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A Diagnostic Framework:

How to Assess the Capacity of a Government's Financial Management Information System as a Budget Management Tool

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A Diagnostic Framework to Assess the Capacity of a Government's Financial Management Information System as a Budget Management Tool

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Abbreviations and Acronyms

BEF	budget execution reports
COA	Chart of Accounts
EBF	Extra-Budgetary Funds
GFS	Government Financial Statistics
IEG	Independent Evaluation Group
IMF	International Monetary Fund
FMIS	financial management information system
MOF	Ministry of Finance
MTEF	medium-term expenditure framework
PFM	public financial management
PEFA	Public Expenditure and Financial Accountability
PPAR	Project Performance Assessment Report
SU	spending unit
TSA	treasury single account
TSS	total system strength

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The authors are grateful to Cem Dener who has made available an extensive database of FMIS World Bank projects and leads the World Bank financial management information system (FMIS) community of practice which provides a useful forum for discussing FMIS-related developments and issues.

Scores for the Philippines, Myanmar, Thailand, Lao PDR, and Malaysia are based on data generously provided by country staff participating in a conference on Public Expenditure Management Network in Asia, in Seoul, December 2–4, 2015. Leah April circulated the template to the staff and asked them to complete the survey. Janis Platais provided additional information that validated the scores for Lao PDR. Scores for Vietnam are based on data provided by Mr. Nquyen Minh of the World Bank and the Vietnamese Treasury; scores for Pakistan are based on data provided by Mr. Khuram Farooq of the World Bank and Mr. Shezad Hasan of the Government of Pakistan; scores for Maldives and Nepal were provided by Mr. Khuram Farooq; scores for Cambodia, the Russian Federation, and Kazakhstan are based on data provided by Ali Hashim; scores for Zambia, Ghana, Malawi, Sierra Leone, Zimbabwe, Mozambique, and Liberia are based on data provided by Mr. Khuram Farooq; scores for Indonesia are based on data provided by Mr. Hari Purnomo of the World Bank. Scores for Afghanistan were provided by Paul Welton and Vishal Gandhi.

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Summary

A government's capacity to manage its public finances is central to its ability to deliver services. Well-functioning accounting and financial management systems are among the basics that facilitate this, and significant resources and time have been invested for the procurement and implementation of such systems across the world. Implementation is, however, often associated with disappointing results and attribution to higher-level public financial management (PFM) objectives difficult to establish.

On the basis of five in-depth project-level evaluations of World Bank investments, this paper proposes a diagnostic framework that can be used to assess the utility of a Financial Management Information System (FMIS) as a budget management tool. The purpose of this is threefold:

- To provide a better understanding of how an FMIS can contribute to larger PFM objectives, such as improved use of resources or improved budget management. Articulating the baseline and change in critical dimensions will establish a clearer log frame and make more apparent the contribution of FMIS investments to improved budget management. Applying this framework should do away with the notion that implementing an FMIS alone is sufficient for better budget management.
- To point out whether the system has the capacity to serve as a good budget management tool and whether its functionality, coverage, and scope can have a significant impact on a government's ability to deliver services. Such an assessment would also highlight any weaknesses and areas that need attention and help develop a road map for further reform. As such, it will not only serve as a baseline but should inform project design and strengthen the relevance of interventions. For example, a country that scores highly on technical and reporting aspects but falls short with regard to coverage may not need another information technology (IT) infrastructure investment. Instead, a push to route more transactions and more types of transactions through the system may be warranted.
- To allow for comparison across countries within specific dimensions. This will generate opportunities for learning: countries can draw on the experience of others who may have successfully implemented certain reforms. For example, an analysis of the treasury single account status can quickly provide an overview of good performers, who may subsequently be drawn on as reference points.

The paper develops a total system strength score and weighs various dimensions according to importance. The total system strength score is mapped to corresponding Public Expenditure and Financial Accountability assessment dimensions to assess any correlation between the two, and extensive sensitivity analysis suggests a positive correlation. This is interpreted as an indication that the framework is robust.

A preliminary application of the methodology to a sample set of countries finds that in many cases further reforms would be most effective if, at this stage, they pertained to expanding treasury single account and FMIS coverage (and its associated controls) rather than additional technological investments.

1. Introduction and Motivation

1.1 Financial Management Information Systems (FMISs) for government constitute a fundamental part of public expenditure management. Automation of government financial management processes has become an integral part of most public expenditure management reform programs, because the availability of timely and accurate information is critical to the economic management of government finances. As such, well-functioning accounting and financial management systems underpin governments' capacity to allocate and use resources efficiently and effectively. The potential of such systems to improve effective service delivery, and increase participation, transparency, and accountability to citizens, their elected representatives, and creditors is widely recognized by the literature and practitioners (Chan and Zhang, 2014: 243; Dener and others 2011; Dener and Min 2013; Hashim 2014).

1.2 As a consequence, investments in FMIS systems have been made on a large scale around the world. The World Bank alone invested about US$3.5 billion across 74 countries. Information and communication technology components tend to be the largest investment item in such projects and make up, on average, about 50 percent of the cost (World Bank 2016). Project commitments have varied, depending on size and scope, ranging from US$3.0 million (Cabo Verde) to US$231.0 million (Russian Federation).

1.3 Recognizing the potential payoffs, World Bank FMIS projects have had high-level objectives along the lines of improved service delivery, improved public sector effectiveness, better expenditure management, or improved transparency and accountability. Reviewing all objectives of the 126 FMIS World Bank projects (table 1.1) shows that the majority (40.5 percent) were focused on accountability, fiduciary responsibility, and oversight, followed by transparency (39.7 percent), efficiency (35.7 percent), and effectiveness (20.6 percent).[1]

Table 1.1 Integrated FMIS Objectives by Area of Focus

Area of focus	***Number of projects***	***Share*** (%)
Accountability, fiduciary responsibility, and oversight	51	40.5
Transparency	50	39.7
Efficiency	45	35.7
Effectiveness	26	20.6
Capacity and coverage	20	15.9
Public service delivery and access to services	12	9.5
Credibility	9	7.1
Allocation	7	5.6
Quality and timeliness of reporting and information	5	4.0
Utilization	5	4.0
Equity in resource sharing and inclusiveness	3	2.4

[1] Categories per project are not mutually exclusive and thus add up to more than 100 percent.

Reliability	3	2.4
Total	126	100.0

Source: World Bank project portal.
Note: Categories per project are not mutually exclusive and thus add up to more than 100 percent.

1.4 In other words, projects were implementing FMIS systems expecting to achieve these objectives. Although this is in principle reasonable, what is frequently lacking is a sufficiently granular framework on the transmission channels on how the FMIS investment would facilitate improvements in any given area of focus. The Independent Evaluation Group (IEG) considered 77 percent of closed FMIS projects[2] to have a modest or negligible monitoring and evaluation framework. This figure gives little confidence that progress in investments can adequately be tracked to intermediate or final outcomes, or that improvements in outcomes are attributable to, and a reflection of, the FMIS investment. Moreover, anecdotal evidence suggests that FMIS investments were often viewed as all-encompassing and the adoption of a comprehensive system sufficient to achieve outcomes. A recent literature review noted a "dearth of rigorous knowledge" (Combaz 2015, p. 3), with evidence being mostly anecdotal and evaluation methods being insufficiently systematic. Contributing to this situation is not only the lack of rigorous ex post evaluations but also the apparent lack of adequate logical frameworks with sufficient baselines, intermediate outcome indicators, and mechanisms to track progress.

1.5 Given the critical importance of FMISs, the apparent lack of rigorous evidence, insufficient monitoring and evaluation frameworks, and a perception of poor performance, this paper proposes a methodology that assesses the adequacy of FMISs as a budget management tool. Conducting such an assessment would have the following benefits:[3]

- It can identify critical areas of need in the current system. Thus, rather than an all-encompassing engagement, interventions could be more targeted on the identified bottlenecks and thus be more relevant for the achievement of the overall project objective—which would also mean better value for money for project funds. Both of these dimensions feed into IEG outcome ratings and could thus improve portfolio performance.
- It lends itself to the identification of critical indicators of the progress of FMIS as a functioning budget management tool. Evidencing progress would facilitate attribution to final outcomes and thereby strengthen the argument for better efficacy performance—a factor critical to project outcome ratings.
- Documenting progress at project end using relevant indicators will, over time, generate the necessary evidence base that will better facilitate learning. As such, this

[2] Of the 86 closed projects, 51 were assigned a monitoring and evaluation rating. Others have either not been evaluated yet or were too old to have been assigned a rating.

