

How to
Select and implement financial management
information systems
A step-by step Guide

sparc

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Acronyms

AG	Accountant General
AuG	Auditor General
BPR	Business Process Reengineering
BPS	Budget Policy Statement
COTS	Commercial Off The Shelf ('Packaged' computer system)
DBA	Database Administrator
DFID	Department For International Development (UK)
ExCo	Executive Council
FAQ	Frequently Asked Questions
FMIS	Financial Management Information Systems
HRM	Human Resource Management
HRMIS	Human Resource Management Information System
ICT	Information and Communication Technology
IFMIS	Integrated Financial Management Information System
IMF	International Monetary Fund
IPSAS	International Public Sector Accounting Standards
IT	Information Technology
LAN	Local Area Network
M&E	Monitoring and Evaluation
MDA	Ministry, department, agency
MDGs	Millennium Development Goals
MoEPB	Ministry of Economic Planning and Budget
MoF	Ministry of Finance
MTBF	Medium Term Budget Framework
MTEF	Medium Term Expenditure Framework
MTFF	Medium Term Fiscal Framework
MTSS	Medium Term Sector Strategy
OAG	Office of the Accountant General
OAGF	Office of the Accountant General of the Federation
OS	Operating System
PAC	Public Accounts Committee
PFM	Public Financial Management
PRINCE	PRojects IN Controlled Environments (A project management methodology)
RDBMS	Relational Database Management System
SA	System Administrator
SHoA	State House of Assembly
* SPARC	State Partnership for Accountability, Responsiveness and Capability
TMS	Tax Management System
TSA	Treasury Single Account
WAN	Wider Area Network
WB	World Bank

Section 1: Introduction

1.A Purpose of this 'how to' Guide

Financial Management Information Systems are likely to be the largest computerised systems that a Nigerian State Government will purchase and implement. Their acquisition and implementation represent high risk in terms of project delivery and initial and ongoing costs. The attention to proper system design and specification and application of good procurement and contracting practice can mitigate these risks.

This Guide describes practices that Nigerian states may wish to adopt in identifying, procuring and implementing computerised systems. It focuses on Financial Management Information Systems (FMIS).

The Guide provides step-by-step suggestions and tools to make the tasks easier. In order to make the guide useful, descriptions of the various process and tools are simple and straightforward. Readers can find further and more detailed information in documents and websites listed in Section 7 at the end of the Guide.

Several Nigerian states are starting to consider major investments in 'second generation' Integrated Financial and Management Information Systems (IFMIS). This Guide identifies the important features of such systems, the key activities involved in identifying requirements, acquiring, selecting and implementing systems, including links to other key systems such as Human Resource Management Systems (HRMS) and Tax (and Revenue) Management Information Systems.

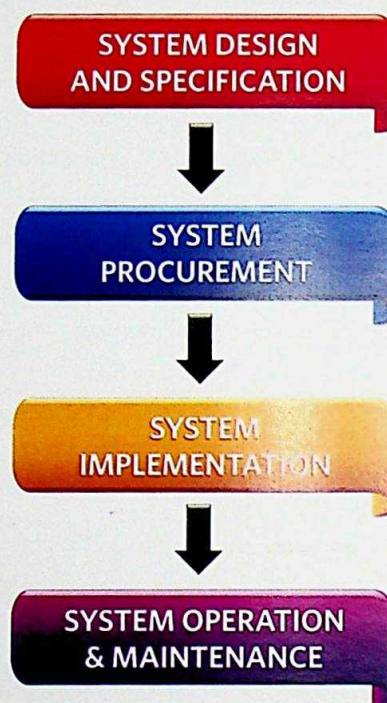
The Guide is set out to provide summaries of the key steps, but also aims to provide sufficient detail (or reference) to inform states on the 'best practice' standards for hardware and software specification, selection, installation and implementation. As such, many of the areas addressed are applicable to any sizable Information system procurement.

1.B How to use this Guide

This Guide should be useful to members of the Executive Arms of both Federal and State Governments by setting out the important stages in identifying, procuring and implementing financial systems. An understanding of the stages and processes involved in acquiring and implementing systems will help government officers to implement systems that meet the defined requirements, are selected and contracted in accordance with approved procedures and are implemented in a sustainable manner.

The guide describes key good practice processes in identifying and specifying system requirements, procuring a system and subsequently implementing and operating the system.

Following sections of this Guide discuss each of the stages shown in the diagram below, and include checklists and guidance in each area.



1.C Computerised Systems – an Overview

It is worth recapping some of the key features of computerised systems, what they are, and what they are not:

- Computerised systems provide automated solutions to enable the logical processing of transactions and management of information in its digitised form - known as data;
- Computerised systems help in performing routine tasks quickly and accurately, provided that proper controls are exercised over the information that is entered into the system, and also assuming that the system is operating as intended;
- Computerised systems do not provide useful output if the data entered into the system is incorrect, inaccurate or untimely;
- Computerised systems must be implemented and configured properly, and have good security to ensure only authorised users are able to do the tasks for which they are authorised;

- A computerised system is not just the computer or box where transactions are processed, but also involves the processes of human involvement, (or intervention), controls and checks how and what information or data is entered into the computer, and the surrounding business processes;
- Information produced by computerised systems is unlikely to be of any use unless the end user has confidence in the accuracy of information or data coming out of the system.

1.D Financial Systems

Financial systems are computer systems used particularly in financial management and accounting.

Often, these systems are also referred to as Integrated Financial Management Information Systems (IFMIS). They consist of a set of computer programs, databases, processes, procedures and hardware and network platforms that enable government finance and accounting staff to carry out their day-to-day operational tasks.

These tasks essentially include originating, receiving, recording, processing transactions related to budget authority, requests for financial resources, treasury management, payment of bills and recording receipts. Very large IFMIS may also include modules which support the recording and assessments of taxes, duties and other levies and also managing the human resource component (payroll and pensions) for the civil service.

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 the status of the government.

The diagram on the next page provides a high level diagrammatic overview of key government financial systems and their relationships, including key modules for:

- Budget preparation;
- Budget execution (including primarily expenditure management);
- Core Accounting, including ledgers, cash management and accounting, and
- Reporting, including financial and management account reporting.

Very important financial 'feeder' systems, which are often outside an IFMIS design, but which provide important information include:

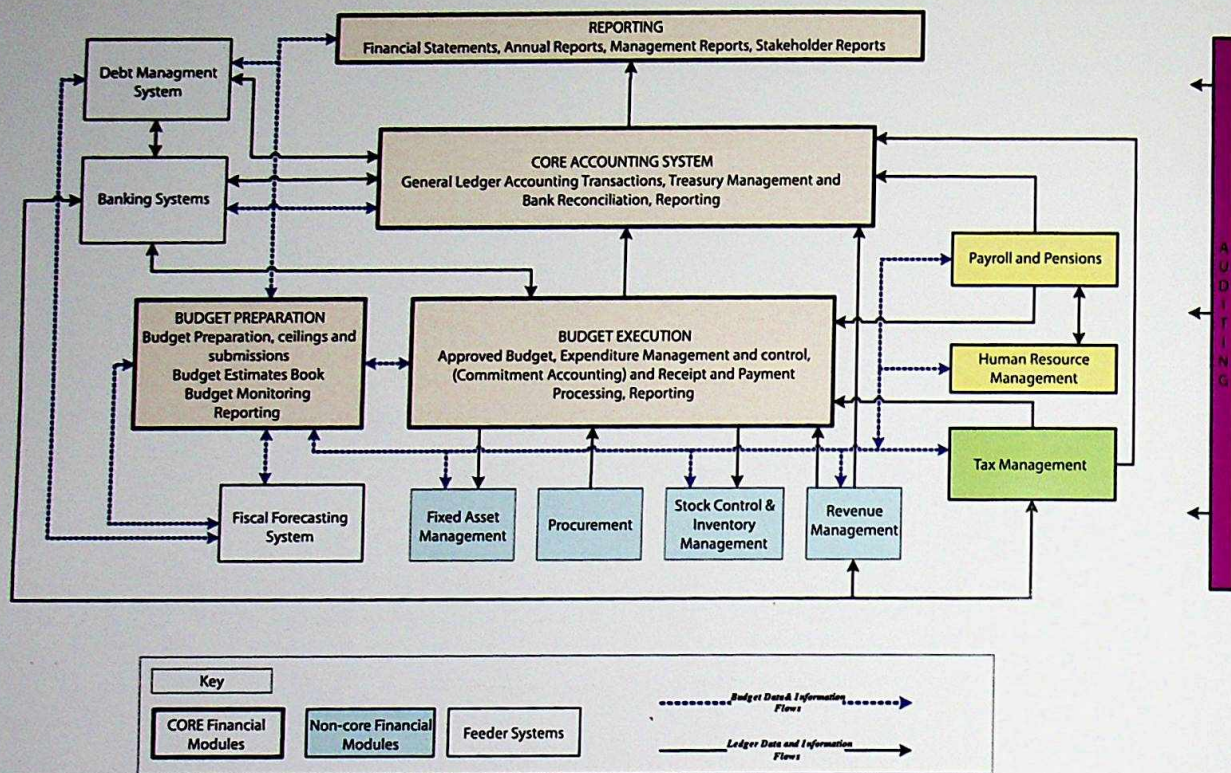
- Macroeconomic forecasting;
- Debt management;
- Asset and inventory management, and
- General revenue management.

