

Conceptual Design: A Critical Element of a Government Financial Management Information System Project

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TECHNICAL NOTES AND MANUALS

Conceptual Design: A Critical Element of a Government Financial Management Information System Project

Prepared by Abdul Khan and Mario Pessoa

This paper addresses the following main questions:

- What is a conceptual design for a GFMS, and why is it critical to the success of a GFMS project?
- What are the key factors that influence the preparation of the conceptual design?
- Who are the main stakeholders in the preparation of the conceptual design?
- What are the main considerations when defining the scope and coverage of a GFMS?
- What key issues related to the budget management framework, business processes, and reporting requirements should be covered in a conceptual design?
- What is a reasonable sequence of activities to prepare the conceptual design?

I. Introduction

Countries are facing increasing pressure to improve fiscal management and reporting. The demand for better information is to: facilitate decisions on macroeconomic, monetary, and fiscal policies; ensure transparency and accountability; and demonstrate government performance in the provision of goods and services. The volume and complexity of fiscal information governments use in daily operations continue to increase. Reliable and readily available fiscal data will be a key determinant of many public finance reforms, including measures to: direct resources to achieve particular policy goals, e.g., poverty reduction; enlarge the coverage of the budget; introduce a medium-term fiscal perspective in the budget; produce information on tax expenditure, fiscal risk, and contingent liabilities; implement a program-based budget framework; and improve the quality of cash and debt management.

Governments are increasingly turning to computerized financial management systems to help them respond to the demand for better information. Development partners also encourage governments to implement these systems, commonly referred to as government financial

¹This note has benefited from useful contributions from Mr. Michel Lazare, Mr. Richard Allen, Mr. Eivind Tandberg, Mr. Pokar Khemani, Mr. Ian Lienert, and Mr. Holger van Eden (all FAD), and Ms. Eileen Browne (advisor).

management information systems (GFMIS), in the expectation that such systems would lead to a significant improvement in the governments' capacity for fiscal management and reporting. In particular, such systems are expected to provide a critical financial management solution for countries whose administrative and economic infrastructures are obsolete or have been destroyed through war and years of conflict.²

However, international experience in implementing a GFMIS varies widely in terms of success and failure. Obstacles abound in the way to successful implementation: inadequate attention to change management and failure to sequence implementation appropriately; capacity constraints at both operational and management level; resistance from the bureaucracy; and governance issues. One of the many reasons for failure is the lack of appreciation that the implementation of a GFMIS is a complex and lengthy process that demands sustained commitment of financial and human resources. Reflecting this tendency to underestimate the complexities, in some cases little effort is made to adequately define the scope, objectives, and coverage of such information systems prior to proceeding with implementation. The pressure to have something in place as soon as possible has sometimes led to a precipitous rush into development and implementation of systems, without first articulating a clear vision of the system and the overall framework which it is intended to support. Conversely, successful implementations usually are associated with the development and specification of a clear view or model, referred to in this paper as a conceptual design (CD), of the intended system and the associated budget management framework.

A well crafted conceptual design is but one factor that is critical to the success of a GFMIS project. This paper does not discuss the many other factors that have to be taken into consideration by the management and project team to successfully implement a GFMIS. These include: project management arrangements, including project plan and budget; reforms of public financial management (PFM) framework, including institutional change; change management; detailed functional requirements; IT and communications environment and architecture (including decision on a centralized or a decentralized system); system performance requirements; custom-made system or off-the-shelf system; procurement of hardware and software; selection of system implementation/integration advisors; coordination with donors and providers; sequence of implementation (pilot, parallel run, roll-out plans); and post implementation review. In other words, having a good CD is a necessary condition but is not a sufficient one to guarantee success of any GFMIS project.

This note discusses the importance of preparing a CD to support the implementation of a GFMIS. It is organized in 10 main sections. Section II defines the objectives of a conceptual design. Section III explains the key factors that influence the preparation of a CD. Section IV identifies the main stakeholders who should be taken into account during the development of a CD. Section V discusses the scope of a GFMIS. Section VI deals with the coverage of a GFMIS. Section VII deals with budget, accounting, and reporting framework issues. Section VIII deals with busi-

²Integrated Financial Management Information Systems: A Practical Guide, USAID (January 2008).

ness processes. Section IX discusses the outputs of a GFMS and Section X presents an indicative sequence of the main activities to prepare a CD.

II. Objectives of a Conceptual Design

There is no universally accepted definition of a GFMS. While there is a broad common understanding that a GFMS is a computerized system that deals with government PFM functions, opinions vary widely about such fundamental issues as the objectives that the system is designed to achieve, the business processes the GFMS is supposed to support (scope), the public sector units that are supposed to be covered by the system (coverage), and the nature and extent of the support the GFMS is expected to provide (functionalities).³

A well developed CD is a tool to clarify and reach agreement on these and other fundamental issues that help define a GFMS and guide the GFMS implementation team. A CD is thus a critical element of a successful GFMS project. A conceptual design has been defined by some commentators as a specification about what a system (i.e., GFMS) is, what it will do, and how it is intended to be used. The CD should also clarify what a GFMS is not, what it cannot do, and how it is not intended to be used. A conceptual design is very different from the engineering design of a product, which specifies architectural and programming details of a product, usually in terms of codes.⁴ This paper defines a conceptual design as *a specification of the objectives, scope, and coverage of a GFMS along with an overview of the PFM framework, user requirements, and key business processes that the system is required to support.*

A CD is different from the detailed functional specifications of a system. A conceptual design should be strategic and indicate, in broad terms, the major functionalities the GFMS is expected to provide. These broad requirements provide the basis for the development of the more detailed specification of functional requirements.⁵ The precise demarcation between the two is a matter of judgment. However, it is important to keep this distinction in mind to avoid the risk of including too much functional details in the conceptual design, instead of focusing on the key conceptual and framework issues.

A GFMS project involves significant investment and a CD reduces the probability of costly failures.⁶ In the absence of adequate specification of requirements, system projects can fail

³According to Diamond and Khemani (2005) a GFMS usually refers to the computerization of PFM processes with the help of a fully integrated system for the financial management of line ministries and other spending agencies. The full system should also secure integration and communication with other relevant information systems.

⁴Interface concepts: <http://www.interfaceconcepts.com/index.htm>.

⁵Functional requirements is sometimes included as part of what is referred to as “system design,” that may also include technology architecture and implementation methodology. (See *Implementation Methodology of the Integrated Public Financial Management Systems in Europe and Central Asia*, by Cem Dener (2007).)