[3] Existing frameworks such as Public Expenditure and Financial Accountability (PEFA) assessments cannot by themselves be used for this purpose. Although they provide good criteria for assessing the quality of budget management across multiple dimensions, they do not connect any identified deficiencies to specific features of the FMIS. However, if used along with this diagnostic framework, the PEFA could form a better basis for developing a targeted reform program.

can improve portfolio performance, hold stakeholders accountable, and deliver systems that facilitate improved management of public resources.

1.6 The proposed diagnostic framework is based on the experience of rigorous field-based World Bank project-level evaluations with substantial FMIS components (see IEG 2016a–e). Additional desk-based studies were conducted for cases that may offer important lessons, and a set of critical success factors and key failure points have been identified for the entire system's life cycle. Key observations derived from actual experience have informed a checklist of functions and features in an FMIS that were found important for implementing effective budget management and control. They cover the underlying enabling policy and the institutional environment under which the systems operate, their functionality, the controls they incorporate, and their actual use and coverage.

1.7 This checklist is presented as a diagnostic framework to determine whether an FMIS has the basic design capacity to serve as a good budget management tool and whether its coverage and scope of use is sufficient for fiscal management. Secondly, this study applies the framework to assess the strength of the FMIS in terms of its effectiveness for budget management and control as they exist in several (22) countries, and to highlight areas of weakness where further reform efforts could focus.

1.8 To assess whether the system strength, as calculated above, can be used as a valid indicator of its capacity for effective budget management, the total system strength (TSS) scores, as calculated from the diagnostic, have been analyzed in conjunction with corresponding PEFA scores to see whether there is any correlation between the two.

2. Methodology

2.1 Based on the experience in the IEG evaluations and building on work done by Dener and others (2011) and Hashim (2014), this paper identifies a set of features that were found to be critical for determining the effectiveness of an FMIS as a budget management tool. These are discussed under the following five categories:

1. **Treasury single account (TSA).** This includes an assessment of the degree of consolidation of government cash balances and the extent to which they are under the direct purview of the treasury.
2. **FMIS coverage.** This category serves as a proxy for measuring the extent to which government financial transactions are covered by the FMIS.
3. **Core system functionality.** This includes an assessment of core functionality features of the system that are critical for it to act as a budget management tool. Among others, it includes issues relating to budget management; commitment management; payments management and associated controls; payroll-related payments; debt service payments; fiscal transfers and subsidies; and tax and nontax receipts.
4. **Ancillary features.** This category includes use of systems modules and interfaces with other systems, such as budget preparation, Medium-Term Expenditure Framework (MTEF) capability, establishment control and its integration with payroll payments, debt management, fixed assets, and auditing.

5. **Technical aspects**. This provides an assessment of the nature of the underlying information systems support for budget execution or treasury processes, systems architecture, and the use of a data warehouse and associated analytical tools.

2.2 The diagnostic framework consists of a set of questions under these categories and assigns scores to them depending on their relative importance. The templates for the various categories are provided in appendixes A–E.[4] From these questions, a total systems score is derived based on Organisation for Economic Co-Operation and Development (OECD) guidance on constructing composite indicators (Nardo and others, 2005). The authors recognize that the total system score may be difficult to interpret, and hides important granularity. Enumeration is only used to correlate FMIS TSS aggregates with PEFA scores. Interpretation of findings pertains to the various subsections only. A detailed discussion on the relevance of the various categories and methods for assessment is provided below.

TSA Coverage

2.3 The presence of a comprehensive TSA is a critical enabling condition for a functioning budget execution system. From a cash management perspective it is important to have all government moneys in a TSA at the central bank so asto avoid large idle balances in commercial bank accounts outside the purview of the treasury and the control of the ministry of finance. Placing money outside the TSA and the central bank means that government would not be able to draw on these funds for investment (or fund requests from other spending units). Further, commercial banks where this money is held can use it to buy government borrowing instruments (such as T-bills) meaning they re-lend to government its own money, at interest.

2.4 Ideally extra-budgetary funds and donor funds are also placed in a TSA and under the purview of the Treasury. A root–branch arrangement can be set up such that donor funds can be ring-fenced even though they are part of the TSA. However, as a second-best arrangement several countries have adopted a modality where these funds are banked in the central bank, but outside the TSA. This arrangement would lower the overdraft limit for government borrowing from the central bank, and users could still have access through zero-balance accounts in commercial banks where balances are swept periodically. The situation that needs to be corrected is where such funds are banked in commercial banks which are not zero-balance accounts of a main account in the central bank.

2.5 Linking accounts is not a different TSA modality; nor should it be viewed as a viable alternative. Although linking accounts means that balances would be known, all of the problems outlined above would still remain as long as the treasury cannot access these funds directly. An International Monetary Fund (IMF) guidance note on TSAs makes this quite clear, stating that for a TSA to work effectively, accounts should operate on a zero-balance basis, and balances need to be swept into the central bank unconditionally (Pattanayak and Fainboim 2011).

[4] Important additional informational items such as staff and budgetary resources available for ongoing system maintenance are discussed separately in appendix G.

2.6 To assess the comprehensiveness and scope of the TSA, the following scoring mechanism was applied: If a TSA has been established, a base score of 10 points is given. Subsequently, two points are deducted if (i) advances are given out to line ministries at the start of the year and these are banked in commercial banks that are not linked to the TSA; (ii) large extra-budgetary funds exist and are banked in commercial banks not linked to the TSA; (iii) internally generated funds are banked in commercial banks owned by the line agencies; and (iv) donor funds are banked in commercial banks not linked to the TSA. In all of the above, if the magnitude of these funds is not high compared with the total budget, then a deduction of only 1 point is made. The scoring system used in this category gives higher marks for cases where these funds are banked in the central bank and are part of the TSA, compared to the situation where they are banked in the central bank but are NOT part of the TSA. If commercial bank accounts are merely linked, points are deducted for reasons outlined above. A maximum score of 10 is possible, which is a proxy for all government financial resources banked in the central bank or TSA. The full set of questions and scoring sheet are provided in appendix A.

FMIS Coverage

2.7 The objective of this dimension is to identify which payments and receipt transactions are routed through the FMIS and which bank accounts (where government financial resources are banked) are covered by the FMIS. Coverage of the FMIS is critical because partial budget and execution reports derived from the FMIS only give a partial picture. Further, benefits related to commitment and expenditure controls would apply only to funds covered by the FMIS; thus the usefulness of the FMIS as a budget management tool is a function of the amount of government financial resources covered. Transactions can only be considered as being routed through the system if subjected through system internal ex ante budgetary controls. Posting transactions into the system after they have occurred only gives the illusion of comprehensiveness, while integrity cannot be ensured and controls are not applied.

2.8 Project advances and internally generated funds are a part of the government's own budgetary resources and should be transacted through the FMIS (banked in the TSA) and therefore be subject to budgetary controls. Transactions related to extra-budgetary funds and donor funds can also be routed through the FMIS even if they are not part of the TSA, because these accounts can be defined in the FMIS and the agencies that are responsible for transacting them can use the same system as is used for government funds. The following scoring mechanism was applied: If an FMIS was set up and is being used, a basis score of 25 points is given. Deductions are made in the following scenarios:

a. Deductions of up to 4 points are made if transactions handled by the central ministry of finance, such as debt servicing, fiscal transfers, and subsidies to state-owned enterprises are not routed through the system and are carried out directly by the ministry of finance communicating with the central bank. As noted above, posting transactions into the system after they have occurred cannot be considered the same as routing them through the FMIS.

b. A deduction of 4 points is made if the system is implemented only at the central level. A deduction of only 2 points is made if it has also been implemented at the provincial level. No deductions are made if it has been implemented countrywide.
c. A deduction is made depending on the extent to which transactions against the recurrent budget are processed through the FMIS. If they are not, a deduction of up to 4 points is made, with lower deductions depending on the amount of the transactions compared with the total budget.
d. A deduction is made if transactions against the capital budget are processed through the FMIS, depending on whether the advance accounts are controlled by the FMIS. If they are not, a deduction of up to 5 points is made, with lower deductions depending on the magnitude of the advances compared with the total budget.
e. A deduction is made if transactions against extra-budgetary funds are processed through the FMIS, depending on whether the extra-budgetary fund accounts are controlled by the FMIS. If they are not, a deduction of up to 4 points is made, with lower deductions depending on the magnitude of the extra-budgetary funds compared with the total budget.
f. A deduction is made if transactions against IGFs are processed through the FMIS, depending on whether internally generated funds accounts are controlled by the FMIS. If they are not, a deduction of up to 4 points is made, with lower deductions depending on the magnitude of the IGFs compared with the total budget.
g. A deduction is made if transactions against donor funds are processed through the FMIS, depending on whether donor fund special accounts are controlled by the FMIS. If they are not, a deduction of up to 4 points is made, with lower deductions depending on the magnitude of the donor funds compared with the total budget.

