank accounts from central (TSA) bank<br>• Treasury has on-line access to balances in bank accounts; Treasury able to monitor balances<br>• Treasury recommends level of spending limits / warrants/ borrowing.<br>• Treasury plays an active role in cash requirements forecasting |
| ***Fiscal reporting*** | • MOF relies on reports from line agencies which are submitted on monthly/ quarterly basis, are late in coming and cannot be verified for accuracy.<br>• MOF starts getting some information from Treasury on the status of budget execution for payments and receipts that are routed through Treasury<br>• MOF gets fairly comprehensive information on the status of budget execution since most central budget transactions are routed through Treasury<br>• The Treasury has complete and timely information on all budget receipts and expenditures; Comprehensive set of fiscal reports produced by Treasury for MOF. |

*(continue on next page)*

## A list of areas to be checked for assessing the status of Treasury implementation in member countries *(continued)*

| Function/ Feature | Current Status |
|---|---|
| ***Basis of Accounting*** | • Cash<br>• Modified Cash<br>• Modified Cash/Accrual<br>• Well documented accounting framework in practice;<br>• Multiple accounting models used at various level of Government (national/subnational)<br>• Adoption of IPSAS;<br>• National body for setting Govt. accounting standards<br>• Preparation of financial statements;<br>• Preparation of financial statements (national and sub-national) |
| ***General Ledger*** | • Treasury maintains and updated single / unified general ledger<br>• Multiple General Ledgers are being maintained |
| ***Advanced Budgeting features*** | • Line Item<br>• Program based<br>• Performance criteria introduced and are being monitored |
| **Nature of Information systems support for Treasury Processes** | • No information systems support.<br>• Rudimentary and partially manual information systems assist Treasury in distributing limits, warrants and controlling payments. Patchwork of systems is in use that are not connected to each other<br>• Basic IT systems at HQ and Treasury connected via telecommunications and exchange summary information.<br>• Bespoke solutions with limited documentation<br>• Line ministries authorized to have their independent financial management applications<br>• Treasury systems have functionality that enables Treasury to set up a Treasury General ledger (TGL) and exchange transaction data between Treasury HQ, regional offices and local treasury branches. However, separate databases exist at each level.<br>• A full function Treasury system with capacity for budget management, commitment management, accounts payable, accounts receivable, general ledger, purchasing, fixed assets and fiscal reporting is in place. System has capacity to implement accrual accounting. |
| **Systems Architecture** | • None<br>• Distributed architecture<br>• Partially distributed architecture<br>• Centralized architecture |
| **Systems deployment** | • None<br>• Treasury centric; No direct connections for Budget administrators or other agencies<br>• Treasury and Line ministries and budget administrators are directly connected to the system<br>• Budget administrators, line ministries, spending units and treasury offices are connected. OR line ministries and SUs have access via a web portal |
| **Data Warehouse** | • None<br>• A data-warehouse has been implemented and gives users the capability to formulate queries against the system databases and produce a variety of fiscal and budget execution and other analytical reports.<br>• Data **maintenance**<br>  • Statutory requirement for keeping data – how many years for any specific kind of data |

*(continue on next page)*

**A list of areas to be checked for assessing the status of Treasury implementation in member countries** *(continued)*

| Function/ Feature | Current Status |
|---|---|
| **Use of Other Systems Modules and interfaces with other systems** | |
| ***Budget Preparation*** | |
| ***Budget compilation*** | • Manual<br>• Partly automated but not integrated with Treasury system<br>• Automated and integrated with Treasury System |
| ***Full Budget preparation including calculation of the costs of programs and projects*** | • Manual<br>• Partly automated but not integrated with Treasury system<br>• Automated and integrated with Treasury System |
| ***MTEF capability*** | • Operated separately from Budget preparation system<br>• Included in Budget preparation system |
| ***Payroll*** | • Manual and calculated separately by Spending units<br>• Some SUs use an automated system but not integrated with Treasury<br>• A central automated payroll system is in use and integrated with Treasury system<br>• An automated decentralized payroll system exists |
| ***Pensions for Government pensioners*** | • Manual and calculated separately by Pension department<br>• Automated pensions calculation used but not integrated with Treasury<br>• Automated pensions calculation integrated with Treasury system |
| ***Benefits calculation for Government employees (Provident Fund and Gratuity)*** | • Manual and calculated separately by Spending units<br>• Some SUs use an automated system but not integrated with Treasury<br>• A central automated payroll system is in use and integrated with Treasury system |
| ***Complement Control*** | • Manual and done off line<br>• Treasury checks availability of establishment budget off line before running payroll.<br>• Integrated with Treasury. Prior to the payroll run Treasury checks for availability of sanctioned posts from the establishment list. |
| ***Debt Management*** | • Manual<br>• Automated but not integrated with Treasury<br>• Automated and integrated with treasury system<br>• Sub-national debt management system |
| ***Fixed Assets*** | • Manual<br>• Automated and integrated with treasury system |
| ***Auditing*** | • Audit department has online access to Treasury databases |