⁶A USAID study suggests that a rough guideline for estimating the cost of installing the complete hardware and software platforms for a comprehensive GFMS is to estimate about US\$6 per capita. Ancillary costs such as training and reorganization can double these base costs. As an example, the study cites the case of the Slovak Republic which had incurred a base cost of US\$30 million, and a total cost of US\$60 million for a GFMS. The cost to implement a GFMS in Latin America has ranged from US\$35 to US\$100 million. The State of California is considering

completely in the sense that no functional system is delivered. More probably, implementation of a system without an agreed conceptual design may require costly modifications. Generally, modification of a system to meet user requirements, e.g., because they have not been specified in an agreed conceptual design, can cost anywhere from 10 to 100 times the cost of building a system where the requirements are defined in advance.⁷ Failure of systems to satisfy user requirements is not restricted to developing countries. For example, the *National Aeronautic and Space Administration* (NASA), probably one of the most technologically sophisticated organizations in the world, implemented a new financial system in 2003, which, according to NASA's independent auditors, could not produce auditable financial statements and did not comply with relevant legal requirements.⁸

A CD can also prevent confusion and disagreements during the implementation phase of the GFMIS. A GFMIS project is often embarked upon as part of a broader PFM reform program. The development of a CD provides an opportunity to systematically discuss the proposed reforms and specify their impact on existing systems and processes. Once agreed, a CD can thus provide a permanent record of the intended systems and processes and help avoid unproductive and repetitive debates. The development of a CD can also help identify major inconsistencies, gaps, and duplications in the processes, and resolve these issues before steps are taken in procuring and implementing hardware and software that may be difficult or expensive to reverse.

A conceptual design should be prepared even if the intention is to implement a well proven commercial off-the-shelf (COTS) system. Some commentators have argued that several COTS FMIS packages with successful track records are available in the market, and a government could simply select one of these and proceed with implementation, thereby saving time and resources. Sometimes this argument is combined with the urgent needs of a country, e.g., in a post-conflict environment, to justify dispensing with a CD and proceeding directly with implementation. Proponents of this view appear to argue that the functionalities of a modern COTS FMIS package can simply be implemented without the need to give any consideration to the particular budget management framework and business processes of the government.

Governments may use the same COTS FMIS package, but require it to satisfy fundamentally different user requirements. These requirements are dictated by each jurisdiction's budget management framework that, in turn, reflects different legal and regulatory revisions, conventions, and management needs. Thus, there are jurisdictions (e.g., Victoria, Australia) that use the *Oracle Financials* to support an accruals- and output-based budget management framework, while others (e.g., Kazakhstan) use the same package to support a cash- and input-based framework. Clearly, simply deciding to implement a modern FMIS package does not eliminate the need to specify the particular framework and business processes that the system is expected to support, so that the

the implementation of a Financial Information System for California (FISCal) that, it is estimated, will cost US\$1.6 billion over a period of 10 years (2008/9 to 2017/18).

⁷Steve McDonnell, *Code Complete*, second edition (Redmond, Washington: Microsoft Press, 2004).

⁸GAO, *Financial Management Systems: Additional Efforts Needed to Address Key Causes of Modernization Failures* (2006).

system can be configured to satisfy these requirements. This is why a conceptual design should be prepared regardless of whether a custom-made system is to be developed or a COTS FMIS is to be implemented.

There are also examples where attempts were made to implement supposedly simple COTS FMIS without developing a conceptual design on the ground that the needs of the post-conflict country were urgent and needed a speedy solution. Unfortunately, after several years of efforts and significant expenditure, the system was still unable to meet the user needs, partly because these needs were never identified through the development of a CD and other user requirements documentation.

Another view is that governments could simply adopt the conceptual design of other governments that have successfully implemented a GFMIS. In principle, this is not an invalid approach and a government contemplating a GFMIS project should certainly learn as much as possible from the experience of others. It is understood that Malawi has successfully implemented the Tanzanian COTS FMIS system without any substantial modification and Ecuador has implemented a custom-made system developed by Guatemala. In practice, however, the feasibility of such an approach would be dependent on the differences in the budget management framework and related business processes between the two governments, and the willingness of one government to adapt its framework and processes to minimize, or avoid altogether, the need for any customization. If the framework and processes are identical, the conceptual design and other user requirements of one government may simply be adopted by the other. However, in most cases there would be some differences and these would need to be documented in a CD. For the sake of completeness it would be preferable to develop a full CD in such cases, even if substantial parts of it are based on the other country's documentation.

III. Key Factors that Influence the Preparation of the Conceptual Design

Political ownership and high level support for the conceptual design phase of a GFMIS project are important. Sometimes it may be easier to attract political support for the implementation of a GFMIS than for a conceptual design. The implementation of the system itself may be seen by the authorities as something concrete, whereas the development of the CD could be perceived as a more abstract process that will delay the implementation of the system. A good communication strategy will be required to obtain and retain political support during the development of the conceptual design. It should also be ensured that the GFMIS project is consistent with any overall government strategy for information and communication technology.

The preparation of a CD must be adequately resourced. Officials with appropriate skills in key business areas, such as budgeting, accounting, and audit need to be involved in the preparation of the CD. In certain circumstances, it will be necessary to supplement expertise in areas with weak capacity by hiring external consultants. The temptation to avoid hiring of experts to

save costs should be avoided. Failing to devote adequate resources during this stage to cut costs is likely to be expensive in the long run, as a poorly designed CD may lead to expensive modifications of the system later, or the failure of the GFMS project altogether.

A sound change management strategy must be put in place in parallel with the development of the CD. The implementation of a GFMS should not be seen as a simple mechanization of existing PFM procedures. A GFMS project is often used as an opportunity to improve PFM systems and processes that can involve radical changes to current procedures and legal framework of the government. Furthermore, one of the objectives of a GFMS project is to benefit from the efficiencies resulting from the use of new technologies. The proposed reforms and changes can naturally cause concerns among staff and other stakeholders. The team developing the CD should identify the areas of potential concern and develop a communication strategy with a view to allaying fears by explaining the proposed changes, addressing valid concerns, and clarifying any confusion. Remote users and legislators may also need similar attention. The change management strategy should also deal with issues related to changes in roles and responsibilities, capacity building, and sustainability after the consultants have departed.

IV. Key Stakeholders to be Involved in the Development of the Conceptual Design

The key stakeholders that should be responsible and accountable for the preparation of the CD include staff in charge of the budget, accounting, cash management, debt management, and reporting. The ministry of finance (MoF) and other ministries in charge of PFM issues (particularly if these functions are not concentrated in the MoF); the budget preparation and execution departments in line ministries; the areas responsible for the payroll and procurement; the committee of parliament in charge of budget analysis and approval; and the supreme audit institution, are areas that should be involved in the process of discussing and developing the CD. Staff from the central bank in charge of preparing the medium-term fiscal framework, the tax administration, and the ones responsible for preparing macroeconomic projections could also be involved, for example, in discussing the implementation of the treasury single account or the interface of the GFMS with the tax system.