2.9 A maximum score of 25 is possible, which is a proxy for all government financial resources routed through the FMIS.

Core Functionality of the FMIS

2.10 This category attempts to establish the quality of the core functionality provided by the system and the controls it incorporates. The concept of core functionality is outlined in more detail in Hashim and Allan (2001). Points are given for individual features and added up. The following evaluation questions are applied:

a. How does the FMIS accommodate budget management? What is the budget classification structure in use, and is it compliant with IMF's Government Finance Statistics (GFS)? Is the chart of accounts for budgeting the same as that for accounting, and is it the same across various levels of government? How are the initial budget and in-year budget transactions loaded in the system?
b. How has commitment control been implemented, and is it applied to all transactions? Is commitment control integrated with payment processing?
c. What are the controls exercised for the various types of payments that are handled by the system?

d. How are tax and nontax receipts data recorded in the system?
e. What is the type of interface used with the banking system?
f. What is the quality of fiscal and financial reporting available from the system?

2.11 A maximum score of 40 points is possible as a proxy for all core functionality requirements in place. Scoring details for the individual evaluation questions are outlined in appendix C.

Ancillary Features

2.12 This category assesses ancillary features related to FMIS functionality, such as the use of other modules and their interfaces with other systems. Modules scored under this category include the nature of the budget preparation system, whether an medium-term expenditure framework capability exists and is integrated with the budget preparation module, the nature of the capacity to perform establishment control prior to making payroll payments, the nature of the debt management system in place, whether a fixed-assets management module is part of the FMIS in use, and whether oversight institutions have independent access to the FMIS transaction databases. Points are given for each evaluation question. A maximum of 15 points is possible. Details on individual evaluation questions and scoring are provided in appendix D.

Technical Aspects

2.13 This category covers issues such as the nature of technology used, whether the FMIS is custom developed or uses a commercial off-the-shelf application software package, the scope of the functionality provided by the software, and the FMIS and its deployment architecture. A maximum score of 10 points is possible. Evaluation questions are outlined in appendix E.

Total System Score

2.14 The total system score is created based on OECD guidance for creating composite indicators (Nardo and others, 2005). The total score is derived from aggregating the various sub-dimensions, with a maximum score of 100 points being possible. Because not all of features have the same importance, dimensions were weighted by how relevant the literature perceives them for budget management (see Bartel 1996; Dener and others 2011; Diamond and Khemani 2005; Hashim 2014; Hashim and Moon 2004; Premchand 2000; and Schick 1998). In particular, the scoring scheme allocates more points for the critical elements of the policy, institutional, and systems elements required for effective budget management. These include the status of the TSA (10 points), the coverage of the FMIS (25 points), and the core functionality of the FMIS and the essential controls that it embodies (40 points). Non-core functionality features (15 points) and the nature of the technology used and its deployment (10 points) are viewed as secondary.

2.15 Authors are cognizant of shortcomings, including that the total score hides important granularity, weighting can be perceived as subjective, and scores across dimensions are not perfectly interchangeable (meaning that one could have two systems with the same score that

are different). Comparison across countries should thus be done with caution, and interpretation, as done by this paper, should focus on the relative achievements of the various sub-dimensions. In this paper, enumeration of the total system score is only used for plotting results against PEFA scores to assess whether the diagnostic framework can serve as a proxy for FMIS contribution to budget management.

3. A Preliminary Assessment Based on the Methodology

3.1 In this section, the methodology described above has been applied to assess the strength of the FMIS in terms of its effectiveness for budget management and control in 22 countries. The various categories and sub-categories have been scored with the help of several World Bank staff, country ministry of finance staff, and treasury staff.[5] The following are preliminary observations:

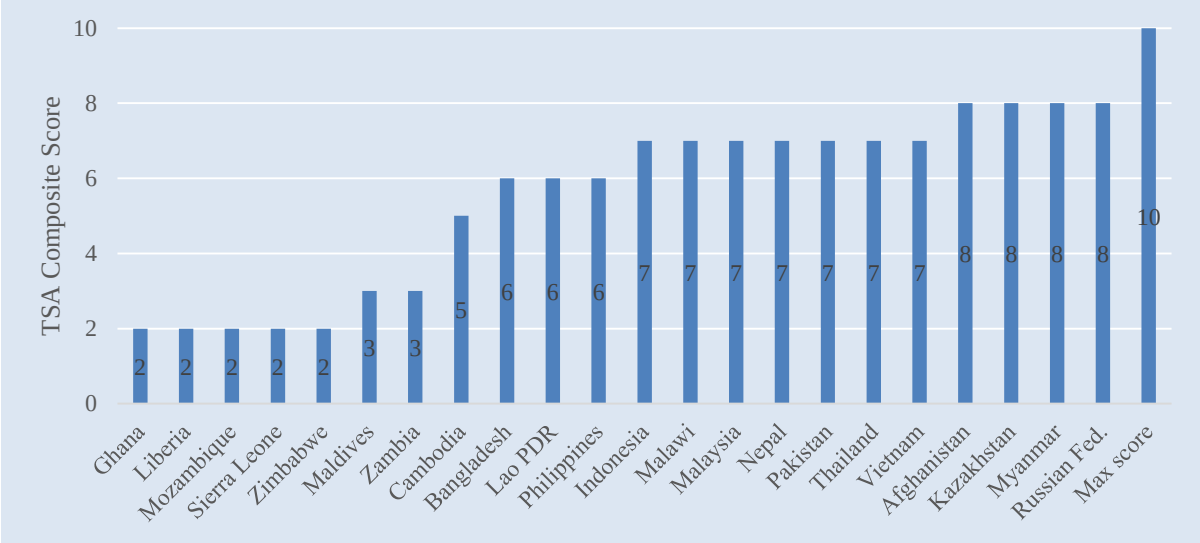
TSA Coverage

3.2 In several African countries, including Ghana, Liberia, , Sierra Leone, and Zambia, the coverage of the TSA is very low. Although a TSA has been established, funds are transferred to line agency advance accounts in commercial banks under the control of line ministries. These accounts are not linked to the TSA by zero-balance clearing arrangements, so the government does not have an accurate idea of the total amount of financial resources in these accounts at a point in time. In addition, large extra-budgetary funds exist (such as road funds) that are banked outside of the central bank and outside the control of the central treasury. The same situation exists for internally generated funds, which line agencies are allowed to bank in commercial banks under their own control; these are not linked to the TSA. Further, locally denominated donors' funds can constitute a large share of the total government financing envelope and are typically banked in special accounts held in commercial banks. These amounts outside the TSA can become quite large and, in effect, represent financial resources over which the MOF has no control. These large balances outside the TSA are generally not remunerated; they can also be used by the commercial banks where they are banked to buy treasury bills floated by the government to manage its liquidity, in which case the government effectively would pay interest on financial resources which belong to it.

3.3 In South Asian countries such as Bangladesh, Myanmar, and Pakistan, this is less of a problem. On the downside, donor funds in these countries are also usually banked outside the central bank. The TSA composite scores are provided in figure 3.1.

[5] Data for scores were generously provided by ministry of finance and treasury staff of various countries, and World Bank staff. A detailed list is provided in the acknowledgements.