Large systems in their own right and often implemented outside the central FMIS include:

- Human Resource Management Information Systems (HRMIS) which is used to manage the civil service establishment and its payroll and pensions, and
- Revenue and Tax Management - Integrated Tax and Revenue Management systems which are implemented to manage the more significant tax revenues for a government.

Whilst the diagram may look like a complicated electrical wiring diagram, it does show the essential data and information flows between key 'sub-systems', represented by financial system modules, for a 'typical' state government.

Financial Systems Overview¹



The diagram shows the many interdependencies between the modules, and ultimately in an integrated system, and shows the sources of all information and financial data that can be used for reporting on the financial operations and performance of the government.

1.E Some recognised advantages of implementing integrated financial systems

The implementation of IFMIS, along with the appropriate policy and institutional reforms, can result in significant advantages such as:

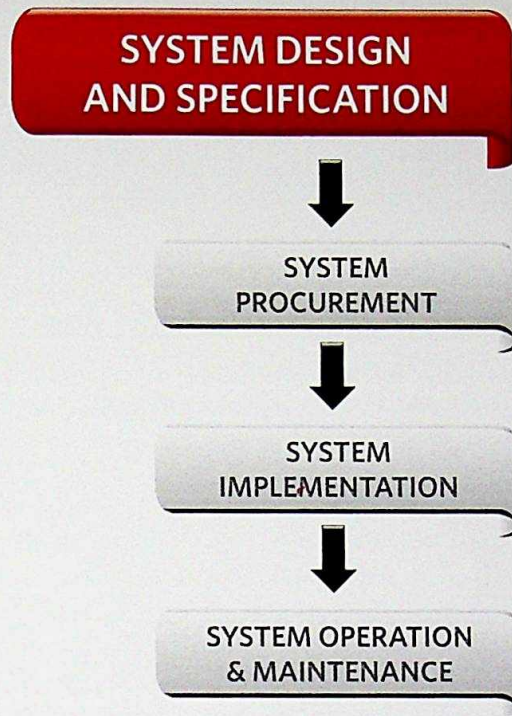
- Improved financial controls in budget execution and overall fiscal controls;
- Better cash and bank management and reduction in idle balances/borrowing requirements;
- Better availability of financial information for economic management;
- Up to date and comprehensive fiscal and financial reporting for Ministries of Budget and Finance and other stakeholders;
- Better and more timely budget execution reports for spending units;

- Increased efficiencies in invoice tracking and payment processing;
- Better management of government programmes and the delivery of government services;
- Better management of Capital Projects;
- Increased accountability and transparency;
- Opportunity for providing better financial information to the public and civil society;
- Efficiencies in auditing - less time required for transaction audits giving more time for performance audits, and
- Earlier production of financial statements for audit.

The following sections of this Guide discuss approaches and key issues in the design, specification, procurement, implementation and operation and maintenance of such financial systems.

¹ After World Bank Treasury Reference Model - Hashim and Allan

Section 2: System Design and Specification



2.A Introduction

It is no use planning to buy a lorry but only having the finances for a car and the skills and capacity to ride a bicycle.

Computer systems must be properly designed otherwise the result will be a system that does not deliver the expected functions and outputs, and a lot of money wasted. A system must have a clear purpose and key functions, and exist to 'add value' - which means there must be a clear need for the system. These requirements must be clearly identified and defined in the design stage.

It is likely that a State Government has, or intends to undertake, at least a high level strategy of its existing and required systems. This should be driven by the government's information requirements, hence it is known as an Information and Communication Technology (ICT) Strategy.

An ICT Strategy is a forward thinking plan for ICT Systems; it identifies how current and future ICT Systems will be managed, and how information and data can be linked, or integrated to provide more efficient and effective management and also meet the regulatory and service responsibilities of the government.

Key features of an ICT Strategy are likely to include and identify such things as:

- Key functions of the government;
- Information and reporting requirements of the government;
- Existing government systems (computers, communication/ data networks, internet, systems (programs), IT resources and capacity etc.;
- A 'gap analysis' between what is required and what is currently available - this may also be called a 'needs analysis';
- A prioritised and sequenced time plan or strategy on how to fill 'the gap', including required systems, hardware, software, networks, communications, human capacity, maintenance; and
- A realistic budget to finance the strategy.

It is very important that there is full political support for the preparation and implementation of the ICT Strategy, and that a proper implementation structure for the strategy is established.

2.B Identifying the need for a system

The need for a computer system may arise from a number of reasons or sources, and should be identified within the ICT Strategy, for example:

- The recognition that a business process could be undertaken more efficiently or faster using a computerised process. This may be part of, or follow on from, a review of business processes and functions undertaken within the government, such as the need for better and more timely information in order to make better decisions;
- The awareness of the benefits of systems that other governments are using; and
- The need to introduce systems to comply with, or implement regulatory or other requirements, for example to introduce the new national chart of accounts and to comply with International Public Sector Accounting Standards (IPSAS) and reporting standards.

As mentioned above, the identification and subsequent selection of computer systems should be part of a wider ICT Strategy. A good strategy should ensure, for example that:

- Data is not duplicated - which may lead to inconsistent and confused decision taking;
- Computer hardware and networks are properly planned to manage not just today's processing requirements, but those of the future;
- Appropriate expansion plans are made in advance of future demand; and

- There is consistency in computer programmes – such as database management systems, operating systems, and other networking protocols and standards.

2.C FMIS design features

The successful implementation of a financial management system requires a clear understanding of several critical aspects and include the following:

- A **clear rationale and strategy/plan** for selecting and implementing the system, based on realistic and achievable timeframes;
- A **strong regulatory and policy framework**, which should ideally exist within the government, and within which the system will be implemented and operated;
- The relevance of the system in terms of **scope and functionality**, and undertake clearly defined tasks or functions;
- A clear **'business process' framework** must exist, or be defined, to ensure proper fiscal management of, and control over the government's financial transactions. The documentation of the business process will be important in the specification of the system;
- A **system design** gives consideration to all **stakeholder requirements**. This should be documented in a stakeholder analysis and be set out in a clear communication and implementation strategy. All stakeholders should be involved, as appropriate, in the system design and implementation;
- A clear definition of **ownership and responsibility** for the system, both in terms of overall operation and system administration, as well as 'functional' ownership. The former will usually be with the Information Technology (IT) Department, whilst the latter will be the key users, for example the Ministry of Finance or Ministry of Economic Planning and Budget;
- Consideration within the design to the required **current (and future) hardware** and communication environments. It should be expected that systems will expand over time, in terms of both the amount of data held in the system, and also the number of users who may require access, as the system is extended to line ministries; and
- Finally, but perhaps having an impact on all of the above, there must be consideration of the **expertise and capacity** that will be required to implement, operate and manage the system. Required capacity in terms of both IT operations and maintenance (hardware, operating system, database and network) and using the system (end-users) needs to be identified, acquired and trained. A key component of the system procurement will be relevant **training** and the acquisition of required skills. It is also important that appropriate plans are put in place to retain the skills and capacity, once acquired.

2.D Design options

There are essentially two options when choosing the type and design of large financial systems:

- Packages, which are systems that have already been developed, based on a 'standard' design and functionality, which are supplied and 'configured' or 'tailored' to the buyers requirements. These are sometimes known as Commercial Off-the-Shelf (COTS) systems; and
- 'In-house' or bespoke developments, which are based on the buyers specific requirements, and involve the programming of a system 'from scratch'.

A system design involves not just the programmes but also a hardware platform, which may comprise a main (or production) server, which holds the main database and undertakes the main processing, a back-up server for security of the data and programmes, a network which may cover an entire organisation, known as a Wide Area Network (WAN), or smaller groups of computers known as a Local Area Network (LAN), and finally end user computers at the end of the network, which may be called workstations.

When a system is running, or installed, it must be properly managed and maintained. This may include support from the supplier to ensure any problems are fixed, or system improvements are introduced.

All of the above should be considered when designing the required system.

It is likely that most Nigerian State Governments will choose to acquire a packaged solution.

Many such solutions provide all the key functions that will be required by the government, added to which, in most cases the functions of these systems are both proven and well supported by the supplier.

To develop an in-house system requires massive technical capacity and resources. For many, a bespoke or in-house financial system development could be viewed as 'reinventing the wheel', as a package will invariably deliver most of what is required and that would be included in an in-house development.

The key design requirement is therefore to identify the required key functions of the system, which will then be configured by the supplier during implementation.

It may be appropriate to decide to design and implement a simple initial computerised system, based for example, on MS-ACCESS. Such a system could be an 'intermediate solution' to establish an initial database and also build skills and capacity, before moving onto a large and complex

solution. This approach may be particularly relevant in developing, say, a simple human resource database by computerising existing manual records, as a precursor to acquiring an integrated payroll/HR database, or to establish a database or inventory of fixed assets in advance of a move to accrual accounting.