The cabinet or senior ministers should approve the lead agency for the development of the CD and implementation of the GFMS. There are different options to lead such projects. Usually, the lead agency is the MoF with one of its key departments, e.g., the treasury, given the responsibility to manage the project on a day-to-day basis. However, when the responsibility for planning, budget, cash management, and accounting is not concentrated in one ministry, the responsibility for managing the preparation of the CD has to be negotiated among the concerned ministries with, preferably, the MoF playing the leading role.

Relevant users of the GFMS should participate actively in developing the CD. The lead agency, in consultation with other stakeholders, would prepare the initial specification of the

system as a basis for discussion and promote understanding among other stakeholders of the key conceptual parameters of the framework, the main features of the system and its impact on the institutional arrangements and main business processes. The responsibilities of each entity in the preparation and/or review of the drafts of the CD should also be specified and agreed.

A steering committee to oversee the preparation of the CD should be created.⁹ The committee would, among other things, ensure that the different views and interests of the stakeholders are taken into consideration in developing the CD. When there are differences of views that cannot be resolved through discussion at the working level, the steering committee would be responsible for making the final decision. This committee could be chaired by the head of the area responsible for operating the system (e.g., the treasury), or another top official nominated by the executive. Appointing someone outside of the main business areas could be justified, e.g., to provide exceptional leadership qualities or to assign a high-profile champion.

V. Scope of the GFMIS

One of the fundamental issues to be covered by a conceptual design is the scope of the GFMIS. Options range from a comprehensive system that supports a large number of financial management activities to a minimalist approach, e.g., a system to simply write checks and record payments. Usually, an option in between these two extremes would be selected depending on the assessment of the priorities, timeframe, and resource availability. In practice, the scope of the GFMIS varies from country to country.¹⁰

A common pitfall is to aim for a system with a wide range of functionalities from macroeconomic forecasting for budget preparation to detailed costing of programs, outputs, and outcomes based on advanced costing techniques such as activity-based costing.¹¹ Such a conceptual design would almost guarantee failure and disappointment, particularly in countries with low capacity. Instead, the focus should be on identifying those business processes that are high priority and are normally supported by such systems. It is useful to bear in mind that if a particular functionality is not part of the GFMIS it does not mean that the business needs cannot be adequately supported by some other system.

When deciding on the scope of the GFMIS, it is also useful to guard against the temptation of over-integration. Although integration of systems is desirable, it can be expensive and technically challenging. Where it is not cost effective or essential to integrate, the CD should

⁹Alternatively, a steering committee could be set up for the whole GFMIS project, and this committee would also be responsible for the CD.

¹⁰For example, in Argentina and Brazil the main modules include the general ledger, payables, receivables, debt management, and cash management, including the treasury single account. In the Dominican Republic, Peru, and Turkey the GFMIS also includes the budget preparation module. Liberia has proposed to implement the basic budget execution modules (general ledger, accounts payable, accounts receivable, and cash management) plus payroll. Egypt reversed the usual sequence and started with the budget preparation module and is now implementing the basic budget execution modules.

¹¹The issue here is not so much the overall capability of the system which, in case of most COTS, will almost always exceed the requirements, but rather how to sequence the implementation and the evolution path.

specify those functionalities that are to be integrated and those where an interface would be adequate.¹² The choice between integration and interface or other data access mechanisms should be made on a case-by-case basis. The key requirement is to have the capacity to access relevant financial information in a timely manner to support specified business needs, e.g., to execute the budget and generate reliable reports.

Even where the long-term goal is a fairly comprehensive system, it would often be prudent to adopt a phased approach, starting with a core system and progressively implementing additional modules. When such an approach is adopted, the conceptual design should indicate all the business processes that the GFMIS is eventually intended to support, and those that it is not. For example, it may be decided that the GFMIS need not provide a budget preparation functionality as this is being effectively addressed by some other system. The key is to adopt a pragmatic approach and focus on implementing essential functionalities first. The CD itself could be based on an incremental approach, with the required functionalities of the GFMIS during the first phase being described in detail, accompanied by briefer descriptions of the required features of the subsequent phases. Illustrative guidance of a three-phase approach is provided below.

Any requirement for consolidated financial reports and the manner in which these are to be met should be specified in the CD. Regardless of what systems are used to process transactions of different entities of the public sector, governments may need to be able to report on the whole of the public sector or specified parts of it. In addition to meeting management needs of the executive, such reporting is required for accountability and other purposes under internationally recognized accounting and statistical standards.¹³ Therefore, when developing a CD it is useful to identify the reporting needs of the government and the manner in which these are to be satisfied from a system perspective. If the system covered by the CD is not expected to be used to support all the identified reporting requirements, the CD should specify how these remaining needs are to be met or refer to any other document where this issue may be covered.

The semantic issue of whether the term “GFMIS” is restricted to a transaction processing system, while any separate consolidation system is called something else, is less important than clearly specifying the requirements related to these two types of functionalities. Ideally, the GFMIS should have, in addition to the usual transaction processing function, a consolidation feature or module that receives periodic data from relevant entities, carries out consolidation of data in accordance with accounting standards, and generates required reports. In many cases a

¹²For the purpose of the GFMIS, “integration” means sharing the same database or a set of standardized databases. Using the same database avoids duplication and increases the reliability of information. When the modules are not integrated, they may still be “interfaced.” It means that systems store data in different databases, but one system has the capacity to access and download data in a specified manner. Since part of the information is duplicated, it is important to compare the information to avoid inconsistencies. It represents an additional effort of reconciliation, and could be a source of errors.

¹³Both cash- and accrual-based IPSAS require consolidated reporting of all entities, including public corporations controlled by a particular level of government, e.g., central government. *GFSM 2001* requires reporting of general government and public sector activities.

transaction processing system may have to be supplemented by specialized consolidation software to generate the necessary reports in a timely manner. In case of relatively simple requirements a spreadsheet-based application may suffice.

Finally, the CD should provide a complete overview of the financial management information needs and how they are to be addressed. It should be recognized that while the GFMIS, by itself, does not have to satisfy all possible requirements for financial information, the combination of systems and processes required to satisfy these requirements must be clear. Thus, if the overall requirements include the need to generate detailed reports about revenue or payroll, but this information is maintained in other systems, the CD should refer to such other systems and the need for any interface with the GFMIS.

The following sections discuss, for illustrative purposes, phases of a GFMIS project starting with a system that has the essential functionalities and progressively implementing more advanced features.