# Annex III – A Questionnaire to Assess the Suitability of Application Software to meet Treasury Functional Requirements

This Annex is intended to assist Treasury managers in the process of selecting appropriate application software from the wide range of options that are now available in the market. The questionnaire focuses on Treasury-specific requirements that are not commonly found in a statement of requirements for commercial accounting systems. It is intended to provide Treasury managers in client countries a benchmark to determine the goodness of fit of the major products on the market with the core Treasury functional processes and requirements. In an actual software selection process it would be used to supplement the normal set of requirements used in the selection of accounting systems.

Specifically, Treasury managers would need to determine:

- How a specific package would be set up / operated in the institutional setting under which the Treasury Department has been set up in the country.
- Determine how the package would support/ perform the key functional processes involved in Treasury operations.
- Determine how the package would interface with the banking system (Interbank clearing system) to enable payments to be made by the Treasury from the Treasury Single Account, and record revenue receipts that are normally collected via the banking system and deposited in the TSA.

## Part I – Implementation Arrangements and Technology Architecture

| Question | Response |
|---|---|
| Describe how the application software package can be implemented in the specific institutional setting in this country. Specifically describe which modules need to be implemented at various locations – Spending Unit, MOF, Treasury head office, Treasury subordinate office, Line Ministry, Spending units. | |

### *Interface with the Banking System*

| Question | Response |
|---|---|
| Describe how the package will interface with the banking system to enable payments from the Treasury to be transmitted to the TSA Bank and to record information from the TSA bank on revenue receipts. | |

### *Technology Architecture*

| Question | Response |
|---|---|
| Describe how the application software package will be implemented in each of the following settings<br>Case I: The Treasury system operates in a centralized architecture with the application software being resident at the central treasury and subordinate offices connected to the central servers via on-line connections for transaction processing.<br>Case II: The Treasury system operates in a two tier partially centralized architecture with the application software being resident on servers located at the Provincial/ Regional level. Lower level treasury offices connect to these servers via on line telecommunication connections and transaction processing is carried out at the provincial level. | |
| Describe, in brief, the hardware/software platform required to operate the package as the Treasury system. (. Name and type of application software package, size of servers, nature of operating system, DBMS, client operating system , nature of LAN/WAN, etc.) | |
| Describe the nature of telecommunications connections required to transfer data or for connections between different levels. (leased lines/dial up), (fiber optic,/copper/ satellite, etc.)<br>Is the system access web-based, so that access to the system can be obtained by connecting to an ISP which, in turn, establishes the connection to the system? | |
| What languages does the package support? Is a version available in the local language?<br>Is full end user documentation / technical documentation available in these languages? | |
| What technical support arrangements and network are available for supporting the application software in country? | |

### *Cost, Time Required for Implementation*

| Question | Response |
|---|---|
| What is the license fee per user for the modules that would be necessary to operate the Treasury functions described in this document? | |

## Part II – Treasury Functional Processes

| Question | Response |
|---|---|
| What are the principal modules of the system required?<br>Budget management<br>Commitment management<br>Purchasing<br>Fixed Assets<br>Accounts Payable<br>Accounts Receivable<br>General Ledger<br>Fiscal reporting<br>Other. | |