In summary, a good computerised system depends on a number of key 'attributes' or features. These should be documented at the design stage, as these will 'feed into' the procurement and selection process, and provide the technical requirements which will be specified and evaluated, between different bids, during the procurement stage, and be subsequently implemented as the 'required system'.

Whether a package or 'in-house' approach is followed, it is critical that a core or steering group of users be identified to oversee and agree the definition of new system requirements, the documentation of existing and required changes to work practices, business processes and organisational implications.

This group must have full political support.

2.E Core Financial System Functions

The diagram above identifies the 'high level' design of a government's financial systems.

This can be broken down into high level system functions, as below:

Integrated Financial Management Information System (IFMIS) – a system which essentially integrates budget preparation, core accounting and treasury (cash management) and accounting information, and process execution systems or ledgers which feed into the accounting system – for example payments (accounts payable), receipts (accounts receivable).

An IFMIS provides integrated reporting, including statutory financial reports and also operational reports for management, such as cash and banking reports and budget performance reports.

Very large IFMIS systems may also include integral models – or interface with external systems which manage payrolls, fixed assets, stores, external debts, tax, etc.

Human Resource Management Information System (HRMIS) – a system which manages the human resource function of an organisation, and integrates establishment and personnel records and functions – for example, position management and pay scales, recruitment, performance, promotion, discipline, training, etc. together with the payment of salaries and wages and the management of pensions.

An HRMIS may be integrated within the IFMIS suite of programmes, or may be a separate system which 'feeds' information to the IFMIS through an interface.

Tax Management System (TMS) – a system used to manage taxpayers and tax revenues and collections, based on taxpayer records and histories, the system manages taxes due, and supports collection, follow up and audit of expected tax receipts.

Non tax revenues may be managed through such a system, or may be managed separately using adapted accounts receivable, sundry debtor and cash receipting systems.

Debt Management systems – packages from the Commonwealth Secretariat (CS-DRMS) and the UN (DMFAS) are selected to manage external (international) debt, and may be expanded to include domestic debt (local loans, bonds) as well as contractor liabilities.

2.F Specifying the system

The specification of a system involves a number of activities, including defining and documenting the business processes to be supported by the system, and the functional design of the required system.

The specification of the system is critical as this will form the technical sections of a Bid Document which will be used to invite potential bidders to submit proposals for supplying and implementing the required system.

System Requirements Specification

It is likely that the system specification will involve the following activities:

- Study and document the current functional processes, administrative procedures, transaction documents, forms and information flows, including the number of transactions currently undertaken, such as the number of payment transactions by type – cheque, electronic, etc.;
- Identify required functional processes, information flows, operating procedures, transaction types and associated documents and forms, etc.;
- Identify the main reports, and their content, for example accounting reports and budget performance reports to be produced by the new system based on legislative, end-user and service delivery requirements;
- Prepare a list of functional requirements and systems specifications that the computer system (application software) will be required to support, including the functional processes and their interfaces with any external systems, such as commercial banking systems (for payment processing and reconciliation purposes). It is important to ensure that the systems specifications capture the essential characteristics of the “to be” functional processes and identify them as specific requirements for the system; and
- Identify common features to ensure systems security and user friendly access.

When documenting the requirements and features of the new system, it is useful to identify against each feature whether it is a ‘Mandatory’ or ‘Desirable’ feature. This will help to decide what is critical and what could be optional, and will help during the evaluation of bids submitted by potential suppliers and enable comparison of different software options, packages offered.

If there are not sufficient internal resources to prepare a functional analysis and design, it may be appropriate to contract a team of external experts who have experience in the design and procurement of big computer systems, to help at this stage.

A poorly specified system is likely to result in the acquisition of a poor system, and result in a lot of expense for no real benefit.

Technology Platform Requirements

The technology platform for a new system involves key areas such as the computer hardware, the system’s software, the telecommunications network (LANS and WANs), internet access, information security and network management systems, power supplies, disaster recovery arrangements, etc.

Many of the rules, or ‘protocols’, for these components are

likely to be identified in the ICT Strategy mentioned earlier in this Guide.

This activity will include documenting the required technical design for the technology platform on which the new system will be operated, and will involve, for example:

- Survey of offices of the main system users who are expected to transmit or receive data - for example the Budget and Planning Department for budget information, the Office of the Accountant General for treasury and accounting information, the Office of the Head of Service for human resource and payroll information - to identify the locations where the computer systems would need to be implemented, the associated transaction volumes (current and projected), numbers of users and data requirements. Based on this information it will be possible to ‘size’ the hardware and software required to be installed at the offices of the main users and also the likely network requirements such as bandwidth;
- Prepare a high level specification for the hardware and systems software required at the various sites;
- Identify the high level requirements for system and data back-up and security. This may include the requirements for a disaster recovery centre;
- Define the information and end user security requirements to ensure control and access to the system functions and databases is given only to authorised staff;
- Draw up specifications for associated facilities required for the installation of the system, such as power stabilizers, Uninterrupted Power Supplies (UPSs), redundant power supply and environmental computer site requirements - air conditioning, dust protection, physical access security. These are critical requirements especially given the sometimes difficult operating environments found in Nigeria.

In many cases it may be best to document the above requirements at a high level, and invite the bidder to recommend or propose the most appropriate (and practical) technology platform solutions, based on a level of required system performance and/or response times and budget.

Support and Operational Requirements

To ensure that capacity building and operational support for the new system is identified, a number of requirements should be identified, as appropriate, in such areas as:

- End user support, training and help desk arrangements;
- System support and maintenance arrangements; and
- Documentation and manual development.

The number of users and their functional roles and responsibilities should be identified, as these will be important for the potential bidder in determining the levels of training and support.

2.G Cost elements of a major financial systems project

Significant capital costs will be incurred in acquiring and keeping a new financial management system running, and it is important that likely costs are recognised during the initial project stages. Budgets must be established and approved for both the initial acquisition and the ongoing recurrent costs of the system.

It is often the case that governments make provisions for the acquisition costs - especially if external financing is obtained say from a development partner - but fail to recognise the importance of recurring costs.

Failure to properly address all costs may lead to degrading systems performance after implementation, and in extreme cases, to the failure of system operations with disastrous consequences for the day to day financial operations that the system supports, and also the loss of data.

Each of these cost elements is discussed below.

Capital costs

Capital costs include:

- Policy and design costs, which may include 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 (software, hardware and Communications Specifications) of the system;
- Project management support. This should cover the costs associated with maintaining the project framework, such as project management, project monitoring and evaluation and other administrative costs associated with the project;
- Applications system costs and initial licences;
- Procurement of the technology platform to operate the system. This includes costs associated with the procurement of servers, workstations, printers, office and systems software, Local and Wider Area Networks - (LANs and WANs), Information security systems, Application software and tools (for example Database Management Systems (DBMS), application development tools and reporting tools) and computer rooms, etc.;
- Additional infrastructure costs, such as building or improving computer rooms/ centres, buying generators etc.;
- Costs associated with procuring implementation services, such as system parameterisation/customisation, and implementation;
- Training, change management and systems transition costs including expenses for end-user training in the day-to-day use of systems, 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; and
- The costs associated with change management - the system transitions from a manual system to an automated system. This will include costs for end-users and managers to familiarise themselves with the new system 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:

- Computer 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 and Relational Database Management System (RDBMS) and other software License Fees: This is a very significant element and could easily be between 20-25 percent of the initial license fees each year;
- Telecommunications Costs: The costs associated with use of the WAN for communicating between remote and central sites, and also other internet costs. These operational costs vary with network providers but can be a significant amount;
- Utility costs including the cost of running generators, computer rooms, IT premises, stationary, etc.;
- 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 as in many cases it may be necessary to contract specialists directly from outside the normal civil service structure, since the remuneration required cannot often be accommodated within government pay scales;
- On-going training costs: These continue throughout the life of the system as trained end-users often rotate out of their jobs after a few years and 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.

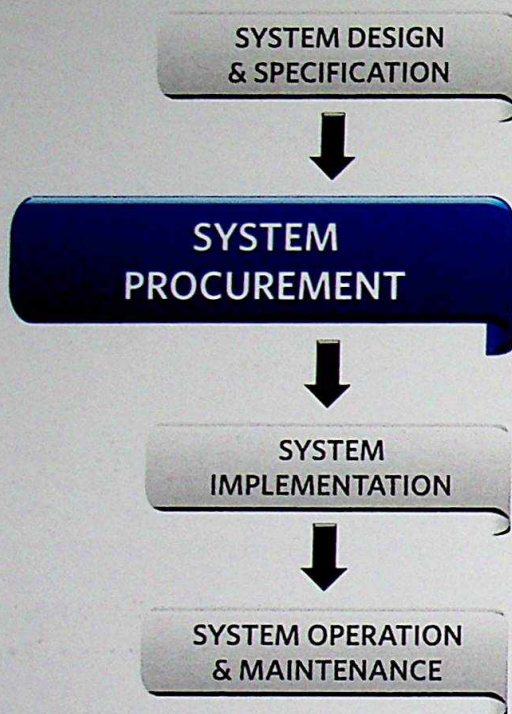
2.H A checklist of key considerations

The following 'checklist' provides an indication of the key areas and considerations when specifying a system. A lot of the information identified at this stage will provide the basis for either bid documents, should you decide to procure a package, or provide the basis for the design specification if you decide to follow an 'in-house' or contracted out development route.