A. Phase I—Core System or Essential Functionalities

Phase I should be concerned with addressing the most pressing business needs. These could include making payments, expenditure control, keeping adequate accounting records, and generating reports necessary for internal management and external accountability purposes. This would translate into a conceptual design of a system that supports the following functions: general ledger, purchase and accounts payable, bank reconciliation, and reporting actual expenditure and commitment against relevant budget data.^{14,15} As fiscal reports must contain information about not just expenditure but also revenues and financing items, the CD must also specify how these requirements would be met. A receivable module could be used to record revenues and other receipts, in which case this would be part of the core system, as shown in Figure 1. In other cases, it may be adequate to simply have a receipt recording system, e.g., through journals, to capture these items during the first phase, and an accounts receivable system implemented during the subsequent phases. The CD should also identify the functionalities or modules that are to be implemented in subsequent phases (see below).

The CD should identify any business processes that are not required to be supported by the GFMIS and briefly refer to other systems and processes that are to be used for such purposes. In such cases, the CD should indicate any data from other systems and processes that would be included in the GFMIS. For example, the payroll function may be supported by a sepa-

¹⁴The general ledger is the principal record of an entity which uses double-entry accounting. It will usually include accounts for systematically recording such items as assets, liabilities, revenues, and expenses. The general ledger is a summary of all the transactions that occur in any entity. The transactions are usually recorded in detail first in other accounting records (sometimes referred to as books of prime entry), and then summarized in the general ledger as a series of debit or credit entries. Many governments use the term general ledger but do not maintain a general ledger as defined above.

¹⁵The purchase and accounts payable modules would normally handle the functions associated with making commitments, receiving goods, and making payments. Some commentators use the term “payments system” to describe this part of the GFMIS.

rate system, but the GFMS may be required to produce the payroll checks/bank transfers based on information generated by the human resource/payroll system. Such requirements should be specified in the CD as should the requirement for broader interface between the two systems, e.g., to ensure that relevant payroll data are posted to the general ledger automatically.

B. Phase II—Desirable to have Functionalities in the Medium Term

Once Phase I has been successfully implemented, consideration may be given to introducing additional functionalities, such as fixed assets (usually a module of COTS FMIS packages); cash management; basic debt management (alternatively the GFMS could be interfaced with a separate system with more advanced functionalities); budget preparation (preferably a module of the system, but could be a separate system which interfaces with the GFMS); and payroll (could be a module of the selected system or a separate system interfaced with the GFMS). At this stage some systems that already exist could be decommissioned.

During Phase II, consideration may also be given to implementing the necessary consolidation and reporting functionality. As discussed above, depending on the nature and complexity of the requirements, this functionality could require a separate special purpose software or a simple in-house developed application. That is why it is important to specify the requirements in the CD to facilitate the selection of the appropriate system solution.

C. Phase III—Advanced Features

More advanced functionalities such as costing of programs, activities or outputs, inventory management, procurement (including issuing and evaluation of tenders), and performance management (likely to be a separate system that is linked with the GFMS for automated transfer of relevant data), may be brought within the scope of the GFMS during this phase. Some jurisdictions, e.g., New York State, have also included business areas such as contracts, project accounting, and grants management (both for government as grantor and grantee) within the scope.

Figure 1 illustrates some of the main modules of a GFMS.¹⁶ In this example, the modules that are highlighted in the figure form the core of the system, and should work as integrated modules using a common and shared database. The other modules can be individual systems interfacing with the core system, or integrated to the core system in further stages.

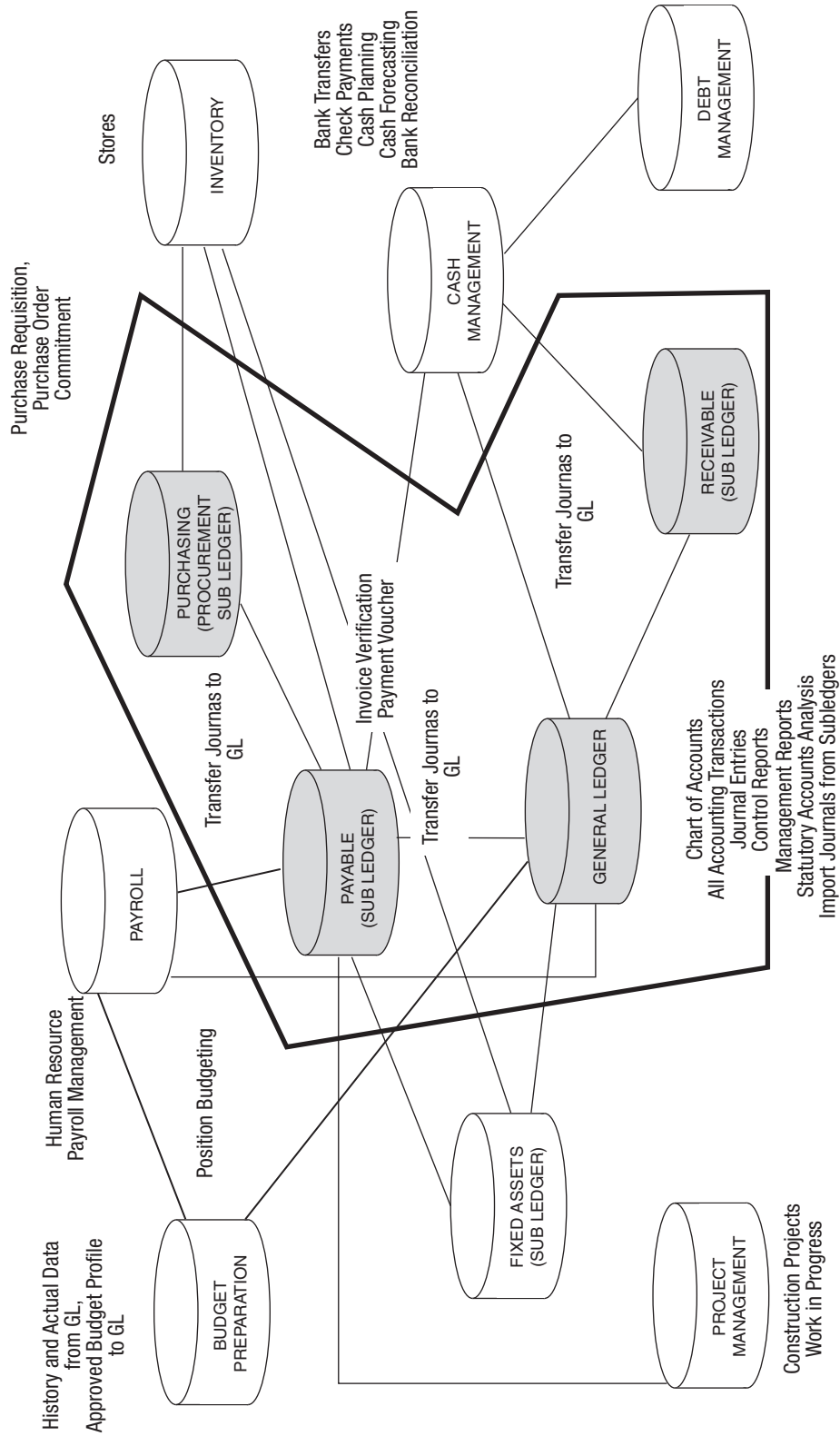
VI. Coverage of a GFMS

The coverage of a GFMS can be viewed from three different perspectives as follows:

- As a transaction processing system.
- As a consolidated reporting system.
- As an “on line” system.