### *Management of Budget Authority*

| Question | Response |
|---|---|
| **Budget Classification Structure** | |
| Can the software package support the budget classification structure in use?<br>Fund<br>Function<br>Organization<br>Program<br>Project<br>Economic classification (Object of Expenditure) | |
| What are the limitations on the sizes of the various segments in the budget classification structure? | |
| How easily can changes be made to the budget classification structure in the light of changing country requirements?<br>How long will it take to make these changes? | |
| **Budget Load Facility** | |
| Is there a facility available to upload the annual approved budget into the system as is normally required at the start of the year?<br>What is the required format of the input file, for example, can this upload be done from an Excel file? What other formats are available? | |
| **Expenditure Plans Recording Facility** | |
| Does the system have a facility to record ministries / spending units expenditure plans (prepared on e.g. a monthly or a quarterly basis) at the start of the fiscal year. Is there a facility available to upload expenditure plans from external files? Any restrictions on format? | |
| Describe how changes to these expenditure plans can be made in the system. | |
| **Budget Apportionment and Allotment** | |
| Describe/Demonstrate how the process of budget apportionment (for ministries) and allotment (for spending units) is carried out in the system.<br>Does the system have a facility to set spending limits (apportionments/ allotments) equal to the ministry/ spending unit expenditure plans?<br>Can the limits be set by prorating the overall approved budget amount. by month, for example? | |
| **Warrant and Sub Warrants** | |
| Describe how the system would support the warrant and sub-warrant processes.<br>Can the warrant/ sub-warrants be set equal to the Spending Unit expenditure plans? | |
| What are the controls in place on the releases of warrants/sub-warrants?<br>What kinds of controls are imposed to ensure that total sub warrants do not exceed total warrants and the total warrants do not exceed the apportionments/ allotments? Are the controls imposed for every budget line item? | |

### *Budget Transfers*

| Question | Response |
|---|---|
| What are the facilities in the system to make transfers of budget allocations from one category to another?<br>What controls are in place?<br>Can specific agencies be given the authority to make these transfers, for example, different authorities to be exercised at the spending unit level, at the line ministry level, and the MOF? | |

### *Supplementary Budgets*

| Question | Response |
|---|---|
| What facilities are in place to support the supplementary budget process? | |

### *Commitment of Funds*

| Question | Response |
|---|---|
| Can the system support the commitment process? | |
| If yes, what are the controls in place for approving commitments?<br>Is the commitment request checked against the budget appropriation, apportionment or against the available warrant allocation before approval?<br>Can thresholds/ other criteria be set for approval of commitment requests to be applicable at the spending unit, parent ministry and at the MOF level? | |
| Does the system have a facility to review budget data on available funds and existing commitments prior to approving new commitments? | |
| Does the line ministry / spending unit making the commitment need to have direct access to the commitment module of the Treasury system to record commitment requests? | |
| If not, how can commitment requests and approvals to and from line ministry/ spending agency be transmitted to the Treasury?<br>a. Computer compatible medium?<br>b. Manually by paper<br>c. Both | |
| What is the stage during the procurement process that a commitment is recorded in the system?<br>Is it at the stage of the procurement request or the actual placement of a Purchase Order (PO). | |
| Does the system have a facility to track the progress of a purchase order? | |

### *Payments Management – Verification of Goods Receipt*

| Question | Response |
|---|---|
| Please describe how the system supports the receiving process. Does the system provide the receiving department viewing access to the PO for validation purposes? | |
| Is the receiving department able to confirm receipt – enter data – directly into the contract management module (against POs, contracts, authorization)? | |
| How does the system confirm the receipt of goods/rendering of service? | |
| Is there an interface between the receiving system and procurement system? Is it able to flag discrepancies between existing purchase orders and actual receipts? | |

### *Payment Authorization*

| Question | Response |
|---|---|
| Describe how the system supports the payment process. Is the system automatically able to check total funds available against the budget prior to authorizing payment? Does it check against budget authorization, apportionment or warrant before authorizing payment? | |
| How are payments authorized?<br>Signature<br>Secure ID code (electronic)<br>Both | |
| Is there a requirement for an existing PO, contract or authorization prior to payment? | |
| How can payment requests be tracked electronically? | |
| Are POs, contracts or authorizations available online? | |
| What mechanisms are in place to flag authorizations that overdraw the budget? | |

### *Payments against Invoices*

| Question | Response |
|---|---|
| Is there a facility for setting payment thresholds for various levels such as Ministries or spending units? | |
| Is there a facility for tracking payment requests? | |
| Is invoice detail captured on the payment? | |
| Is invoice detail captured when PO updates are made? | |
| Is payment confirmation information accurately captured and available for viewing by staff? How?<br>a. Electronically<br>b. Report<br>c. On request by line ministry / spending unit<br>d. Other? | |
| How is payment progress tracked? | |
| Are payments in different currencies pooled in the payment schedule? | |
| What facilities are in place to record payment confirmations received from the Bank?<br>a. Instantly<br>b. Daily<br>c. Other | |
| Do commitment and expenditure updates occur simultaneously as payment are made? | |