Key areas to consider	Notes
Purpose and scope of the system	Consider for example: <ul style="list-style-type: none"> ■ Organisational and administrative coverage ■ Functional coverage ■ Technical coverage ■ Legislative framework/coverage
High level design	Document the high level functions, business processes and information/data flows for the Government's key financial systems.
General and specific technical requirements	Technical requirements for all modules, e.g. security and data management and integrity; requirements for each module - could be 'documented' as inputs, processing, outputs/reports and interfaces with other modules.
Number of users	Include functional responsibilities and management responsibilities which will be needed to determine functional and access levels.
Number of transactions	For example: <ul style="list-style-type: none"> ■ Purchases: Numbers of Purchase Requisitions, Purchase Orders and Purchase Receipts ■ Payments: Number of payment vouchers, Cheques produced, Average Number of payment postings per month ■ Assets: Number of assets purchases, Number of asset disposals ■ Receipts/Sales: Number of invoices issued, Number of cash receipts ■ Average monthly Budget Preparation/Reallocations, etc. ■ Monthly Payroll and pensions processed
High level implementation plan	Consider: <ul style="list-style-type: none"> ■ Timescales ■ Responsibilities ■ Implementation schedule
Financing	Establish whether a proper budget has been prepared, which includes initial capital costs for: <ul style="list-style-type: none"> ■ Hardware ■ Operating systems software ■ Database software ■ Generators ■ Implementation ■ Training ■ Consulting, etc. And ongoing training costs including budgets for: <ul style="list-style-type: none"> ■ Software licenses ■ Communications ■ Office and computer centre operations ■ Utility and generator operating costs ■ ongoing training and personnel costs ■ Consulting costs

System and Service Specifications:	<p>Consider:</p> <ul style="list-style-type: none"> ■ System integration ■ Project experience/project management experience ■ Project planning ■ Training and training materials ■ Technical support ■ Warranty and post warranty support ■ Technical support for ongoing implementation/roll out ■ Data conversion and migration ■ Documentation requirements - technical and end-user ■ System software and system management ■ Database software, development tools, reporting tools
Testing and Quality Assurance	<p>Consider requirements for:</p> <ul style="list-style-type: none"> ■ Pre-commissioning ■ Operational acceptance ■ Functional testing ■ Acceptance testing
Procurement and related valuation methodology	<p>Consider:</p> <ul style="list-style-type: none"> ■ Type of selection - single or two stage ■ Bid evaluation - mandatory and scoring (technical, commercial) ■ Bidder demonstration and testing ■ Test scripts ■ Clarifications ■ Contract negotiation ■ Contract award
ICT Strategy issues	<p>Consider:</p> <ul style="list-style-type: none"> ■ Ownership of the system ■ Related systems ■ Current processes and systems ■ Required processes ■ Current equipment and support ■ Required equipment and support ■ Current communication and network infrastructure ■ Required communication and network infrastructure ■ Current and future users ■ Current user skills ■ Training and capacity building requirements ■ Existing constraints ■ Planned reforms and the role of the required system in the reforms

Section 3: Procuring the system



3.A Introduction

It is important that a system is properly acquired – to ensure that what is wanted is what is actually purchased, as economically as possible and in accordance with government's procurement rules and regulations.

There should be a standard and structured approach to identifying the most appropriate solution. This should include consideration of options and the justifications for acquisition, including, but not be limited to, the identification of current system problems, and/ or the requirements for a new system.

Central to any system procurement is the preparation of tender documents for the various components, which should also include the associated implementation and required integration services.

The system specification and requirements discussed in the previous section should form the basis for the technical requirements section of the bid documents. In addition, the bid documents should include instructions for bidders on such areas as bid submission requirements and the evaluation and scoring methodology for the bids received in response to this tender.

It is likely that the government has developed standard bidding documents for ICT Systems. If not, a very comprehensive template used by the World Bank can form the basis for a bid document. The World Bank website where this can be found is provided in Section 7 of this Guide. The website also provides useful guidance notes on ICT Procurements.

Procurement/bid documents should include, as a minimum:

- A specification of the system requirements including hardware, applications software, networking and communication requirements;
- A description of the business processes to be supported by the new system, including data sources, data capture and entry procedures and controls;
- Requirements for on-site implementation including:
 - o project management and implementation arrangements
 - o availability of technical implementation and integration resources
 - o arrangements for pilot system set-up/configuration and functional acceptance
 - o roll-out and project sign off arrangements;
- System administration, operating controls and procedures;
- System and data security and management, including back-up and contingency arrangements;
- End-user support, training and help desk requirements;
- Provision of Technical and End-user documentation/ manuals;
- System support and ongoing maintenance requirements;
- A proposed implementation plan;
- Criteria for the evaluation of vendor proposals. These should include specification of mandatory and desirable features, technical scoring schemes for desirable features, weight of technical and price scores; and
- Sample contracts for hardware, software, telecommunications/networking and implementation services, including general and special conditions of contract.

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 be phased so that it is procured as close as possible to the time when it will be installed.

3.B Procurement Options

The procurement of major IT application system packages – IFMIS, HRMIS and TMS – and associated hardware, networking and integration services can be done in one of two ways, as discussed below.

Turnkey or 'Single Responsibility' Contract

This type of contract involves all the system components – the application software, the hardware and the networking, the implementation and integration services being supplied in one contract. In many cases a lead (usually software supplier) will associate with local hardware and network contractors. It is critical to ensure that the lead contractor is solely responsible under the contract for the delivery of the entire system.

It is necessary to:

- Specify all requirements in functional terms and also provide transaction volumes for each key area;
- Identify the number of users for each module being purchased, for examples numbers of staff involved in accounting, and by operation – Budget Preparation Budget Execution/expenditure, Accounting, HR/Payroll, Inventory/Fixed Assets, Revenue Management, etc.;
- Specify the required system performance, for example response times for enquiries or major processing/report times. These details will enable the supplier to size and propose the appropriate software and hardware technology platform;
- Require the supplier to clearly state in the bid that the hardware and other elements of the technology platform are sized to meet both the system functional requirements and also the performance requirements. This also avoids the risk of a supplier under sizing the proposed solution so as to submit a lower priced bid.

In a single responsibility contract, systems integration should be the responsibility of the supplier. Since it is easier to manage one contract, this option is often recommended in cases where the government has limited contract management capacity.

It is therefore very important that in the tender documents and contract the respective government and contractor's responsibilities are clearly defined. If the government does not have the required capacity, consideration may be given to identifying separate contract management support.

Multi-vendor Procurement

This option involves different suppliers being responsible for the delivery and implementation of various components – hardware, software, etc.

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 of this approach is that procurement packages are more specialized and can attract better responses for each area.

In such cases, the first contract for software and implementation services should include systems integration, to ensure that the software works properly with the hardware that has been specified by the successful bidder, for example proving this in a test or pilot site.

A number of problems can occur in such procurements, often as a result of the complexity in defining and 'enforcing' specific contract responsibilities, and managing different suppliers.

Again if the government does not have the required capacity, consideration may be given to identifying separate contract management support.

3.C World Bank Procurement Procedures

The World Bank has prepared standard bidding documents, which a number of Nigerian states have adopted and tailored, especially for procuring IT Systems. However, these documents can be both complex and time consuming in both preparation and use.

Whilst World Bank procurement processes are designed to ensure complete transparency in procurement practices, their complexity may have serious time implications – for example the World Bank's two-stage procurement process can take over a year from start to contract award.

The World Bank will invariably require these processes to be followed if they are funding the procurement of systems, and the process involves the World Bank to provide 'no objection' approvals at various stages.

The rules and procedures accompanying this process need to be understood very well by the government in order to avoid unnecessary delays and tender problems such as bidder complaints. It is often advisable for consultants who are conversant with World Bank processes to support the preparation of the tender documents and be responsible for supporting the procurement process – indeed the World Bank often require this. Whilst this is invariably expensive, it does provide a high degree of assurance that a transparent and proper procurement and selection process is followed.

² See source references in Section 7 of this paper.

3.D Preparing bid documents

The following are some key points to consider and include in the bid documents when procuring significant financial systems. Some of these points draw on the good practices included in the World Bank procurement documents.

When designing the Technical Requirement of the bid documents, it is important to identify which requirements are mandatory or desirable. It is normal for a bid which does not meet the mandatory requirements to be rejected.

- Some mandatory requirements for a bidder could include, for example:
 - a) A requirement to be able to supply the required application software, based on commercially available off-the-shelf package(s);
 - b) The need to demonstrate that they have undertaken at least two successful projects (i.e. Signed off and accepted by the purchaser as a fully operational system), implementations of the proposed software (and required services) during the last 5 years in similar environments, i.e. in state or central government treasury with line ministry support;
 - c) To provide evidence that it has been in the business of supplying and supporting the proposed application software(s) and equipment for at least 3 years;
 - d) To provide evidence that the principal bidder has had an annual turnover in excess of NGN x million for each of its last three financial years.