¹⁶For simplicity, Figure 1 does not include a separate consolidation functionality.

Figure 1. Conceptual Model for a GFMS



Source: IMF Technical Assistance Report, 2007, Mexico: Selected Treasury Reforms for a Modern Hacienda

A. Coverage of GFMS as a Transaction Processing System

The CD should clearly identify the entities whose transactions are to be processed by the GFMS. International practice varies with some advanced economies (the United Kingdom, the United States) preferring to make line ministries and departments responsible for their own financial management functions and operating their own FMIS.¹⁷ The MoF in these jurisdictions generally has its own FMIS to record its transactions (payments and receipts), including those with other ministries. In addition, the MoF would usually have some system to receive, store, and consolidate data from other budget entities to produce consolidated financial reports.¹⁸ However, this may not be a practical option for developing countries with limited resources. There may also be a desire to maintain centralized control over all payments. In such circumstances, the preferred option, referred to hereinafter as Option A, may be for a GFMS *to process individual transactions of all budget entities*, i.e., ministries and any other entities that receive budget appropriations in accordance with the budget classification.¹⁹ If necessary, the system may be initially implemented at the treasury offices and rolled-out to budget entities over a specified period of time.

The issue of coverage may also be influenced by the extent of deconcentration of financial management functions. If there are political or other pressures to move towards a more deconcentrated framework where line ministries are to be held accountable for the management of their activities and related resources, a GFMS to record all transactions of budget entities could be viewed by some as contrary to the spirit of such reforms. A pragmatic approach is required in a developing country environment and, notwithstanding any proposed move towards deconcentration, Option A may be considered the most appropriate, given the resource constraints. It should be possible to configure the system in such a manner as to ensure that the individual entities are in control of their system and data.

B. Coverage of a GFMS as a Consolidated Reporting System

Consolidation issues are not always given adequate consideration in conceptual designs. As discussed in Section V, in addition to processing transactions of specified entities, for accountability and other reasons governments may also need to produce consolidated financial reports covering entities that have their own financial management systems. Therefore, the entities to be covered by any such consolidated reports are an important issue when considering the coverage of a GFMS. In theory, a GFMS could process transactions of extrabudgetary funds/entities and local

¹⁷In contrast, the Swiss federal government uses a common COTS FMIS package based system for all departments and offices.

¹⁸Canada uses a central data bank approach (as an alternative to the traditional consolidation system), where relevant data from diverse sources, including departments, are stored. The information can be extracted by a user of the system, whether it is a department or a central agency, by specifying what data are to be selected from the data bank and the format, sequence, amount of detail, and totals in which they are to be reported.

¹⁹Some jurisdictions are considering options under which the GFMS would record transactions of the MoF, but would only record summary data (monthly reports) from other line ministries and departments to generate consolidated reports of the budget. Line ministries and departments usually have manual systems. Such a system would usually not generate the benefits of an automated financial management information system for the budget sector as a whole and is not recommended.

government entities. However, this may increase complexities to such an extent as to pose risks to the GFMIS project as a whole. Instead, it may be preferable to opt for a combination of a transaction processing system for the budget sector to facilitate budgetary control and management, and a consolidation system to enable reporting of broader government activities

Ideally, any consolidation module of the GFMIS of a central government should have the capacity to receive summary data from specified entities and generate required consolidated reports. The entities to be covered would normally be dictated by any regulatory requirements and/or internationally accepted standards. Thus, under IPSAS consolidated reports are required for all entities controlled by the government. Additionally, although not common, the GFMIS could also have a facility to receive relevant reports from local governments to generate reports for the general government sector required by statistical standards.²⁰

The options for a complete system to satisfy a government's requirements for transaction processing and consolidated reporting could include the following:

- The GFMIS satisfies the requirements for transaction processing as set out in Option A (Section VI.A. above), and receives summary data (e.g., periodic reports) of extrabudgetary units and generates consolidated reports for a particular level of government, e.g., central government. (Option B.)
- The GFMIS satisfies the requirements of Option B above, and receives summary data of public nonfinancial and financial corporations, and generates *whole-of-government* consolidated reports for a particular level of government, e.g., central government, as required by accounting standards. (Option C.)
- The GFMIS satisfies the requirements of Option B above, and includes summary data of state and local governments and generates consolidated *general government* reports as required by *GFSM 2001* (Option D). However, this type of report may be more appropriately generated by special purpose systems outside the GFMIS, e.g., by the national statistical agency.

Options B, C, and D could require sophisticated consolidation functions that a transaction processing system may not be able to provide. Therefore, the GFMIS may comprise a transaction processing system and a special purpose consolidation system.

Continuing with the prudent and phased approach recommended in this paper, governments may wish to start with Option A, and move to the other options at a later stage.

C. Coverage of GFMIS as an “On-line” System

The CD should specify the entities that are to be connected to the system. The requirement in this area would normally follow from the options selected for system coverage related to transaction processing, as discussed above. Thus, for Option A the system would preferably be connected

²⁰In Peru, the GFMIS encompasses all entities in central, provincial, and local governments, although some data at the regional and local levels is entered after the fact, by hand, and has no automated reconciliation. In Argentina and Brazil, the central and local governments run independent GFMIS systems.

to the budget entities that would enter their transactions into the system from their locations, and would be able to access such data on-line and produce and print reports as required. However, in some circumstances, e.g., where there are too many budget entities and inadequate resources, another option that is sometimes considered is to connect the GFMIS only to regional offices of the MoF/treasury who would act as the accounting agents for ministries and agencies, and process their transactions (Box 1). Such a system may also be adequate where the treasury exercises centralized control over all payments. Some commentators suggest that efforts should be made to avoid such an option as it distracts from the efficiencies of a truly automated system. It is also argued that such a system has the potential to reduce a sense of ownership of the system by the ministries and agencies who may continue to operate their own systems and processes.