Figure 3.1 TSA Coverage Score by Country

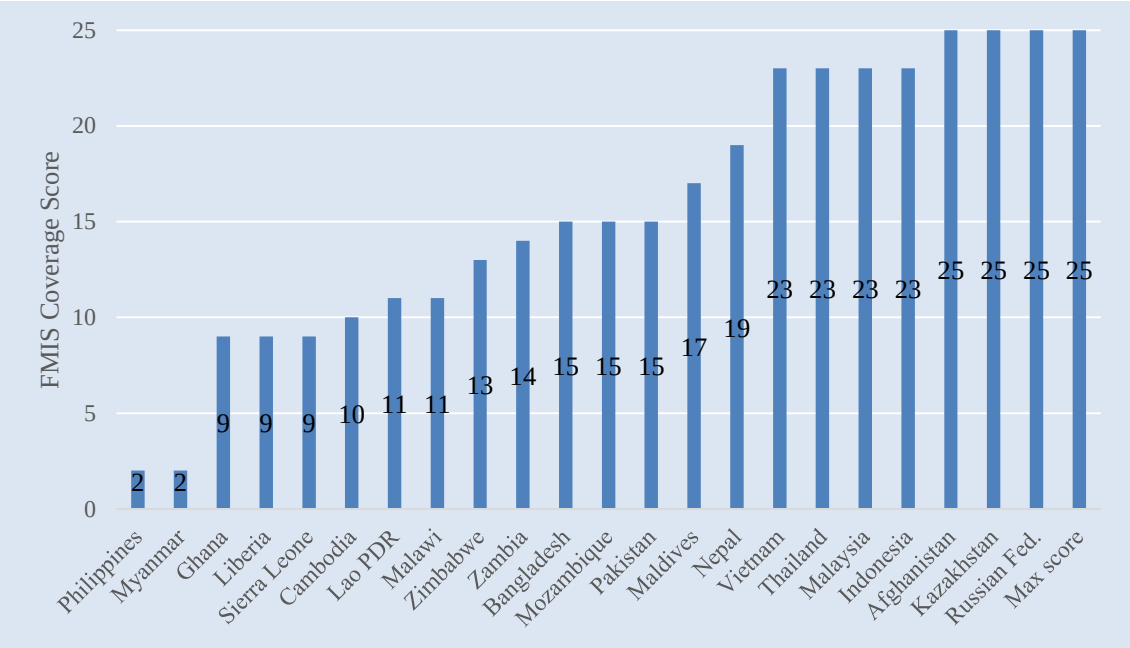


Note: The following abbreviations apply to all figures and tables in this paper: Fed. = Federation; PDR = People's Democratic Republic.

FMIS Coverage

3.4 The coverage of the FMIS is very low in several countries, as shown in figure 3.2. It is noted that in this group there are some countries, such as the Philippines and Myanmar, where a budget execution system is still to be established and low coverage is to be expected. However, this low coverage is also evident in several other African countries where costly FMIS projects have been implemented over long periods of time. Prominent among these are Ghana, Liberia, Malawi, Sierra Leone, and Zambia. The low scores in these countries indicate that transactions related to advance accounts, internally generated funds, extra-budgetary funds, and donor funds, which constitute a large percentage of the total government resources for these countries, are not routed through the FMIS. Further, in some cases domestic debt servicing as well as wages and salaries are not routed through the system and are only posted to the general ledger after the transaction has occurred.

Figure 3.2 FMIS Coverage Score of Select Countries



3.5 It is also noted that in these countries, the core functionality score of the system that determines its capacity for budget execution and control, as shown in figure 3.3, is quite high, and the technology used is state of the art (see comparison table 3.1). In these countries, the low coverage of the FMIS means that a sophisticated system is in place, but only a small percentage of the transactions related to government financial resources are being channeled through it and subjected to the ex-ante controls that are necessary for good fiscal management. Therefore, to this extent, the investment is not being properly used.

3.6 The relatively low scores for Pakistan reflect the fact that large sections of the economy, such as defense, railways, and departmentalized accounting agencies, do not use the system for ex ante control of transactions. Further, the ministry of finance generates transactions related to debt servicing and subsidies (for example, to the power sector) that amount to billions of U.S. dollars, and then instructs the central bank to pay directly without these transactions passing through the FMIS prior to payment. In the case of Maldives, the system is operational only at the center.

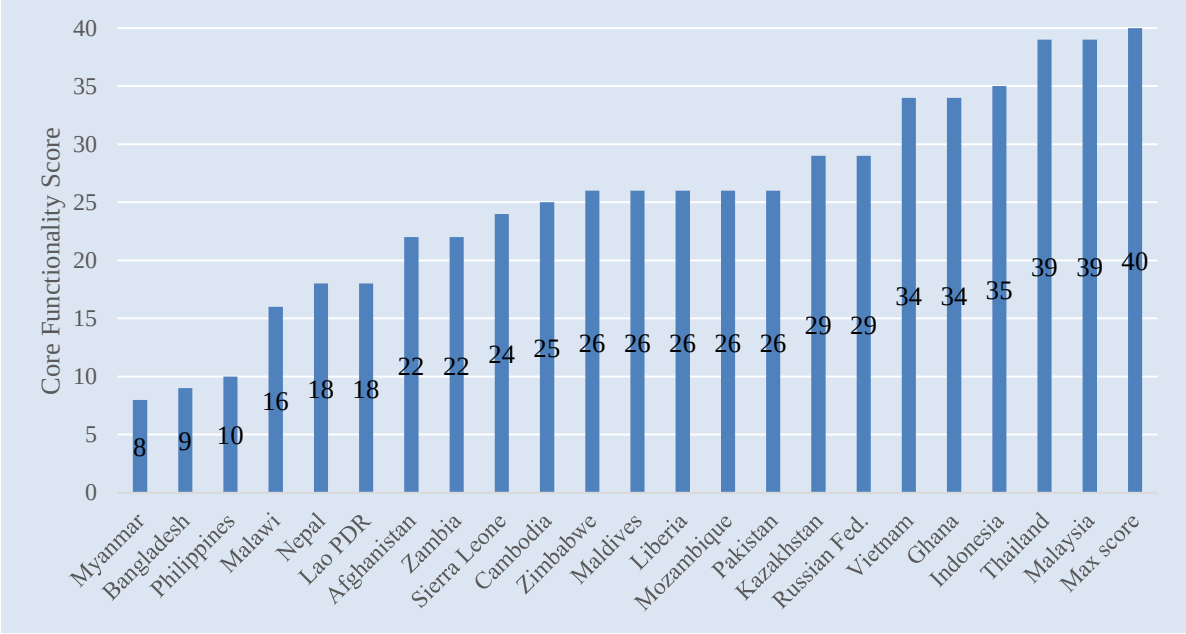
3.7 In all these countries, the low coverage of the systems means that the overall fiscal management reports and statutory financial statements produced by the system are not complete. The reports as they stand are not useful to finance managers at the ministry of finance for economic management. Various additions from manual systems need to be made before a complete countrywide picture is obtained (this has been repeatedly stated by, for example, the finance managers in the ministry of finance in Pakistan). Therefore, the focus of the reform in these countries should be to close the gaps in coverage instead of making more technological investments, as is being planned for in Zambia and Malawi, among others.

Core Functionality of the FMIS

3.8 This category assesses the core functionality and the controls incorporated in the system for budget execution or treasury processes. For countries with no effective budget execution system in place (for example, Myanmar and the Philippines), scores are understandably low. Bangladesh scores poorly because the system in place does not integrate budget data with budget execution data and does not carry out an ex ante check on budget availability and therefore lacks critical controls. In Lao and Nepal the reason for the low scores is that the systems in place are still rudimentary and lack core functionality such as commitment control. The reform programs in these countries should therefore focus on enhancing the FMIS functionality and its controls.

3.9 A notable point is that some countries with high scores in core system functionality, such as Kazakhstan, Russia, and Vietnam, received low scores for ancillary features. In these cases the core functionality required for budget execution has been established and the TSA coverage is fairly comprehensive. Subsidiary systems (such as a budget preparation system integrated with the budget execution system and a centralized payroll system) have been given lower priority and are not in place (see table 3.1).

Figure 3.3 Core System Functionality Score of Select Countries



Overall Assessment

3.10 The overall scores show whether countries have a fully functioning financial management system in place, and the extent of its ability to serve effectively as a budget management tool. The total system strength score is a composite rating of the five dimensions discussed above: (i) TSA, (ii) FMIS coverage, (iii) Core functionality of FMIS, (iv) ancillary features, and (v) technical aspects. Table 3.1 summarizes performance of the sample set of countries against these dimensions and ranks them by tertile. Traffic lights have

been used to visualize the urgency of reforms in these dimensions, and reflect progress on the overall ability of FMIS to serve as an adequate budget management tool.

3.11 Breaking down the overall assessment into the five subcategories and providing an at least crude ranking with respect to the overall score establishes an important benchmark for current system performance, and identifies binding constraints. These can inform the reform agenda and improve the relevance of project design. Diagnostic measures as per appendixes A–E can be used as performance indicators to track progress against the baseline and strengthen attribution to the achievement of overarching public financial management outcomes.