- Desirable requirements should be scored as part of the technical evaluation process. This normally involves establishing if the bidder's response indicates that the requirement is available or not. It is often difficult to apply subjective scoring - for example fully met, can be met with modification, partly met, etc. Such an approach is not recommended as a rule.
- The World Bank suggests in their selection criteria that the overall technical scores should represent a percentage of no more than approximately 30% of the total. The balance scoring should be based on the price. Having a higher component for technical scores often drives up the prices, as many systems do provide the same functionality. It is therefore important that there is a robust mandatory evaluation.
- The inclusion of a test script of basic transactions should be a part of the bid and the bid document should require the suppliers to demonstrate how the proposed software will meet these requirements. 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 parameterisation of the software, rather

than requiring possible customisation. Test scripts are also a good way to obtain first-hand experience of both the software and the suppliers capability.

- The functional specifications should identify which external systems will need to be interfaced and what is the exact nature of information that will be transferred/exchanged (for example tax and debt data). It should state the nature of the Banking interface: Will payment be electronic or manual/cheque based? How will bank reconciliation be performed by the system?
- For application software, the government can ask the bidder to state how the specified requirements will be met - can they be provided as standard within the proposed system, or is parameterisation or customisation of the software required?
- The government should investigate costs associated with 'Named User' vs. 'Concurrent User' licensing for application software, and explore site license options.

The costing of software licences is a particularly complex area. It is important that full clarification and cost implications are obtained, in writing, from suppliers before any contract is entered into. Licencing costs may have implications for application software as well as operating software, and can be based on a number of criteria including named users, concurrent users, number of primary and secondary sites, numbers of processors, etc. This is an area where a state government may wish to obtain external advice.

- In a single responsibility contract, the government should state its requirements in functional terms and specify key performance requirements and provide details of transaction volumes. The contractor should have the responsibility to size the equipment and propose all components to meet the specified functional requirements and projected transaction load. Additionally, the supplier should be required to deliver all necessary licenses configured as needed for the proper operation of the system for the requested duration.
- A supplier should be required to provide and employ only technical personnel who are skilled and experienced with regard to the proposed software and tendered services.
- The supplier should be required to provide the latest version of the proposed software and equipment. In large projects which extend over several years, hardware models and software versions can change significantly over the contract period. In relation to software, it is useful to obtain confirmation of the suppliers' proposed version releases.
- It is important that a performance security bond is obtained from the supplier on contracting to provide a degree of security over the contract's delivery. Also any advances should be secured by a Bank guarantee.
- Warranty Clauses should ensure that warranty coverage

continues for a defined period after the entire system is operationally accepted.

- The bid documents should specify the total amount of financial resources available for the project so as to restrict spurious or very high priced bids.
- The bid documents should include an implementation plan to which the bidders should confirm that they can meet before contract signing. This will be important in managing the contract delivery.
- The bid documents should specify clearly only deliverables which can be verified; for example, application software, computers, WAN/LAN networks and implementation services. Some items, such as consulting and additional training requirements, may be difficult to clearly specify at the bid stage, and it may be best to procure and contract these separately.

Where this is the case, the government should obtain unit prices for the training of specified numbers of staff in key areas such as certification in the use of the software, database or operating system. These can then form the basis for costing additionally contracted work during the period of the contract.

3.E Financial Implications

The acquisition of large financial systems has massive financial implications, not just for the initial procurement but also for medium and long term support and maintenance costs. This can run into several billion Naira.

A pragmatic approach should be followed where appropriate, such that systems are acquired to enable a State Government to move through a controlled 'evolution' to the next level, and beyond, based on a series of practical steps. Such an approach may be preferable to a 'big bang' implementation.

Related to this, technical gain considerations can be encouraged which recognise budgetary and capacity constraints. For example a simple bespoke system may enable initial expertise and capacity to be established, within a limited budget and with acknowledged outcome limitations, but in recognition that this is part of a strategy with a future packaged system being the longer term objective.

Where a package is to be acquired, a full training and staffing needs assessment should be undertaken to ensure that, where necessary, appropriate staff retention and training plans are developed and planned to be implemented.

3.F Bid Evaluation and Selection

The bid documents should set out in detail the requirements of the bid and what the bidder is required to provide in terms of a response, and by when, and clearly state that incomplete or late bids will be rejected.

The usual approach to evaluating bids is to set up an evaluation committee which should comprise procurement officers, finance officers and end-users.

A clear timetable and evaluation approach should be determined and agreed in advance of the bid opening.

It is normal to undertake a rapid review to ensure that all the mandatory requirements have been met. If not, bids may be rejected. The failure of a bidder to meet the mandatory requirements would suggest that they would not be able to meet the contract requirements, and there is no point spending time undertaking further evaluation.

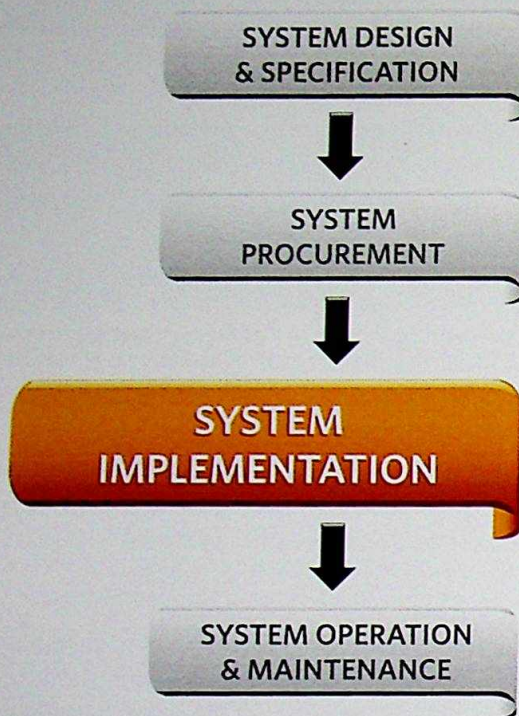
An independent bid scoring process should be followed as part of the process, with each member of the evaluation committee scoring the bids, and the scores being consolidated and reported. Any clear differences should be reviewed by the committee.

As may be identified in the bid documents, bidders may be invited to demonstrate their systems, based on the test scripts provided and also some sample data which they would be requested to enter into the proposed system. Like the scoring of functional responses, the demonstration should also be scored.

At the end of the functional and price evaluation, it is likely that a preferred bidder will emerge, and be recommended, however, there may be a number of areas that require written clarification and/or negotiation before a contract is signed. If a contract cannot be agreed the next ranked bidder should be invited for contract negotiation.

The signed contract should ensure that all contract payment schedules are linked to specific milestones – and should be in line with the procurement and implementation plans as set out in the bid documents. Likewise it is important that signed contracts are linked to the provision of a performance security, and that any advance on contract signing is secured by a bank guarantee.

Section 4: Implementing the system



Once procured and contracted, a system must be properly implemented and tested with comprehensive user and technical documentation provided. Good training should be delivered to end-users and effective support arrangements established to ensure the system can be used efficiently and effectively.

System implementation includes setting up project management structures, identifying the activities and tasks involved in implementing the system in an agreed implementation project plan which provides an indicative timeline and resource plan for the implementation, and a list of the main cost elements for the project, to ensure that funding is available at the appropriate contract implementation milestones.

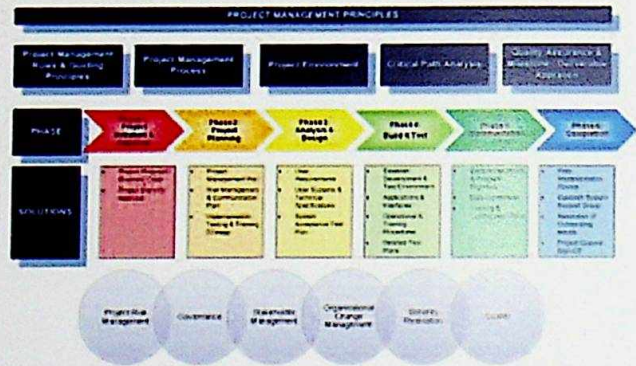
The failure to provide appropriate funding, at the defined intervals, may lead to significant implementation disruption and contractual problems.

4.A Project Management Structures

Establishing a Project Management Structure

For large contracts, it is essential that government has the capacity to manage the contract implementation. Governments may use experienced consulting firms to assist them in managing contract implementation.

It is important to identify processes and controls to ensure that any work is managed so as to minimise risks to the state government. Where feasible, standard project management approaches, such as PRINCE2³, should be adopted.



Identification of a Project Sponsor

This needs to be a high level Government official such as the Commissioner of Finance or the Permanent Secretary. The implementation of financial management systems requires consensus on various issues across a number 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 should hopefully show that such commitment is present.

Appointment of a Steering Committee

The Steering Committee is comprised of representatives for example the MOF, Treasury, Budget, Head of Service, key line ministries, revenue collection agencies, etc. to provide policy guidance and ensuring consensus across all stakeholders. This committee should have the authority and responsibility for resolving conflicts between various stakeholders and agencies.