Box 1. GFMIS Connected to Treasury Offices Only

In Kazakhstan, the GFMIS was installed at MoF (treasury) sites only, with line ministries and other budgetary units having to send the manual records of expenditure and other transactions to the treasury, including its regional offices, for approval and recording in the system. Such an option may sometimes need to be adopted because of financial and human resource consideration. Where the number of budgetary units is large, licensing costs can be significant. Furthermore, the need for skilled resources may also militate against installing the system in numerous sites, some of them possibly in remote locations with unreliable power supply and communication facilities. If this option is selected, the CD should also indicate the manner in which transactions of the budgetary units would be recorded and reported, and the services, if any, to be provided by the GFMIS and treasury to these units.

If Option B, C, or D is selected, in addition to the budget entities being connected to the transaction processing part of the system, the consolidation module/system would normally be connected to the extrabudgetary units, public corporations, or local government entities to enable them to upload their periodic data into the system that the MoF can access and process to generate consolidated reports. However, there may be circumstances, e.g., numerous entities in remote locations making an on-line configuration unduly expensive or otherwise onerous, where entities could provide input to the consolidation system through CDs or e-mails.

VII. Budget Management Framework Issues

The CD should clearly identify the overall budget management framework that the GFMIS is required to support. If significant reforms to the existing framework are envisaged that have been specified and approved, the CD should describe the reformed framework and spell out the relevant implications for the GFMIS. In practice, although the need for reforms may be acknowl-

edged and the nature of the agreed reforms specified in broad terms, the development of the CD may be the stage during which these have to be specified in adequate detail to facilitate a common understanding and agreement. In such circumstances, the CD should preferably separately describe the existing framework and clearly identify all the proposed reforms. If the intended reforms require legal or formal administrative actions these should also be identified. The framework issues may be discussed under the following broad headings:

- Legal and regulatory environment.
- Budget management.
- Accounting and reporting.

A. Legal and Regulatory Environment and its Implications for the GFMIS

The legal and regulatory requirements related to the budget management framework must be analyzed and set out in the CD to ensure that the GFMIS has the capacity to support the relevant requirements. The requirements related to key business processes such as budget preparation, budget execution, expenditure control, payment, accounting, reporting, and audit must be specified in sufficient detail. In particular, the CD should set out the requirements related to the form and content of the annual and any supplementary budgets (assuming that the GFMIS is intended to support the budget preparation function), the legal implications of appropriations, and the related requirement that the GFMIS must meet, e.g., to provide an automated appropriation control function, provisions regarding lapsing, and any carryover of unspent appropriations, roles, and responsibilities related to financial management, payment, accounting, and reporting, including the form and content of the annual and any other financial statements and outturn reports, and internal and external audit.

An important issue to consider is the nature and extent of any changes to the laws and regulations that may be required to implement any reforms. All necessary changes should be identified and the reasons for such changes explained. As a matter of contingency planning, the CD should also indicate any alternative scenario for the GFMIS in case the identified legislative/regulatory changes cannot be achieved.

B. Budget and Estimates Framework

The CD should describe the budget and estimates framework and processes, and the related role of the GFMIS. If the GFMIS is intended to be concerned solely with budget execution, and the budget preparation function is to be supported by other systems, this should be made clear at the outset and the budget and estimates preparation process need only be described in summary form. In addition, the necessary interfaces between the GFMIS and the separate budget preparation system should be described, including the need to capture relevant budget data in the general ledger.

The budget and estimates process varies widely from one jurisdiction to another, and it is important to provide information about the particular framework that the GFMIS is required to support. A relatively simple budget and estimates framework could feature an annual

cash and input-based budget designed to exercise parliamentary control over cash expenditure. Such a framework could also involve monitoring fiscal policy through the use of a simple indicator, e.g., the difference between cash revenues and cash expenditures. At the other extreme, a government could adopt a framework featuring multi-year accrual-based estimates that focuses on programs, outcomes and/or outputs, and exercises controls over expenditures or expenses at commitment, liability, and payment stages. Such a framework would, in turn, require an advanced accounting and reporting framework, and probably use several indicators to monitor fiscal policy, including flow indicators such as net lending, operating balance, cash balance, and indicators of financial positions such as net worth, net financial worth, and net debt.

It can be seen from the above that the particular framework selected would have significant implications for the GFMIS. It is, therefore, important to specify these features of the framework and the role of the GFMIS in sufficient detail in the CD so that system vendors/integrators have a reasonable probability of satisfying these requirements. In particular, the CD should address the following aspects of the framework.

Budgeting focus

The CD should explain whether the budget is concerned with inputs only or also with outputs and outcomes. In the case of the latter, the CD should spell out how the focus on outputs and outcomes is reflected in the budgeting framework, and draw out the implications for the GFMIS. For example, if the budget and any forward estimates need to provide specific information on outputs and outcomes, and this information has to be maintained by the GFMIS, this may require a sophisticated budgeting system that may not be practical for many governments with capacity constraints. If, on the other hand, the information on outputs and outcomes is mainly nonfinancial and/or to be recorded in other systems, the demands on the GFMIS may be less onerous.

The CD should specify any requirements for information about existing and new policies. Thus, if the budget deliberations, e.g., at the cabinet level, are focused on new policy (expenditure or saving) proposals and the GFMIS is expected to support the related information requirements, the budget system may need to have highly sophisticated functionalities. If, on the other hand, the GFMIS is to be used mainly to process budget data from entities in order to generate standard consolidated reports, such requirements could be handled by a relatively simple system.

The CD should specify whether the budgeting framework has an annual or a multi-year perspective. In case of the latter, the CD should also describe the requirements of data for the years beyond the budget year.

Budgeting basis, classification, and other issues

The accounting basis to be followed for the preparation of budget estimates should be specified. If there are exceptions within an otherwise cash-based budgeting framework (Section VII.A.), these should be identified and any implications for the system should be specified.

The required segments of the budget classification should be identified in the CD. The essential segments (e.g., economic, administrative, and functional) should be identified and distinguished from others that are considered desirable in the medium term. Consistent with the phased approach recommended in this paper, an emerging economy may decide to implement the essential segments first, and only move towards the more advanced requirements (e.g., program or geographic) at a subsequent phase.

The appropriation control process should be specified. In particular, the stage of the expenditure process (e.g., commitment, accrual, or payment) when legally mandated control against appropriation should operate and the role of the GFMIS, as well as the MoF and other ministries and agencies, should be described.

Treatment of commitments

For budget management purposes, best practice is to control expenditures at the commitment stage. Other practices include the recording of commitments for information purposes but not using it as an expenditure control point. Finally and less desirably, some systems may not record commitments at all. Similarly, for budgetary reporting purposes, some countries recognize commitments as expenditure (Brazil and the U.S.). Others may not recognize commitments as expenditure, but disclose the relevant amounts in their budget outcome reports and audited financial statements in accordance with accounting standards. The CD should specify the particular model to be followed and its implications for the GFMIS.