### *Payroll and Benefits Payments*

| Question | Response |
|---|---|
| Does the system have a payroll module?<br>Does the system have facilities to accept input from another payroll system if one is not available in the package? | |
| What are the controls in place prior to making payroll payments?<br>(a) Can the total salary bill of a unit checked against available budget?<br>(b) Can the system check for existence of a sanctioned position for each position in a spending unit prior to making the payment? | |
| How can payroll payments be made?<br>a. Electronic deposit<br>b. Check<br>c. Cash<br>d. Combination of some or all of a, b, and c. | |

### *Scheduling Payments*

| Question | Response |
|---|---|
| How can payments be prioritized (by size, by currency, recurring vs. one-time, vendor, etc.)?<br>How are these priorities set can they be restricted to a specific agency e.g. Treasury/ spending unit? | |
| Does the system have facilities for making the payment pipeline available to the line ministry or spending agency for viewing? | |

### *Payment Processing*

| Question | Response |
|---|---|
| Does the system have facilities for making payments by:<br>a. EFT?<br>b. By check?<br>c. In cash? | |
| How are payments monitored and tracked? | |
| How is payment completion transmitted to the Treasury from the bank for reconciliation against the budget, PO, payment authorization? What Bank reconciliation facilities are available in the system? | |
| Describe the nature of the interface between the system and the inter-bank clearing system | |
| Does the system have facilities to create a fixed asset record after the purchase of an item from the procurement system? Describe these facilities. | |

### *Receipts Management*

| Question | Response |
|---|---|
| What facilities does the system have to support the receipt management processes?<br>Describe how will the system enable the tax/ customs receipts information to be recorded in the Treasury system in the following cases?<br>a. Tax Receipts are first deposited in Bank accounts controlled by the State Tax Administration Department and are subsequently transferred to the Treasury Account on a periodic basis. The TSA Bank informs the Treasury of deposits.<br>b. Tax receipts are directly deposited by tax payers into the TSA or accounts controlled by the Treasury. The TSA Bank informs the Treasury of the deposits. | |
| What facilities does the system have to transmit data on tax/ customs collections to the tax/ customs departments? | |

### *Revenue Sharing*

| Question | Response |
|---|---|
| Describe the process of revenue sharing for example, computing, verifying request, process payment order) | |
| During the verification process does the system automatically check revenue sharing requests against revenue rules? | |
| How would the Treasury transmit/transfer shared revenue?<br>a. Check<br>b. EFT | |
| How is revenue sharing information communicated?<br>a. Electronically<br>b. Printed report<br>c. Both<br>d. Not communicated | |

### *Cash Management*

Revenue and Expenditure Forecasts

| Question | Response |
|---|---|
| What facilities re available for preparing the revenue forecasts? | |
| What facilities are available for preparing cash requirements forecast? | |
| What kinds of tools are used to determine trends, compare data and arrive at forecasts? | |

### *Monitoring Cash Balances in Treasury Accounts*

| Question | Response |
|---|---|
| What facilities are available for monitoring balances in Government Bank accounts? | |
| Is it possible to receive TSA balance information electronically ? | |
| Where is foreign currency reserve requirements information stored? Does the system automatically flag when cash balance levels are approaching reserve requirements? | |

### *Reconciling TSA and sub Account Balances*

| Question | Response |
|---|---|
| What facilities are available for reconciling TSA and sub–account ? | |

### *Monitoring Payables*

| Question | Response |
|---|---|
| How are payables monitored and evaluated? Is this process automatic or manual? | |
| Can payable information be compared with receivables? | |

### *Monitoring Receivables*

| Question | Response |
|---|---|
| Please describe the receivables aging process. | |
| Can receivable information be compared with payables? | |

### *Debt and Aid Management*

New Debt Agreements

| Question | Response |
|---|---|
| Is there an automated debt management system available? | |
| Does the system automatically notify the responsible parties of approaching maturity and payments due? | |
| Does it generate payment transactions relating to debt servicing that can be entered into the Treasury system? | |

### *Foreign Aid and Grants Receipts*

| Question | Response |
|---|---|
| What are the facilities for tracking foreign aid/grants terms and conditions? | |
| How are aid/grants received by the Central Bank? | |
| How are funds transmitted by the donor to the Bank?<br>a. EFT<br>b. Check<br>c. Cash | |
| Describe the process of transmitting receipts information from the Central Bank/ TSA Bank to the Treasury system? | |

### *New Debt Inflows*

| Question | Response |
|---|---|
| Describe how your system would support the process of transmitting receipts information from the Central Bank/ TSA Bank to the Treasury system? | |