Selection of a Project Manager

A common mistake is to consider financial system implementations such as IFMIS and HRMIS projects as IT projects.

³ PRINCE2 (an acronym for PProjects IN Controlled Environments) is a de facto process-based method for effective project management. Used extensively by the UK Government, PRINCE2 is also widely recognised and used in the private sector, both in the UK and internationally. The PRINCE2 method is in the public domain, and offers non-proprietary best practice guidance on project management.

Whilst significant investment is required in setting up the technology platform required to support the systems, the primary emphasis of the project needs to be on the functional objectives such as fiscal control, cash management, human resource management, etc. Ensuring that the system can address these issues requires that the management of the project is competent in these areas rather than the technology. The project manager should be a senior official from the functional side with stature within the government as well as adequate financial and administrative powers to manage 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 responsible for final overall system performance. The manager may need to 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

The Core Team/Working Group is comprised of stakeholder agencies, with members having expert knowledge of their functional areas. This group should ensure that the new system design is responsive to functional requirements. They will help document the current 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.

Establish a Project Secretariat

The Project Secretariat should 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.

4.8 Key implementation activities

The activities and tasks associated with systems implementation are numerous, and are common to all major system implementations. The following provides a 'checklist' of some of the key areas:

Checklist: Application Software configuration/ parameterisation, testing and integration of all components

The tasks included in this activity are:

YES NO

- Setting up a test site for a 'pilot' system; YES NO
- Planning and preparing for data conversion, user training and systems acceptance testing; YES NO
- Building up a team of technical and end-user specialists for system testing/acceptance; YES NO
- Drawing up specifications for testing of the hardware and software procured for the project; YES NO
- Developing test scripts to ensure software compliance with requirements; YES NO
- In the case of procurement of software packages, the project team would be required to ensure that the software meets the functional requirements. If the application software package requires customisation to meet specified functional requirements, the team will specify the changes required and arrange for the changes to be implemented; YES NO
- Testing the application software for the delivery of required functionality, and; YES NO
- Agree and accept any changes. YES NO

Checklist: Pilot systems implementation

It is often normal practice to install the selected hardware and 'pilot' or test the software to ensure that the system meets user requirements in a test operational environment before it is extended to all users and other sites.

The tasks associated with a pilot system installation are:

	YES	NO
• Install hardware/networks at the pilot site;	<input type="checkbox"/>	<input type="checkbox"/>
• Install application software for pilot site;	<input type="checkbox"/>	<input type="checkbox"/>
• 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 users will need to be trained to a level sufficient to operate and maintain the systems, and to provide necessary end-user support;	<input type="checkbox"/>	<input type="checkbox"/>
• Set up end-user help line;	<input type="checkbox"/>	<input type="checkbox"/>
• Introduce change management procedures;	<input type="checkbox"/>	<input type="checkbox"/>
• Migrate data as required;	<input type="checkbox"/>	<input type="checkbox"/>
• Implement the systems at the pilot site; and	<input type="checkbox"/>	<input type="checkbox"/>
• Review and agree any system changes and accept the pilot operations.	<input type="checkbox"/>	<input type="checkbox"/>

4.C Software Testing and Acceptance

Application software testing and acceptance needs to be carried out at the various systems implementation phases described above.

System Testing

There are many types of testing relating to 'in-house' developments and associated programmes, including, for example, unit and integration testing; however, where a package is acquired the main testing to be undertaken by the government will be System Testing.

This should be carried out on the complete, integrated system to ensure that the system complies with the original specifications, functional requirements and properly applies the business process requirements.

The design for this system test should be based on the system design documents, and should be done by an independent testing group which may include senior users.

Acceptance Testing

Acceptance testing is also referred to as 'User Acceptance Testing' (UAT), 'Beta Testing', 'Application Testing' or 'End User Testing', and should be carried out by end-users after system testing is completed and determines if a system satisfies the acceptance criteria and design requirements.

Acceptance testing should be performed in the real operating environment and allow users to perform any test based

on their own business processes areas prior to final sign-off and acceptance of a system.

4.D System Security

Two types of controls are required in any system - a regime on 'Internal Controls' and 'System Security', which must be established as part of the implementation.

Internal control

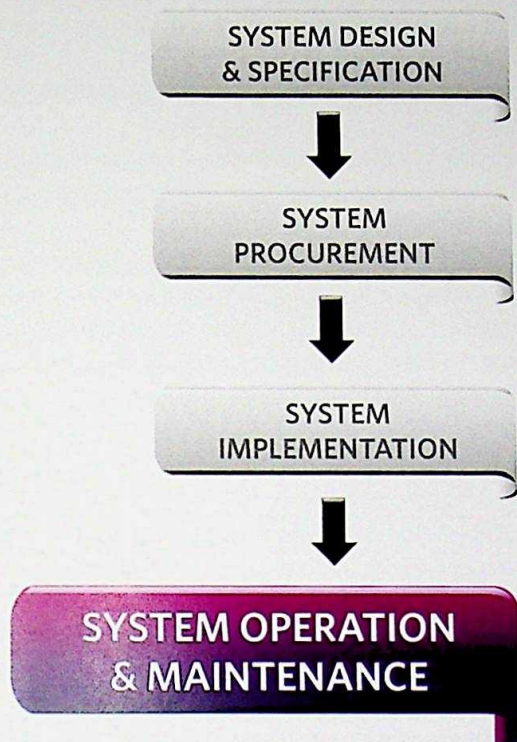
An authorised user must be prevented from performing improper or unauthorised actions within the system. These controls limit access of staff to specific types of transactions and specific segments of the database. These types of controls are usually defined as part of internal control procedures.

System security

In addition to internal controls, the entire system must be secured from unauthorised access through the use of password controls and other appropriate information security protocols. These controls relate to IT security and IT management procedures to ensure that the systems design includes appropriate controls and reports.

Both of these controls should be subject to independent audit review, and IT security specialists should formulate a risk-based approach to defining the required internal controls, and an information technology security policy may be drafted which addresses IT security aspects such as physical and logical security.

Section 5: Operation and Maintenance



On-going systems maintenance and operations require that a technical and end-user support arrangement 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 and system management arrangements to operate and maintain a major new financial system.

This section identifies some key lessons relating to the successful implementation and operation of financial systems.⁴

5.A Some key requirements for successful implementation and operation of financial systems

In order to ensure the sustainable operation of financial systems and associated financial reforms or improvements, a number of key prerequisites or requirements could be identified, based on experiences of system implementation and operations. Some of these are discussed below.

Strong government commitment

This is a key factor for the success of system implementation projects which support financial reforms. Such projects may take several years to complete and it is necessary to main-

tain government and political commitment over such periods which will invariably extend beyond the implementing administration's governing period. It is important to demonstrate and emphasise the importance of financial systems in supporting public expenditure management systems reforms. Such reforms are of more interest and are higher on the agenda of most politicians and governments - especially during the current fiscal tightening environment - rather than just accounting systems reform, which has a more specialised and limited focus, and may not figure as prominently on the agenda of political leaders.

Senior level policy makers in Finance and Budget ministries, and also development partners are also more likely to support such an approach.

Project 'Design'

It is important that project design is driven by functional rather than technical considerations. It is necessary to focus priorities on improving the various financial and business processes, and setting up the appropriate institutions and their associated systems and procedures.

As mentioned earlier, a common mistake is to consider financial system implementations as IT projects. They are not just IT projects!

Business Process Engineering (BPR)

For successful implementation and operation, primary processes may need to be re-engineered before systems implementation, in particular those relating to control and cash management.

For this, the roles and responsibilities of the department of Budget and Treasury will need to be defined. Consideration may be given, for example, to rationalising state bank accounts and introducing a Treasury Single Account operation, or improving payment processes.

The streamlining of other processes such as transaction approvals and treasury releases would improve efficiency, but may not be pre-requisites of systems implementation.

Most financial packages already provide for standard best practice processes and 'work flow processes'. It may be a good idea to use these as a starting point unless there is a specific legal requirement that needs to be fulfilled.

In several instances, after undertaking a costly and time consuming detailed BPR exercise, it was found that ninety

⁴ This section draws heavily on the lessons and experiences set out in 'A Handbook on Financial Management Information Systems for Government' by Ali Hashim. World Bank 2014.

percent of the business processes offered by the packaged solution were in accordance with the results of the detailed BP engineering exercise.

An important lesson from this experience is the need to distinguish clearly between the part of the business process re-engineering which is actually required prior to systems implementation, and that part which can be best addressed by using the processes incorporated in the packaged system and which can be adjusted during the systems implementation.

Internal Control Procedures and Information Security

As mentioned in the previous section, internal controls and system security are an important part of a system's implementation. The need to follow prescribed internal control procedures should be specified in Financial Instructions, which may need to be updated when new systems are introduced and processes change from manual to automated environments.

Experience has shown that as governments have started implementing new - and computerised - systems, there have been cases where lax internal controls have led to a breach in internal control procedures. Whilst there was nothing wrong with the new system or other elements of the technology platform in use, the opportunity to exploit a 'changing environment' may be used to commit fraudulent and unauthorised transactions.