Table 3.1 Overall Assessment of FMIS in Sample Countries

Country	*TSA Status*	*FMIS Coverage*	*Core Functionality*	*Ancillary Features*	*Technical Aspects*	*Total System Strength*
Max score	10	25	40	15	10	100
Afghanistan	8	25	22	8	8	71
Bangladesh	6	15	9	5	3	38
Cambodia	5	10	25	4	7	51
Ghana	2	9	34	5	9	59
Indonesia	7	23	35	13	10	88
Kazakhstan	8	25	29	4	8	74
Lao PDR	6	11	18	3	7	45
Liberia	2	9	26	7	8	52
Malawi	7	11	16	4	5	43
Malaysia	7	23	39	14	9	92
Maldives	3	17	26	3	8	57
Mozambique	2	15	26	6	8	57
Myanmar	8	2	8	1	3	22
Nepal	7	19	18	5	6	55
Pakistan	7	15	26	9	9	66
Philippines	6	2	10	0	0	18
Russian Fed.	8	25	29	4	9	75
Sierra Leone	2	9	24	5	7	47
Thailand	7	23	39	11	10	90
Vietnam	7	23	34	3	8	75
Zambia	3	14	22	7	8	54
Zimbabwe	2	13	26	8	9	58

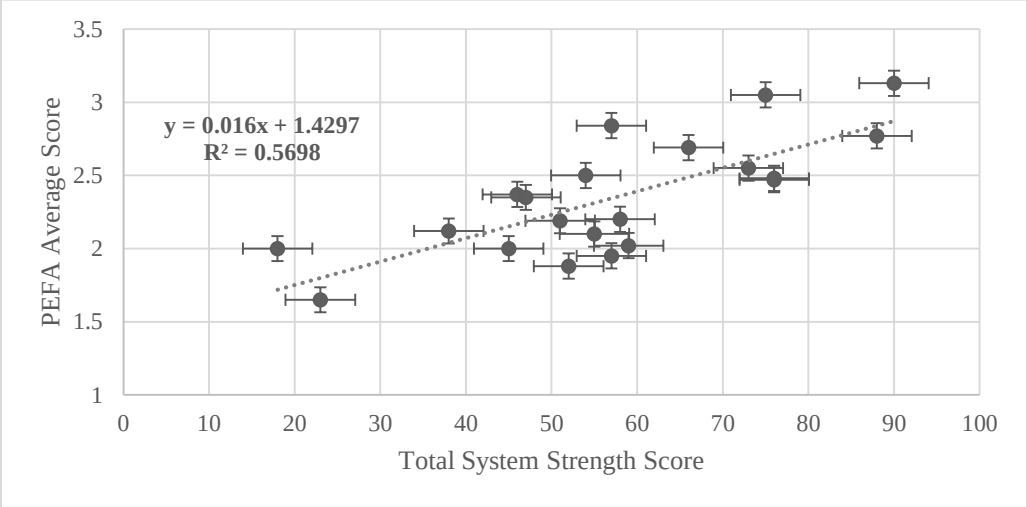
3.12 A review of the system scores suggests that having a fully functional FMIS in place alone is not a sufficient condition for it to serve as a good budget management tool. Some countries with good scores in functionality and technical aspects such as Ghana, Sierra Leone, and Zambia, continue to have mediocre overall ratings owing to, for example, an insufficient underlying policy environment (as reflected by the TSA), the coverage of the system and therefore the extent of its use, or the application of its controls.

4. Correlation with Other Budget Management Indexes

4.1 To assess whether the system strength, as calculated above, can be used as a valid indicator of its capacity for effective budget management, the TSS scores as calculated above for several countries have been compared with the corresponding PEFA scores for these countries. For this purpose, the PEFA scores used are the latest available from the PEFA site, and these scores have been converted to a numerical scale using the conversion scheme A = 4, B = 3, C = 2, and D = 1. This methodology has been used by others, for example de Renzio (2009). It has some limitations: inter alia, the various indicators measure very different things that are not equally important, and definitions used in different assessments (for example, "arrears") may not be the same (Ibid.).

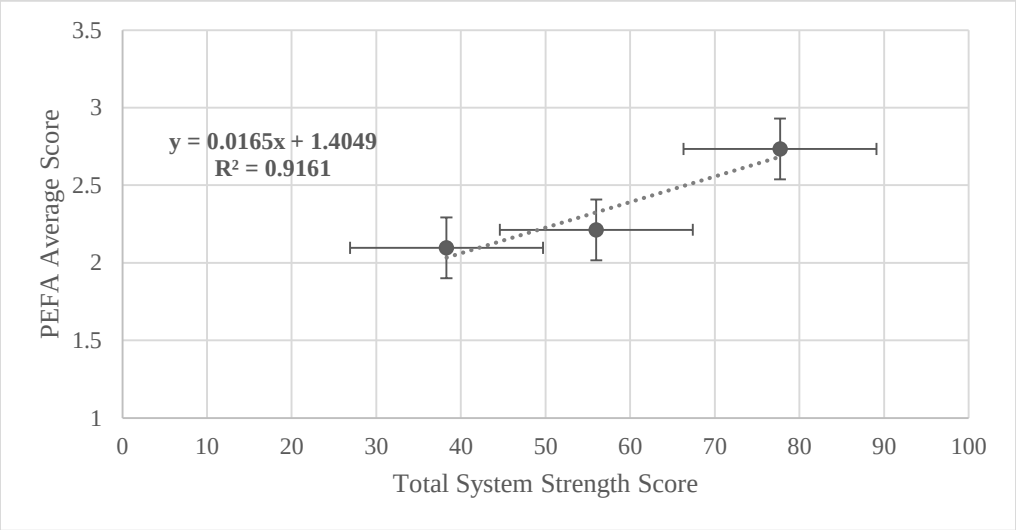
4.2 The scatter diagram in figure 4.1 plots the PEFA scores for the countries included in the survey against the corresponding TSS scores and shows a linear regression. This diagram shows that there is a fairly high correlation between the TSS score and the PEFA average value for these countries. It is observed that countries that have a comprehensive TSA, a standardized budget classification structure and chart of accounts, and a good-quality FMIS implemented with high coverage along with its controls do have significantly higher PEFA scores.

Figure 4.1. Scatter Plot of PEFA Average Score and Total System Strength Score



4.3 To establish whether there is indeed an underlying correlation between the TSS score and the PEFA average scores, it is necessary to suppress the scatter in the diagram because part of the variation may be to the effect of inaccuracies in the indexes. To do this, the data have been divided into three almost equal groups: (i) countries with the lowest scores, (ii) countries with middle scores, and (iii) countries with the highest scores. The system score values and the PEFA values have been averaged for these three groups. The averaged system score values have then been plotted against the correspondingly averaged PEFA values. This is shown in figure 4.2.

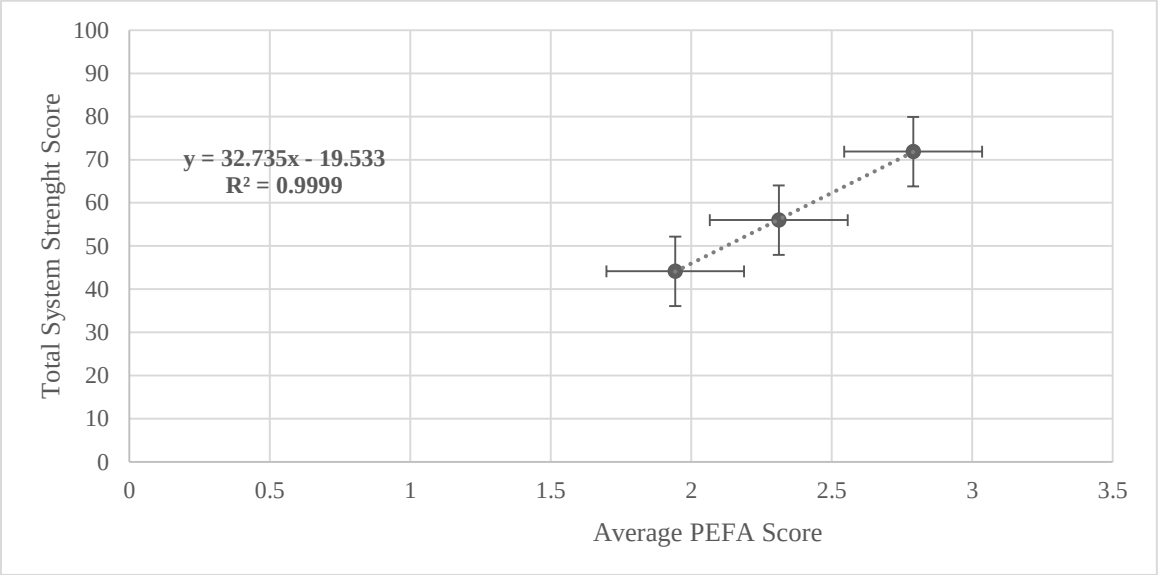
Figure 4.2. Countries Sorted into Three Groups on Total System Strength