C. Accounting and Reporting Framework

The accounting framework is an area that often does not receive adequate attention in conceptual designs. The accounting basis, other main accounting policies and principles, the structure of the general ledger, and chart of accounts are all areas that may have a critical effect on the configuration and usefulness of a GFMIS and should be set out in the CD.

Accounting basis

The lack of clarity of some CDs starts with the most fundamental feature of an accounting framework, i.e., the accounting basis. CDs sometimes describe requirements in this area that are almost incomprehensible. For example, “the reporting function must cover three areas ... a resource management area to link financial and performance information (cash-based accounts and accrual based reports).” In other cases, general statements are made, such as “the system should support both cash and accrual basis.” While as a statement of required *capacity* of the system this may be adequate, it is not very informative about the accounting basis to be followed by the particular government and required to be supported by its GFMIS. Clarity on this issue is critically important for the GFMIS to meet a fundamental user requirement.

Although governments are frequently described as following cash accounting, the reality is that most governments do not rely exclusively on a cash accounting basis.²¹ Many governments, while ostensibly following cash accounting, include various accrual concepts in their accounting framework. Thus, many governments do not recognize all cash receipts and payments as revenue and expenditure, respectively. For example, governments may not recognize some tax receipts as revenues, but treat as a liability any amounts related to taxes of future year or years. Similarly, governments may not recognize as expenditure cash advances to suppliers or contractors. In addition, some governments also recognize goods and services received, but not paid for as expenditure and liability. In these limited respects, these governments can be said to be following accrual accounting. Unfortunately, the accounting for these items is often not done fully on an accrual basis either, because in many cases governments do not account for or report the stock related to these items. The effect is a significant lack of transparency and accountability. In some countries this type of accounting framework has led to significant amounts effectively remaining unreported.

The use of an accounts payable system in a cash accounting environment is another example of confusion with accounting basis. Accounts payable is, by definition, an accrual concept because it represents a liability for goods and services received, but not paid for in cash. Yet, CDs of GFMS routinely specify that an accounts payable system is to be used while at the same time requiring a cash basis to be followed. A well crafted CD should avoid such confusion of this type and clarify apparently conflicting requirements and explain what is intended.

Given that different governments may have different mixes of accounting bases, it is important to specify in the conceptual design the default accounting basis, e.g., cash, and clearly identify and explain any exceptions, i.e., any items where an accrual basis is to be applied. For these items, the CD should also specify that asset, liability, and equity accounts are to be maintained and a balance sheet of such stock items must be included as part of the required reports. In addition, the CD must also require that the usual reconciliations and checks applicable to accrual-based financial statements should apply.²² If the valuation basis is to be different from historical cost, this should also be specified. It is not helpful to use terms such as “modified cash” or “modified accrual” without further explanation because there is no universally accepted definition of these terms and, therefore, may mean different things to different people. Any GFMS developed based on such imprecise specifications would be unlikely to satisfy user requirements.

When specifying details of the accounting bases to be followed, the conceptual design should also take into account the implications for a GFMS. While COTS FMIS packages usually work well on an accrual basis, they can also support a cash-based system. However, ap-

²¹IPSASB defines cash basis as a basis of accounting that recognizes transactions and other events only when cash is received or paid. This contrasts with the accrual basis of accounting under which transactions and other events are recognized when they occur, regardless of the timing of the related cash transactions. For an explanation of the concepts of cash and accrual accounting see Khan, Abdul and Mayes, Stephen (October 2007) *Transition to Accrual Accounting*, IMF Technical Guidance Note.

²²For example, the opening and closing net assets or equity must be reconciled with movements in the income and expenditure statement.

plying different accounting bases for different items may pose some challenges and lead to higher implementation and maintenance costs, particularly if customization is involved. With custom-made software, implementation of a hybrid of cash and accrual accounting bases may present even greater challenges. Clear specification of these framework issues would facilitate the system implementation and may also help rationalize the requirements.

Other accounting policies and principles

The CD should also specify other accounting concepts, policies, and standards to be followed. Vague statements such as “internationally accepted standards” are not adequate for system development and implementation. It would be helpful to identify the particular standards, e.g., on consolidation, financial instruments, and contingent liabilities that would be followed. This applies particularly where accrual basis is adopted for all or some items. Ideally, governments should follow IPSAS and this should be noted in the CD. If IPSAS are to be followed selectively, these should be specified. If neither IPSAS nor any other national or international standards, e.g., IFRS, are to be followed, the CD should indicate what accounting policies are to be adopted. If the accounting basis is cash, the choices are less extensive, although as indicated above very few governments follow exclusively a cash accounting basis. The accounting policies and principles adopted should be related to the key fiscal reports and fiscal indicators to be used, and these should be generated through the GFMIS.

The general ledger and chart of accounts

The organization of the general ledger system should be specified in the CD. While all FMIS packages provide a general ledger function, the CD should specify the manner in which the general ledger is to be organized, particularly the units that are to have their own general ledgers. Options range from the MoF maintaining the sole general ledger, to a system where each ministry (or separate budget entity) maintains its own general ledger. In the latter scenario, the CD should also specify if the ministry’s general ledgers are to be configured as subsets of the overall government general ledger, or if they are to be independent in which case the necessary reporting and consolidation processes should also be specified. The lack of clear and agreed position on this type of issues have significantly delayed a GFMIS project in a Middle East country. As explained in Box 2, the organization of the general ledger system is also influenced by the extent of deconcentration of financial management functions in a jurisdiction.

The chart of accounts defines the content of the general ledger and the reports that can be generated from the general ledger system in the GFMIS. The chart of accounts should incorporate the budget classification, although the former would normally accommodate the recording and reporting of more information than the latter. This is particularly true with the administrative classification where the budget may be for a ministry or department, but for internal management purposes the accounting records may need to be maintained at lower levels of organization units.

Box 2. Deconcentration of Financial Management Functions and Design of the General Ledger System

In a fully centralized environment, line ministries are not responsible for significant financial management functions, and the GFMS and the general ledger would generally be configured to mainly support the needs of the responsible central agency, i.e., the MoF.

The model that countries are increasingly exploring requires the ministries and other budget entities to assume more responsibilities for financial management, which in turn could have implications for how the GFMS and the general ledger are configured. To illustrate the type of issues that may arise—in the centralized model the general ledger could be balanced at the budget as-a-whole level. This would mean that double entries could be completed across ministries (i.e., the debit could be in the health ministry and the credit could be in the MoF). The design of such a general ledger would be relatively simple as it would be effectively required to service one entity and generate one set of reports—consolidating all the line ministries. Although subsets of particular reports for each ministry could also be produced, e.g., showing actual expenditure against budgets, the system would not be required to maintain and report on a fully balanced set of accounting records for each ministry or budget entity. In a deconcentrated model, each line ministry may have to be set up in the general ledger as separate reporting entities. This would mean that the double entry must be completed within each line ministry, sometimes referred to as self balancing entity. Under such circumstances, the system should be configured in such a manner as to facilitate the reconciliation between the overall general ledger and consolidated financial reports of the budget sector and the constituent individual ledgers and reports of the line ministry and budget entities.