### *Debt Service Payments*

| Question | Response |
|---|---|
| Does the system have a facility to receive bills from lenders?<br>a. Electronically (SWIFT, etc.)<br>b. Paper (mail, fax, telex, etc.)<br>c. Both | |
| Is there an automated debt management system in place?<br>Does the system automatically notify the responsible parties of approaching maturity and payments due?<br>Does it generate payment transactions relating to debt servicing that can be entered into the Treasury system? | |
| Are payment and maturity terms for each instrument readily available? | |

### *Budget Review and Fiscal reporting*

| Question | Response |
|---|---|
| Describe the system's fiscal reporting facilities. | |

### *Revenue Monitoring*

| Question | Response |
|---|---|
| What facilities are available for revenue monitoring?<br>Is past collection data used in reviewing current year collections? | |
| If so, how many years of past data is used in comparing trends? | |
| Are there any specialized tools used in comparing current collections against expected collections? If so, please provide details. | |

### *Expenditure Monitoring*

| Question | Response |
|---|---|
| What facilities are available for expenditure monitoring?<br>Is past expenditure data used in reviewing current year expenditures? | |
| If so, how many years of past data used in comparing trends?<br>How many years of past data is stored in the system?<br>Are there any specialized tools used in comparing current expenditures against expected expenditures? If so, please provide details. | |

# Annex IV – Functional Responsibilities of the Technical Organization to support an IFMIS

The Technical support organization proposed for supporting the operation and maintenance of an IFMIS will have significant responsibilities for the management, control, operation and integrity of the applications and data, namely: system administration, database administration, applications technical support, network administration, operating systems and help desk administration. An explanation of the key functions and activities to be performed is given below.

- **Systems Administration**: System Administrators are responsible for: setting up all user profiles and access rights on the production system; notifying all new users of their initial user-id's and passwords and advising them to change the passwords immediately; maintaining the system access rights after receiving appropriate authorization, including disabling users, updating user access rights, and re-enabling users, managing security, concurrent processing, and other ERP administrative functions.
- **Database Administration**: The Database Administrator should have a technical background with thorough knowledge of the UNIX operating system, and ERP Database Administration (DBA background) with knowledge of clustered environments. Key responsibilities would include:
  - Maintaining the various application environments and instances
  - Creation of periodic backups
  - Application of software patches
  - Reporting Technical Action Requests to SAP
  - Following troubleshooting paths
  - Performing restores of a previous backup.
  - Start-up/Shut down of the System
  - Notify the implementation team and user community of potential loss of service periods.
- **ERP Application Development and Support**: An Application Developer is responsible for developing code and fixing bugs that are found during testing, design of user interfaces, reports, and any customization. The Application Developers would perform the following tasks:
  - Development work including but not limited to export programs from the existing applications (HR & payroll, FI etc.)
  - Developing reports required for all the functional modules
  - Taking over responsibilities for customizations developed by the Supplier and maintain these in Production.
- **Network Administration**: The Network Administrators are responsible for the maintenance of the FABS network connectivity ensuring that all users have the required connections to the system, access to production and training. The Network Administrator is responsible for the following tasks:
  - Performing recurring operational tasks related to the support of the network infrastructure, including LANS, WANS, routers, servers and workstations.
  - Maintaining communication infrastructure, access to the internet and the WAN resources when neededSetting up and testing all users required connection and accesses to FABS Application Instances.
- **UNIX Administration**: UNIX Administrators are responsible for the maintenance, support and upgrades of the operating software and utilities on which the Oracle Database and SAP applications reside. The UNIX Administration works in close collaboration with the Database Administration to ensure full applications availability and security to the end users. The UNIX Administrators are specifically responsible for the following tasks:

- Managing File Systems
- Managing Users
- Network configuration
- Printer Management
- Managing and analyzing system resources
- Backup and recovery
- Managing and monitoring processes
- Development of UNIX scripts for management of specific tasks
- Disaster Recovery.

- **Help Desk Administration**: Help Desk personnel are either selected from the competent Super-Users or trained by the Super-Users to perform the Help-Desk activities. Help-desk personnel must be specialized by Module/Track. Help-desk supervisors shall have more multiple module knowledge. Their role is to provide first line support to end-users as follows:
  - Receiving and responding to end-user queries and requests
  - Receiving and logging end-user trouble-tickets (report of a problem)
  - Relaying resolutions of trouble-tickets to the originating end-user
  - Establishing a knowledge base of FAQ's (Frequently asked questions) and their traditional troubleshooting and resolution paths
  - Escalating non-standard problems to second line support as to be outlined in the Help Desk Strategy, logging, and receiving resolutions
  - Communicating circulars and changes to the system operation mode if/when needed.

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