4.4 This chart shows that there is indeed a very strong correlation between the systems scores and the averaged PEFA values. To this extent, figure 4.2 also confirms that the systems score calculated as above can be used as a fairly good indicator of the quality of the FMIS as a tool for budget management, as implemented in a given country. It also shows that countries with a strong FMIS do have significantly higher PEFA scores. However, it is noted that improvements in the PEFA score are relatively modest, ranging from 2.05 to 2.65, which represents a move from an overall C score to an overall C+ score. This emphasizes the findings of the aforementioned project-level evaluations, which show that FMIS are necessary but not a sufficient condition for good budget management. A multitude of other factors also contribute to better results.

4.5 However, the critical requirement of a good FMIS for even a modest improvement in the PEFA scores is shown by figure 4.3, in which the TSS scores are plotted against the PEFA scores. This diagram implies that a steep improvement in FMIS strength would be required (from 44 to 72) for even a modest improvement (1.9 to 2.8) in PEFA average scores for a country.

Figure 4.3. Countries Sorted into Three Groups on PEFA scores

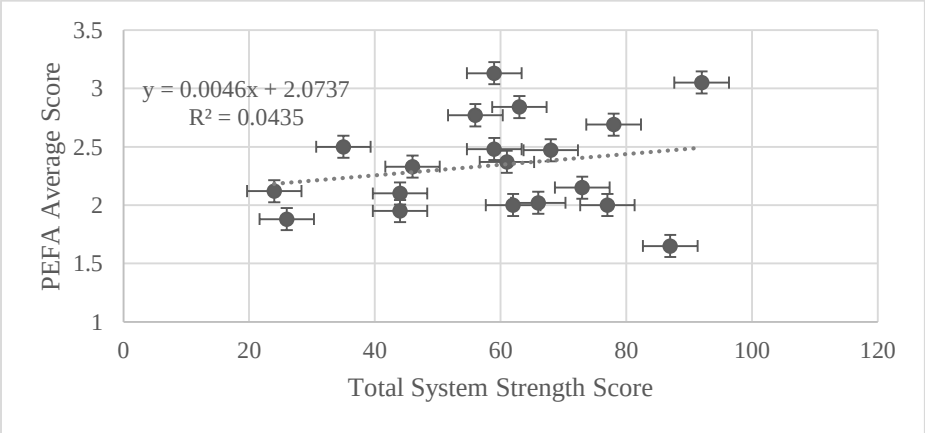


Sensitivity Analysis

An extensive sensitivity analysis was carried out to test whether the correlation observed is merely a spurious artifact of the methodology employed and the extent to which it was dependent on the relative values and relative weights of the scores for the five categories. Several tests were carried out.

4.6 First, to see whether there is indeed a causal relationship between an improvement in the PEFA average score and the FMIS strength and to eliminate the possibility that the improvement in the scores is merely a result of the data sample used, the TSS scores were scrambled and plotted against the corresponding PEFA scores. This showed no correlation with a low R-squared value (figure 4.4).

Figure 4.4. PEFA Data Scrambled: Average Scores Plotted against TSS Score



4.7 Second, a test was carried out to assess the sensitivity of the correlation to the relative weights of the various components that were used in the calculation of system strength. For this purpose, the calculation of the system strength was done according to three different

schemes: (i) the system strength was calculated as a sum of the scores for the TSA coverage, the FMIS coverage, and the functionality and technical features; (ii) the FMIS coverage was normalized to have the same weight as TSA coverage plus core and ancillary functionality and technical features; and (iii) the TSS score was calculated as a product of the normalized system's strength with the sum of core functionality, ancillary functionality, and technical features. To do this test, the system strength as calculated in the methodology has been further summed up.

4.8 The total scores for the core and non-core functionality and the technical features have been summed up into one variable named SUM_{tech}. The total maximum score for SUM_{tech} in this scheme is 65. The total maximum score for the FMIS coverage is 25, and the maximum score for the TSA is 10. The TSS is then calculated in two ways: first, as a sum of TSA plus FMIS coverage and SUM_{tech} ($TSS = TSA + FMIS_{norm} + SUM_{tech}$) (figure 4.5) and second as a sum of TSA plus the product of the FMIS coverage and SUM_{tech} ($SS = TSA + FMIS_{norm} \times SUM_{tech}$) (figure 4.6). These two indicators are plotted against the PEFA average scores for these countries, and the results are shown in figures 4.5 and 4.6.

Figure 4.5 PEFA Average Plotted against TSS (1)

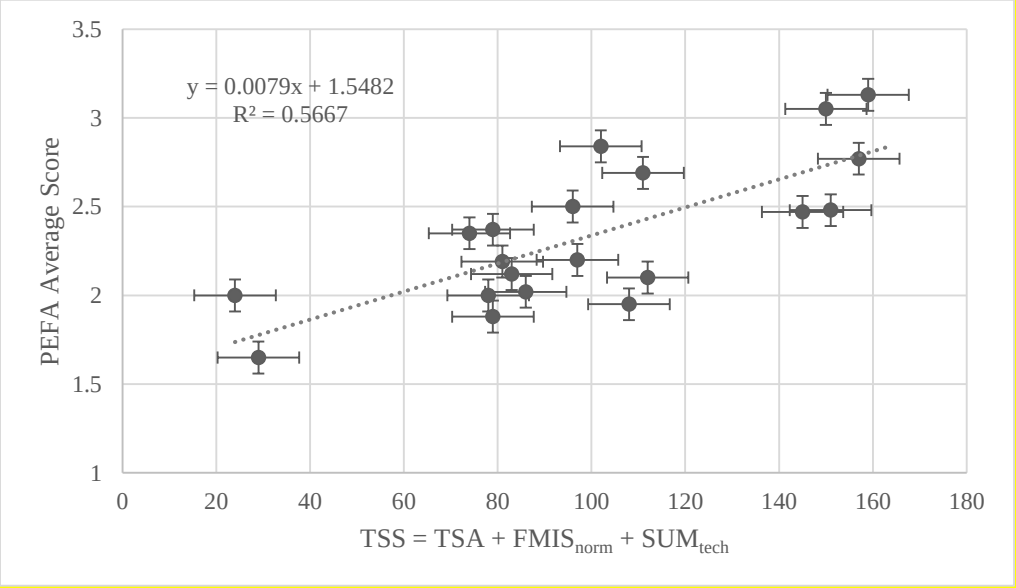
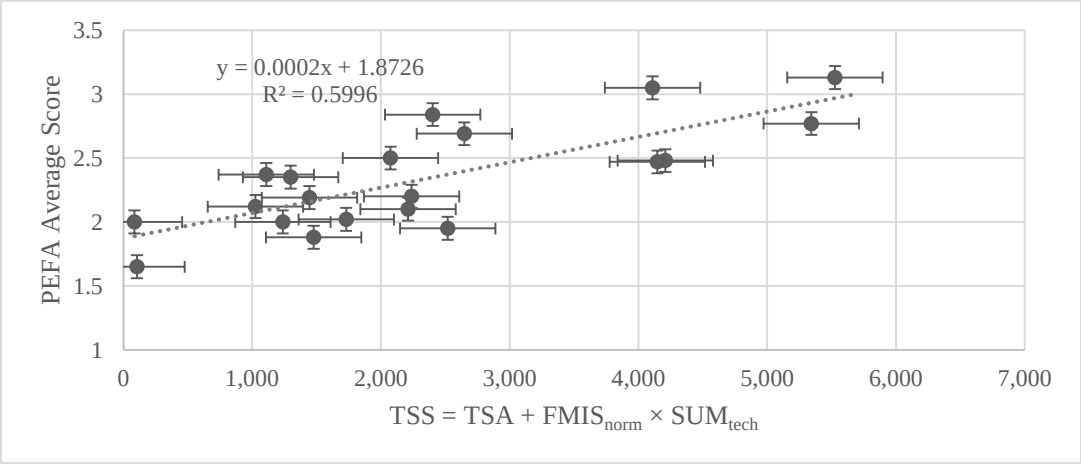


Figure 4.6. PEFA Average Plotted against TSS (2)



4.9 It is seen that the value of R-squared for the case in which FMIS coverage is normalized to have the same weight as that of SUM_{tech} is essentially the same as the value of R-squared for the calculation in which the system strength is calculated as a product of the normalized FMIS coverage score with SUM_{tech}.