VIII. Business Processes

For each main business area, the CD should specify the key processes from the initiation of a transaction or activity to its conclusion. The CD should describe the key decision and control points, highlighting those that are to be operated automatically or otherwise supported by the GFMS. One commonly used way of describing the business processes would be to start with a high level description of the processes, including responsibilities of different organizational units, and this would be followed by flow charts of key processes and controls. The main business processes to be covered would depend on the scope of the GFMS, discussed above.

The CD should provide clarity about the linkages between the business processes and key legal, management, and other requirements. For example, if the legal requirement is that the act of entering into a commitment constitutes the usage of a parliamentary appropriation, but there are also nonstatutory requirements to ensure that cash payments cannot exceed allocations issued to a budget entity, the business process description must ensure that requirements for such dual controls are addressed. In some jurisdictions, the commitment control has to be exercised

at a transaction level, but the cash control is only required at an aggregated level. The CD should clarify specific requirements of this type.

If the GFMIS is intended to be used by not just the MoF, but also by line ministries for their own financial management purposes, the CD should also cover the latter's business processes. This may be done by including one business process section in the CD with subsections for the relevant processes effecting different levels of government/agency functions. At one extreme, the MoF may simply issue allocations to the budget units without any inter-departmental cash movements taking place, and the units may submit payment requests through the GFMIS to the MoF which leads to payments from the TSA. In another extreme, and less desirably, the MoF may transfer cash to the budget units' bank accounts based on projections, and offset these cash advances when the units submit their reports, probably once a month. There may be variations in between, where agencies have zero-balance bank accounts that receive replenishments once, or several times, a day. The function of checking that each proposed expenditure is in compliance with the applicable rules, including budgetary limits, could be performed by the budget units, the MoF, or a combination thereof. These differences in the banking and budget execution arrangements would have different implications for the configuration of the system. Therefore, it would be important to specify these business processes in adequate detail.

IX. Outputs of the GFMIS

The CD must specify the outputs required to be generated by the GFMIS. While the detailed form and content of individual reports could be specified separately at a later stage, e.g., as part of the specification of the detailed functional requirements, the CD must provide an overview of the requirements. The required reports could be broadly grouped in two categories. The first group could include standard budget execution reports required for managerial and operational purposes. This group could include (i) daily/weekly/monthly budget execution reports comparing actual revenues and expenditure with budgets or estimates; (ii) budgets/allocation, expenditures committed, incurred, and paid, funds available, and any arrears; (iii) cash management reports showing cash inflows and outflows, and balance of the TSA; (iv) debt management report showing the position of the internal and external debt by source and type of instruments (may only be available if a sophisticated debt management module/system is in use). The second group would include formal reports required to be submitted to parliament or other stakeholders such as annual or periodic financial statements, budget outturn and other fiscal reports, and any special reports required by the auditors. In addition to these two main types of reports, the conceptual design should also identify reports that may be required on an *ad hoc* basis, including any required facility to generate user-defined reports.

Users may require some reports that are not generated by the particular COTS FMIS package selected or custom-made system developed. In such cases governments may need to use special purpose reporting systems. It is important to consider this issue during the preparation of the CD, and specify any requirements for the GFMIS to provide functionality to transfer data to

packages such as Excel and/or interface with special purpose reporting packages, e.g., COGNOS and Crystal.

Caution should be exercised in specifying any requirements for nonfinancial information.

A basic GFMS may not be able to provide such information easily. Including such requirements in the CD may, therefore, implicitly impose a requirement for a sophisticated GFMS that may be impractical in the short to medium term. The CD could include these as longer term requirements to be implemented as part of Phase 3 (Section V.C.)

X. Sequencing

The preparation of the CD should involve extensive consultations on the main features of the budget management framework, business processes, and the desired functionalities of the GFMS. Although no hard and fast rules apply, a suggested sequence of activities for a smooth and efficient process to develop a CD is set out below:

- the minister of finance should obtain cabinet approval for the preparation of the conceptual design for the GFMS;
- the cabinet should form a steering committee and appoint its chair and members to oversee the preparation of the CD (alternatively, the minister could undertake this task if authorized by the cabinet); and
- the steering committee/minister should set up a task force and appoint its leader and members to develop the CD, under the direction of the steering committee.

Once these administrative arrangements are completed the task force, under the direction of the steering committee, should proceed as follows:

- define the strategy and an indicative timetable for the preparation of the CD, and relate this to the overall GFMS project plan and budget; as part of the strategy, identify the stakeholders that will be involved in the preparation of the CD;
- develop a change management strategy and agree on the processes, e.g., timetable to discuss and reach agreement on changes required in the existing systems and processes and the capacity building required to support implementation;
- obtain top level approval to the strategy proposed by the steering committee;
- ensure that financial resources are allocated in the budget for the preparation of the CD;
- if necessary, identify and deploy suitable consultants and internal staff resources to support the steering committee;
- define the scope and coverage of the GFMS, including any phasing; define the modules and business processes that will be integrated in the GFMS, and identify other systems that will be interfaced with the GFMS;
- develop, discuss, agree, and obtain approval for the overall budget management framework, including legal/regulatory parameters, budget and estimates regime, and payment, accounting, and fiscal reporting framework; identify key elements of budget preparation and execution process; identify, to the extent practicable, any changes required in laws and regulations;

- define the main elements of the budget classification and the CoA;
- prepare periodic reports showing the activities and decisions undertaken by the task force and the steering committee; the status of the development of the CD, issues finalized; and issues that are still work-in-progress; and
- complete the preparation of the CD and obtain any final approval either from the minister or the cabinet.

XI. Conclusion

A well crafted conceptual design—together with, *inter alia*, sound project management, relevant PFM reforms, and change management—is an essential element of a successful GFMS project. This paper focuses on issues related to the conceptual design and emphasizes its importance regardless of whether a COTS FMIS or a custom-made software is to be used. A conceptual design should specify the scope, coverage, and outputs of the system, and provide a broad description of the overall budget management framework and the specific business processes that the GFMS is intended to support. The key stakeholders, particularly the intended users of the GFMS, should be involved in the preparation of the conceptual design, which should be formally approved at a senior level prior to proceeding with purchase of hardware and software, and detailed implementation.

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