Good Quality Telecommunications Network

A minimum bandwidth of 128kbs is an important prerequisite for supporting financial systems, especially to enable remote sites to connect directly to the central server.

Technical Expertise

Integrated or large financial systems often involve many users from many departments and agencies. The Treasury and its sub-treasury offices are likely to be responsible for most of the transaction processing that is carried out through a financial system, and likewise officers in the Office of the Head of Service will be responsible for maintaining human resource and establishment records. End-user groups both within and outside the Treasury, including Ministries of Finance and Budget, Line Ministries and Departments will use financial systems for the performance of their day to day financial operations.

Usually, a nominated Departmental, or central IT Agency will be responsible for maintaining 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 Department or Agency. Key functions which must therefore

be properly addressed to ensure the successful operation and maintenance of financial systems include:

Systems Administration

System Administrators are responsible for:

- Setting up all user profiles and access rights on the 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; and
- Generally managing security, concurrent processing, and other other Enterprise Resource Planning administrative functions.

Database Administration

The Database Administrator should have a technical background with thorough knowledge of database administration and database environments. Key responsibilities would include:

- Maintaining the various application environments;
- Undertaking Backup and restore functions;
- Application of software 'patches';
- Reporting Technical Action Requests to software suppliers;
- Troubleshooting; and
- Start-up/Shut down of the system and notifying users of potential 'loss of service' periods.

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 customisation. The Application Developers would perform the following tasks:

- Development work including but not limited to export programs from the existing applications (HR & payroll, debt management, etc.);
- Developing reports required for all the functional modules; and
- Taking over responsibilities for customisations developed by the supplier and maintain these in the production environment.

Network Administration

The Network Administrators are responsible for the maintenance of network connectivity ensuring that all users have the required connections to the system and access to production and training. The Network Administrator should:

- Maintain and support the network infrastructure, including LANS, WANS, routers, servers and workstations; and
- Set up and test all user required connections and system access.

Operating System Administration

System Administrators (SAs) are responsible for the maintenance, support and upgrades of the operating software and utilities. The SAs should work in close collaboration with the Database Administration to ensure full applications availability and security to the end-users. Specific responsibilities should include:

- Managing File Systems;
- Managing Users;
- Network configuration;
- Printer Management;
- Managing and analysing system resources;
- Backup and recovery;
- Managing and monitoring processes;
- Development of scripts for management of specific tasks; and
- 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:

- Receive and respond to end-user queries and requests;
- Receive and log end-user 'problem reports';
- Refer resolutions of 'problem reports' to the originating end-user;
- Establish a knowledge base of FAQ's (Frequently Asked Questions) and their traditional troubleshooting and resolution paths;
- Escalate non-standard problems to second line support as to be outlined in the Help Desk Strategy, logging, and receiving resolutions; and
- Communicate changes to the system operation.

Training

Training needs can be divided into a number of categories:

- Technical training in the application software, system software databases, networking systems (local and wider area networks (LANs and WANs), 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.

Whilst initial training should be delivered as part of the implementation contract, it is important that an ongoing training programme is prepared and supported to ensure new officers receive training whilst existing officers have retraining and 'refresher' training courses available.

Technical training should 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 may be arranged as an ongoing support service provided by the vendor of the hardware and software tools that are acquired for system operations.

End-user training invariably requires the most attention as large numbers of staff are likely to be involved in the operation and management of financial systems. Training must be properly planned so as not to seriously disrupt ongoing regular activities handled by staff.

Many governments have established training institutions which have been used successfully to impart training internally on a sustainable and ongoing basis. It is important that the training program is matched to requirements. Many staff may need to know only specific features of the system, and initial training can be limited to those features. Training should be coordinated and focused to specific requirements and provided as close as possible to the time it will be required, and not several months before it is likely to be used.

It is important to set up a help desk, hand holding clinics, and train a group of key users thoroughly who can then be used to provide cascade training to technical resource personnel.

Change Management

Several types of change management initiatives may be necessary.

a) The implementation of new financial and HR systems is often resisted by staff who consider 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, 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.

b) A second type of resistance may come from staff used to doing their regular work in a given way, and who are reluctant to adopting 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 recognise the inevitability of this change.

The owning Ministry or Agency management has a major role to play here. For example, for payments, it should be emphasised that the only way a payment will be processed is through the system, and only those suppliers or personnel whose data is on the suppliers or payroll files. Similarly, all transactions from revenue agencies should be processed through the system. As the system is implemented, 'handholding' support from key users and more formal training should be made available to staff as they transition to the new system.

c) Resistance may also arise from areas where nefarious practices operate, and where the new systems reduce the opportunity for such activities. This can only be overcome by ensuring the proper application of system and internal controls.

Section 6: Examples of Key Financial System Requirements

This section provides some of the key requirements you should expect to find within financial systems. This list may be tailored and used as a list of key requirements you would expect a system selected to contain.

When specifying systems for bid purposes, a common approach in the selection of major systems is to identify against key requirements a particular expectation or attribute, for example:

REQUIRED – a requirement that **MUST** be met. The non-provision or availability of this requirement will render the bid as substantially non-responsive.

DESIRABLE – A requirement that is very desirable and may be paid for if funding allows but failure to provide the requirement would not be a cause for failing to respond.

REQUEST FOR INFORMATION – A Bidder should submit requested information on a requirement.

Requirements may be specified by individual modules, but there will also be general, or system wider requirements that must be specified, for example:

General - Use of the system

- The ease with which users can navigate through the system;
- The ability of the system to assist in resolving errors and providing help;
- Compliance to software engineering principles and standards;
- Support to defined work flows.

General - Security

The objective should be to ensure that access to the system is available to the right users, at the right times, for the right purposes and at the right locations. Meeting this objective is dependent on:

- Preventing improper access;
- Providing business continuity by ensuring adequate back-up, recovery and archiving procedures;
- Ensuring integrity of data;
- Determining and enforcing access rules through ensuring that the system supports best practice work flows, including adequate levels of internal check;
- Providing thorough audit trails of all system transactions and errors.

General - Information interchange/ System interfaces

Objectives are to ensure that the system supports:

- Any transitional arrangements for accepting data from line ministries or Ministry of Finance/Budget agencies

that will use, or need to exchange information with the system;

- Data migration to and from other financial management systems, such as payroll, debt management, assets, tax and revenue systems, etc.

6.A Financial Management System Requirements

Specific Budget Classification and Chart of Accounts Requirements

The requirements will need to specify in particular the structure and reporting requirements of the budget classification and chart of accounts and their respective field sizes, relationships and reporting requirements – for example administrative, economic, functional, programme, fund and geographic segments.

This is important to ensure that the required Office of the Accountant General of the Federation (OAGF) National Chart of Accounts (NCOA), as modified by individual states, are properly defined and configured within the system to be selected.

Particular attention should be given to defining the programme segments and their relationships, i.e. sector, policy, programme, project, objective and activity. These are necessary to support required budget and programme management reporting formats.

Likewise the formats of required financial reporting in compliance with the OAGF IPSAS and budget performance reporting – which are dependent on the chart of accounts – must be clearly defined.

Specific Ledgers and Accounting Requirements

Ledgers record the transactional data associated with a nominated Chart of Accounts. The General Ledger is the controlling Ledger and contains the overall account balances. It will contain accounts that hold detailed transactional facts, but will also contain Control Accounts that hold summaries of detailed transactions recorded in subsidiary “feeder” ledgers (such as: accounts payable; accounts receivable).

Together with the Chart of Accounts and the subsidiary ledgers, the General Ledger will provide Government with the capability to manage the overall budget execution process and generate fiscal reports.

Ledger features to be accommodated within a system are likely to include:

- Postings - Transactions posted to a Subsidiary Ledger must automatically and simultaneously update the Control Account for that Subsidiary Ledger in the General Ledger.
- Comparisons - account ledger balances must be capable of being compared with approved budget, revised budget, budget year to date, commitments, previous year actual balances for comparable period, etc.
- Controls - At any time, only one period can be "open" for general posting. Security must prevent posting to an invalid period. Will contain validations to ensure double entry and use of valid Chart Component combinations.
- Periods - the General Ledger will be divided into 12 monthly periods and a thirteenth period for closing entries.
- Reports - The General Ledger will receive data from subsidiary and interfaced modules, enabling consolidation of financial data to reflect the overall picture of Government's fiscal position - to be published in the financial statements. When combined with information on budgets and commitments, reports can be produced for cash flow forecasting, budget management, expenditure planning and management accounting.

Budget Module Requirements

It is likely that subsidiary systems based on MS-Excel will be in use to identify revenue forecast projections, and consolidate budget submissions based on a Medium Term Fiscal Forecast (MTFF) and Budget Policy Statement (BPS), which will identify sector ceilings.

SPARC has produced templates and guidance on these areas which are available on the SPARC website.⁵

The state government's specific budget preparation processes should be explained within any specifications, and also the requirement that:

- The financial system should be able to record approved sector, programme and project budgets, against which budget performance reports can be produced.