4.10 It is also seen that there are no significant changes in the values of R-squared for the samples as shown above compared with the values for R-squared for a simple summation of the scores for TSA coverage, FMIS coverage (not normalized), and the functionality (core + ancillary) and technical features. This value is $R^2 = 0.5647$, and interpreted to mean that the value of the system strength as used in the paper's TSS approach is not excessively sensitive to the relative weights assigned to the various categories.

5. Concluding Remarks

5.1 Given the increasing complexity of financial transactions and data management needs, most countries have invested in some sort of automated FMIS to support their budget management processes. The quality, scope, and coverage of these systems, however, varies considerably across countries; consequently, there is also large variation in their ability to effectively apply controls and manage the budget process. It is therefore necessary to determine why in some cases desired results have remained elusive, while in others significant improvements are apparent. A second generation of reforms may be necessary for countries that have made limited progress, and investment strategies should be carefully built upon evidence of why the previous attempt did not lead to an effective budget management system.

5.2 This paper identifies a number of key factors that are necessary conditions for FMIS to act as an effective budget management tool. These include:

- The system needs to have core budget execution processes in place to enable meaningful fiscal control and cash management.
- Banking arrangements must be in place, such that all government finances are banked in a TSA at the central bank or in zero-balance accounts in commercial banks. If large

balances reside outside this arrangement and transactions are not routed through the FMIS, these will not be subject to system controls and undermine basic budget management.

- The system needs to be comprehensive of all government expenditures. Otherwise controls are only partial, and the system cannot be effective for fiscal management. Entering expenditures into the general ledger after they have occurred (that is, without subjecting them to FMIS budgetary controls), only gives the illusion of control, while the system is de facto not comprehensive.

5.3 The lack of progress in any one of these dimensions will fundamentally undermine the core objective of the system.[6] This paper proposes a diagnostic framework that can be applied to assess where core shortcomings are, and where future investments may best be placed; interventions could thus be more focused and targeted. It would also provide for an overall monitoring and evaluation framework: it can establish a baseline, progress indicators can be derived from the desired intervention dimension, and eventual public financial management outcomes will be more credibly attributable to the FMIS intervention. Applying a consistent and objective evaluation methodology will, over time, build the necessary evidence to inform as to what worked, provide better value for money, and build confidence that any such system can help manage budgets effectively, has integrity, facilitates an effective oversight function, and serves to institute fiscal discipline.

[6] It should be noted that the political will to enforce compliance to protocols will also be necessary. Controls can be in place, but are ineffective if they are being bypassed.

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Appendix A. TSA Scoring Scheme

Evaluation questions		Response	Score	Actual
Q1.1.	A TSA been established, and government funds are deposited in a consolidated fund or control account at the CB.	Yes	10	
		No	0	
Q1.2.	Large project or program advances given out to line ministries are banked outside of the TSA.	Yes	−2	
		No	0	
Q1.3.	Large EBFs are banked outside the CB and TSA. Note: If they are banked in the CB but are not part of the TSA a deduction of only 1 is made.	Yes	−2	
		No	0	
Q1.4.	Large IGFs exist and are banked outside the CB and TSA.	Yes	−2	
		No	0	
Q1.5.	Large amounts of donor funds are banked outside CB or TSA. Note: If they are banked in the CB but are not part of the TSA a deduction of only 1 is made.	Yes	−2	
		No	0	
Max TSA score			10	

Note: If a TSA has been established, a score of 10 is given. Questions Q1.2–Q1.5 assess the comprehensiveness of the TSA, and points are deducted for potential leakages. If advances, EBFs, IGFs, or donor funds are not banked in bank accounts linked to the TSA but the magnitude of these funds is not high compared with the total budget, then a deduction of only 1 point is made. If there is no TSA, 0 points are given and no response for Q1.2–Q1.5 is necessary. The maximum score possible is 10. EBF = extra-budgetary funds; IGF = internally generated funds; TSA = treasury single account.

Appendix B. FMIS Coverage Scoring Scheme

Category	Evaluation questions		Response	Score	Actual
	Q2.1.	An FMIS has been established.	An FMIS has been established, and government funds are routed through it.	25	
			There is no FMIS in place.	0	
Coverage of payments handled by the MOF	**Q2.2.**	Are debt service payments included?	Debt service payments are sent directly to the CB and then posted ex post in the accounting system.	−2	
			Debt service payments are routed through FMIS and subject to ex ante budget control.	0	
	Q2.3.	Are fiscal transfers or subsidies included?	Fiscal transfers, subsidies, or transfers to state-owned enterprises are not routed through the FMIS. The MOF directs the CB to make payments directly. Transactions may be posted ex post in the system.	−2	
			Transactions are routed through FMIS and are subject to budgetary control.	0	
Geographical coverage	**Q2.4.**	What is the geographical coverage?	It pertains to line ministries and spending units at central levels only.	−4	
			It pertains to the center and provinces.	−2	
			It pertains to the whole country (that is, center, provinces, and districts).	0	
Coverage of financing sources	**Q2.5.**	Is the recurrent budget processed through the FMIS?	No	−4	
			Yes	0	
	Q2.6.	Are the capital budget or project advances to line ministries processed through the FMIS?	No	−5	
			Yes	0	
	Q2.7.	Are EBFs processed through the FMIS?	No	−2	
			Yes	0	
	Q2.8.	Are IGFs processed through the FMIS?	No	−2	
			Yes	0	
	Q2.9.	If amounts of locally denominated donor funds are significant, are they	No	−4	
			Yes	0	

processed through the FMIS?		
Max FMIS coverage score	25	

Note: If an FMIS has been implemented, a basis score of 25 is given. Questions Q2.2–Q2.9 assess the coverage of the FMIS, and points are deducted for financing streams made outside. If there is no FMIS, 0 points are given, and no responses for Q2.2–Q2.9 are necessary. The maximum score possible is 25. EBF = extra-budgetary funds; FMIS = Financial Management Information System; FMIS = Integrated Financial Management Information System; IGF = internally generated funds; MOF = Ministry of Finance.

Appendix C. Core Functionality Scoring Scheme

Category	Evaluation questions		Response	Score	Actual
Budget classification	**Q3.1.**	Is the classification GFS compliant?	The BCS is not GFS compliant.	0	
			A basic GFS-compliant BCS with function, organization, and economic classification segments is used.	1	
			A comprehensive BCS with capacity to also monitor expenditures on projects and programs is in use.	2	
	Q3.2.	Are budget and accounting data integrated?	The economic classification segment of the BCS is not a subset of the COA.	0	
			The economic classification segment of the BCS is a subset of the COA.	3	
	Q3.3.	Is there uniformity of budget classification?	The BCS and the COA are not the same for all levels of government.	0	
			The BCS and the COA are the same for all levels of government.	2	
Budget transactions[7]	**Q3.4.**	Is the budget load integrated?	The treasury or MOF loads the initial approved budget in the system.	1	
			A budget preparation or compilation system is in place and integrated with the treasury system. After the budget is finalized, it is available to the core treasury system to post transactions; no separate load is required.	2	
	Q3.5.	How are in-year budget transactions (for example, apportionments, allotments, virements, and fund releases) managed?	The treasury or MOF enters transactions in the system.	1	
			Line ministry budget administrators are directly connected to the system and enter transactions in the system.	3	

[7] The approved budget should be transported by some automated means from the budget preparation system. This should be done without interventions for budget execution. In-year changes to the approved budget should be properly authorized and tracked.

Commitment management	**Q3.6.**	How is commitment control practiced?	No commitment control is practiced.	0	
			Selective commitment recording is in place *separately* for major contracts or for selective line items, but payment control against these commitments is not automatic.	1	
			Selective commitment recording is in place in FMIS and is also used for payment control. The treasury loads commitments transactions in the system.	2	
			Comprehensive commitment control is in place.	3	
Payment management	**Q3.7.**	How are goods-and-services-related payments managed?	The system does not carry approved budget or released budget (warrant) data. There is no automatic ex ante budget and warrant control.	−5	
			The system has approved budget and released budget data and uses these to control payments.	1	
	Q3.8.	Is there full transaction coverage?	Only payment requests based on invoices are entered in the system.	1	
			There is full P2P transaction coverage at all stages of the transaction, including a PO, contract or GRN, and invoice. All are entered in the system.	3	
	Q3.9.	How are payroll-related payments handled?	Payment requests from individual SUs are based on a calculated payroll sent to the treasury; the treasury then enters the payment request in the system. The system checks against the relevant budget head for adequacy of funds and releases for payment (budget control is implemented at the aggregate level by SU).	1	
			A central payroll calculation system is in place. The payroll payment file is sent to the treasury, and payments are made through the treasury or FMIS system. Same budget check as above.	3	
Receipts management	**Q3.10.**	Are nontax receipts routed through the FMIS?	Nontax receipts are collected by a separate system and deposited in the TSA. The treasury gets information on nontax receipts	1	

			through the banking interface-reconciliation system.		
			Most nontax receipts are routed through the FMIS.	2	
	Q3.11.	How are taxes and duties managed?	Tax and customs receipts are deposited in bank accounts controlled by the customs and tax department and are periodically deposited in the TSA. The treasury gets information via the banking interface-reconciliation system.	1	
			Tax and customs receipts are deposited in bank accounts controlled by the treasury. The treasury or TSA bank informs the tax and customs departments of details of receipts.	2	
Interface with banking system	**Q3.12.**	How are payment transactions routed to the TSA?	Payment transactions from FMIS are sent to the TSA bank manually or via a file-based interface.	0	
			Payment transactions from FMIS are routed to the TSA bank via an automated system (for example, Swift).	2	
	Q3.13.	How are receipts sent to the FMIS?	Receipt transactions from the TSA bank or fiscal agent are sent to the FMIS via a separate file or in the form of paper-based statements.	0	
			Receipt transactions from the TSA bank or fiscal agent are sent to the FMIS via an automated banking interface.	2	
Fiscal reporting	**Q3.14.**	What is the adequacy of fiscal reporting?	The MOF relies on reports from line agencies, which are submitted late and cannot be checked for accuracy.	0	
			The MOF gets some information from the treasury or FMIS on the status of budget execution for payments and receipts that are routed through the treasury.	1	
			The MOF gets fairly comprehensive information on the status of budget execution, since most central budget transactions are routed through treasury.	2	

			The MOF or treasury has complete and timely information on all budget receipts and expenditures. A comprehensive set of fiscal or BER reports is produced by the treasury for the MOF.	3	
Basis of accounting	**Q3.15.**	What is the basis of accounting?	Cash	1	
			Modified cash	2	
			Accrual	3	
Advanced budgeting features	**Q3.16.**	What is the budgeting modality?	Line item	1	
			Program based	2	
			Performance criteria are introduced and monitored along with costs.	3	
	Max core functionality score			40	

Note: Scores of individual questions are simply added up. The maximum score possible is 40. BCS = budget classification system; BER = budget execution reports; COA = chart of accounts EBF = extra-budgetary funds; FMIS = Financial Management Information System; GFS = government financial statistics; GRN = goods received note; IGF = internally generated funds; MOF = Ministry of Finance; P2P = procure to purchase; PO = purchase order; SU = spending unit; TSA = treasury single account.

Appendix D. Ancillary Features Scoring Scheme

		Evaluation questions	Response	Score	Actual
Budget preparation	**Q4.1.**	How is the budget compiled and prepared?	Manually	0	
			Partly or fully automated but not integrated with the treasury system	1	
			Automated and integrated with the treasury system	2	
			Full budget preparation, including calculation of the costs of programs and projects	3	
	Q4.2.	What is the MTEF capability?	Operated separately from the budget preparation system	1	
			Included in the budget preparation system	3	
Payment control	**Q4.3.**	How is establishment control integrated with payment control?	No establishment control	0	
			Ministry of Public Service or the treasury checks availability of establishment (posts) off-line before running payroll	2	
			Integrated with the treasury payments system; prior to the payroll run, the Ministry of Public Service or the treasury checks for availability of approved posts from the approved establishment list online. In this case the budget check is both the aggregate budget of the SU and the establishment register to see whether the person being paid is occupying an approved slot. This reduces the risk of payment to ghost workers.	4	
Debt management	**Q4.4.**	How is debt management handled?	Manually	0	
			Automated but not interfaced with the treasury system.	1	
			Automated and integrated with the treasury system.	2	
Fixed assets	**Q4.5.**	How are fixed assets managed?	Manually	0	
			Automated and integrated with the treasury system	1	

Auditing	**Q4.6.**	How is the auditing function accommodated?	Not interfaced.	0	
			Audit department has access to treasury databases	3	
	Max score ancillary features			15	

Note: MTEF = Medium-Term Expenditure Framework.

Appendix E. Technical Aspects Scoring Scheme

Evaluation Questions		Response	Score	Actual
Q5.1.	What is the information systems support?	No information systems support	0	
		Rudimentary and partially manual information systems assist the treasury in distributing limits and warrants and controlling payments, and a patchwork of systems that are not connected to each other is in use.	1	
		A countrywide, online, custom-developed *basic* treasury system is in use, which enables budget availability checks and warrant control and allows the MOF or treasury to practice fiscal control.	2	
		A fully functioning treasury system with capacity for budget management, commitment management, accounts payable, accounts receivable, general ledger, purchasing, fixed assets, and fiscal reporting is in place, and the system has the capacity to use accrual accounting.	3	
Q5.2.	What is the systems architecture?	None	0	
		Distributed architecture	1	
		Partially distributed architecture	2	
		Centralized architecture	3	
Q5.3.	What is the systems deployment modality?	Treasury centered	1	
		Treasury and line ministries and budget administrators are directly connected to the system.	2	
		Budget administrators, line ministries, spending units, and treasury offices are connected, *or* line ministries and SUs have access via a web portal.	3	
Q5.4.	What is the use of data warehouse and analytical tools?	None	0	
		A data warehouse has been implemented and gives users the ability to formulate queries against the system databases and produce a variety of fiscal and budget execution and other analytical reports.	1	
Max technical aspects score			10	

Note: MOF = Ministry of Finance; SU = spending unit.

Appendix F. Total Score Assessment

Dimension	Max score	Actual	Actual / Max
TSA	10		
FMIS coverage	25		
Core functionality	40		
Ancillary features	15		
Technical aspects	10		
Total	100		

Note: TSA = treasury single account; FMIS = Financial Management Information System.

Appendix G. Additional Informational Items

This appendix contains questions regarding some informational items which describe the technical platform used, the numbers of users that are connected to the system, and the costs that have been incurred for setting it up and are required for its ongoing maintenance. No scores are assigned for these items but information regarding them is important to assess costs incurred for setting up the system, its ongoing maintenance, and its sustainability.

The Appendix also requests information on the numbers of staff and budgetary resources that are available for ongoing maintenance and the quality of the telecommunications network that is used to connect the various system nodes in the country. These aspects have been found to be important on the ongoing operations and maintenance and for the sustainability of the FMIS.

Nature of Technical Platform Used and Associated Costs

	Evaluation Question	Response
Nature of software	Custom Developed/COTS	
	Name of the software package used in case of COTS with software version.	
	Number of end-users connected to the system (average, maximum)	
Cost items (in US$)	Total capital cost to date	
	Application software licenses	
	Implementation services	
	Hardware systems software etc.	
	Telecommunications network costs	
	Other (Design and supervision consultancies)	
	Total annual recurrent / operating costs	
	License fees (Application Software, middleware)	
	Ongoing telecommunications usage costs	
	Costs for Technical staff for systems operation and maintenance	

Arrangements for Operational Sustainability

Evaluation Questions	Response	Actual
Is there an adequate number of technical staff available within the MOF/Government to provide ongoing maintenance and support for the system?	Yes	
	No	
Are there adequate budgetary resources allocated on a yearly basis for ongoing systems maintenance and support and for operational costs?	Yes	
	No	

What is the quality of the telecommunications network that connects remote end-users to the system in terms of the bandwidth available, robustness, and medium of connection (e.g., fiber)?	Very good
	Good
	Fair