After the budget submissions have been approved by the Executive Council and the draft budget is deemed complete, the Budget Estimates Book and draft budget may be printed and presented to State House of Assembly for approval.

- The system should be capable of printing, and paginating the various budget reports in formats suitable for reproduction by the printers.
- The system should also support the publication of budget books in a format suitable for viewing and downloading via the Ministry of Finance or Government web-site.

Once the budget has been approved, revisions may be made to vary that budget to reflect changed needs and priorities, and to enable urgent expenditures that were not anticipated when the budget was drafted. Budget maintenance through budget reallocations, supplementary budgets, and the withdrawal/suspension of budgets, will be subject to a set of business rules detailed in the financial regulations.

- The system should be able to record budget reallocations; supplementary budgets; and the withdrawal/suspension of budgets in a controlled way, and report on any budget changes.

Upon approval of the annual budget and the signing of the Appropriations Bill by the Governor, the Commissioner of Finance will issue warrants authorising expenditures up to the limit of the various budget approvals. The Accountant General will in turn release budgets to Accountable Officers, authorising them to incur expenditures up to the authorised limits.

The process followed by the state should be clearly defined to enable a system to be designed and configured so as to:

- Record and report on the required budget processes and support the legislative and organisational 'business rules';
- The system should support budget virements and reallocations.

Budget Reporting Requirements

The system should provide users of the system, in particular budget holders and managers with a variety of on-screen and printed management reports, including exception reports, where performance outside defined tolerances.

Reports will typically:

- Compare actual costs and commitments against appropriated, revised and released budgets;
- Be able to report by Ministry/Department/Agency, economic codes, sector, programme, project, geographic code, etc. in compliance with IPSAS and OAGF performance reporting requirements;
- Compare actual and commitments against profiled year-to-date revised budgets;
- Be available at various combinations of Chart Components with the ability to pivot data, drill down and roll-up;
- Various managerial and operational reports;
- Provide tracking of budget variations and releases.

The reporting should be stated to be required to be in compliance with the OAGF IPSAS formats for cash based (and future accrual based) reporting.

⁵ <http://sparc-nigeria.com/GREAT/>

Budget Execution and Payment Requirements

Functionality should include:

- Issue and recording of warrants;
- Recording of Local Purchase Orders (LPOs) from procurement, and subsequent goods received notes, returns and invoices;
- Recording of commitments for both capital contracts and purchase of goods and services;
- Processing of invoices and related payment approvals and remittance advice for suppliers;
- Ability to make payments by both cheque and electronically;
- Reporting of outstanding payments and scheduled payments.

Specific Bank Account and Treasury/ Cash Management Requirements

It is good practice for many governments to follow a strategic goal of rationalising the number of bank accounts and to progressively move towards a Treasury Single Account (TSA), which will be maintained by the Treasury and be used for all revenue deposits and payments by all ministries and agencies. The use of a TSA enables greater attention to cash and treasury management, including:

- Using the profiled budget information to develop cash flow forecasts of revenues and expenditures;
- The facility to forecast and plan cash availability for the payment of payroll, debt servicing and other expenditures, in order to support an orderly implementation of the annual budget;
- Support the forecasting of periods and values of cash shortfalls;
- Enable the management of bank account operations; and
- Distinguish between Funds.

The system must be specified to meet any TSA requirements and must be capable of accepting information from banks and must assist in the reconciliation of the cash books to the bank statements, for example support standard banking functionality such as:

- Identification of "stopped" cheques;
- Treatment of stale cheques;
- Treatment of dishonoured payments;
- Cancellation and replacement of cheques;
- Payment by electronic funds transfer;
- Foreign currency payments and receipts;
- Inter account transfers; and
- Consolidated reporting.

General Receipting and Revenue Management Requirements
A sub-module of a financial system may be used for general cash receipting for cash and other payments. As such the system should support general revenue management.

Functionality should include:

- Cash receipting from a variety of locations and payment formats (cash, cheque, debit card etc.);
- The banking of and accounting for revenues, and the management of miscellaneous monies due to the government;
- The creation, maintenance and management of debtor records for a range of non-tax revenue purposes;
- Management reporting.

Overall Financial System Reporting Requirements

A wide range of reporting requirements cover the following areas:

- **Statutory reporting** - to provide information to the legislature and general public. The main reports are:
 - o Annual Budget presentation, including performance and medium term budget; and
 - o Financial Statements, to be compliant with prescribed formats - Federal and other standards.
- **External Stakeholder reporting** - to satisfy the needs and requirements of, for example, Federal Government, development partners and prospective investors and financial markets/ agencies. These will be compliant with international standards such as GFS and IPSAS.
- **Management reporting** - to provide information in a variety of formats for financial managers and policy makers.
 - o Budget and performance monitoring
 - o Exception reports
 - o Ad hoc reports
 - o Export to Excel for modelling, and for inclusion in other documents
 - o Executive Information capability, providing on-line and dynamic reports with ability for user to filter, sort, pivot and drill-down data.
- **Operational reporting** - the largest category. Includes a wide range of reports in specific formats to support the business processes, such as:
 - o Budget release permits
 - o Local Purchase Order
 - o Cheques
 - o Payment Advice
 - o Salary Advice
 - o Bank reconciliation statement
 - o Receipt
 - o Debtors/Creditors aged reports
 - o Payroll listings
- **Audit Reports** - including both the system supported audit trail reports, and a capability for internal and external audit staff to generate exception, statistical and other reports to test compliance to financial regulations.

6.B Human Resources and Payroll System Requirements

Human Resource functionality is likely to include, as a minimum:

- Maintaining personnel data relating to all current and previous permanent Public Service and casual employees;
- Managing the government establishment structure (linked to the payroll system);
- Managing pay structures;
- Managing human resources (recruitment, personal information, medical, performance review, disciplinary, training, employment history etc.);
- Ensuring that formally approved, validated and verified personnel will be enabled for payroll processing at the correct rates;
- Management reporting.

Payroll System Requirements

Key requirements will include the ability to:

- Prepare payroll budgets;
- Maintain employee records, including:
 - o Start, termination, transfer and suspend pay dates;
 - o Employee bank details.
- Ensure employees are coded against correct Position Numbers and administrative units;
- Process standing and temporary allowances and deductions; and
- Monitor personnel costs against budgets.

Key data management requirements will include, for example:

- o Full name
- o National ID number
- o Address and contact details
- o Qualifications
- o Date of Birth
- o Commencement Date
- o Position Number (and Incremental Point)
- o Bank Details
- o PSD employment authority reference
- o Employee classification details
- o Allowances
- o Deductions
- o Termination date
- o Employee Status (e.g. active, suspended, terminated)
- o Management reporting

6.C Tax Management System Requirements

Key data and functional requirements will include:

- o Taxpayer registration – Company, Individuals, etc.
- o TIN request allocations and set-up;
- o e-registration for companies and individuals.
- Tax account management, including:
 - o opening balance
 - o exemption
 - o tax type business rules, and
 - o tax declaration forms
- Online and manual filing processes
- Manual returns processing
- Payment management
 - o Payment recording
 - o Refund management
- Compliance monitoring
- Penalties and interest calculations (including e-payment, e-refund)
- Collection management
- Payment agreement
- Support for Tax Audit (case tracking and follow-up)
- Objection and Appeal case management and document and file management
- Letter and reminders
- Interface with financial systems, including bank systems and associated reconciliations
- Management reports

Section 7: Useful websites and documents

Web URL	Description
http://www.imf.org/external/pubs/ft/expend/guide3.htm	International Monetary Fund (IMF) Public Expenditure Management Guide for details of functions of key financial processes - budget preparation, budget execution and cash planning and management.
http://web.worldbank.org/WBSITE/EXTERNAL/PROJECTS/PROCUREMENT/0,,content-MDK:21994672-menuPK:84284-pagePK:84269-piPK:60001558-theSitePK:84266-isCURL:Y,00.html	World Bank Standard Bidding Document for the Supply and Installation of Information Systems - Single Stage Bidding. December 2008
http://web.worldbank.org/WBSITE/EXTERNAL/PROJECTS/PROCUREMENT/0,,content-MDK:50004516-menuPK:84284-pagePK:84269-piPK:60001558-theSitePK:84266-isCURL:Y,00.html	World Bank Standard Bidding Document for the Supply and Installation of Information Systems - Two-Stage Bidding. March 2003
http://www.sparc-nigeria.com/RPT	Revenue projections tool (and documentation) developed by SPARC to assist state and local government in estimating recurrent revenue.
http://blog-pfm.imf.org/pfmblog/	A blog site providing the views of public financial management (PFM) practitioners on a range of PFM issues, including budget realism.

Title	Authors	Publisher
Treasury Reference Model	Ali Hashim and Bill Allan	World Bank technical Working Paper 505. May 2001
Treasury Diagnostic Toolkit	Ali Hashim and Allister Moon	World Bank Working Paper No 19. 2004
A Handbook on Financial Management Information Systems for Government	Ali Hashim	World Bank 2014
Introducing Financial Management Information Systems in Developing Countries	Jack Diamond and Pokar Khemani	IMF Working Paper WP/05/196 October 2005

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