



Special Series on COVID-19

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June 8, 2020

Enhancing Digital Solutions to Implement Emergency Responses

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This note provides guidance to low-income developing countries (LIDCs) and emerging market economies (EMEs) on how public financial management (PFM) systems can leverage digital solutions to support the implementation of COVID-19 emergency responses. Such digital solutions include financial management information systems (FMIS), fiscal transparency portals, and procurement platforms. The recommended measures could be implemented relatively rapidly during the crisis to streamline spending and control processes embedded in the information systems, enhance FMIS functionalities for cash management, and improve transparency of emergency responses through digital solutions.

KEY ENHANCEMENTS TO DIGITAL SOLUTIONS TO IMPLEMENT EMERGENCY RESPONSES

PFM digital solutions, such as FMIS, procurement platforms, and fiscal transparency portals, are critical for smooth, efficient, and transparent implementation of COVID-19 emergency responses. They can also play a key role in macro-fiscal planning and budget management, help reduce governance vulnerabilities, including corruption (IMF 2019), and support operationalizing emergency processes established in the PFM legal framework. Additionally, during the COVID-19 pandemic, digital solutions are important to facilitate, among others, enhanced reporting of crisis-related spending, ex post audits, and procurement transparency.² Digital information systems are powerful tools to help achieve these objectives based on their capabilities to process, store, and report financial information. For example, by tracking each budget transaction across government agencies, FMISs can produce timely, reliable, accurate, and meaningful information to support financial decision making, improve fiscal discipline, strengthen expenditure control, and enhance fiscal transparency (Una, Allen, and Botton 2019).

However, procedures and controls embedded in digital information systems are generally not designed to deal with emergencies such as COVID-19. In fact, business-as-usual FMIS functionalities and processes

¹ Please direct any questions and comments on this note to cdsupport-spending@imf.org.

² IMF Factsheet "[How the IMF is Promoting Transparent and Accountable Use of COVID-19 Financial Assistance.](#)"

might hinder the smooth implementation of emergency responses by the ministry of finance (MoF) and various other ministries, departments, and agencies (MDAs) as they typically rely, for example, on sequential authorization steps for each transaction, and restrict budget reallocations. Such issues could hamper the flexible and rapid implementation of emergency measures during the crisis, especially in sensitive areas such as the health sector.³ Also, the economic classification utilized in the FMIS may not allow for identification of COVID-19 related spending and would need to be enhanced for this purpose. Further, some manual processes, such as bank reconciliation and manual compilation of COVID-19 expenditure reports, could also be a challenge for effective control and monitoring of the emergency package, increasing governance and corruption vulnerabilities. Finally, digital information systems should generate fiscal information in an open format to facilitate civil society participation.

There are three main areas where PFM digital solutions might require modifications or adjustments to adequately support the implementation and transparency of emergency responses: (1) streamlining FMIS expenditure execution and control processes and improving their interaction with procurement platforms; (2) enhancing FMIS capacities for cash forecasting and management; and (3) strengthening fiscal transparency through web portals, open data, and FMIS-enabled reporting. Enhancing FMIS functionalities or implementing major new improvements could be time and resource consuming, especially in countries with low institutional capacity that is further constrained by the current crisis. At the same time, the crisis presents an opportunity for enhancing such digital solutions to improve PFM and fiscal transparency practices, where viable. The adjustments to the digital solutions should be designed to minimize risks arising from cybersecurity threats and need to involve multidisciplinary teams comprising functional and IT profiles.

To help meet these needs, this note addresses the following four key questions:

- What specific PFM requirements could potentially be addressed through PFM digital solutions?
- Which functionalities of existing PFM digital solutions could meet some of these requirements?
- What functionalities could potentially be adjusted in the short term to meet these requirements?
- What complementary tools could be used if the current information systems provide no room for adjustment?

It is important to note that not all measures suggested in the note would apply to all countries. Measures that are relevant for countries with just a core treasury system focused FMIS would be quite different from countries with a mature FMIS with interfaces to other automated systems, such as for tax administration, debt management, and procurement platform.

STREAMLINING FMIS EXPENDITURE EXECUTION AND CONTROL PROCESSES

Adoption of COVID-19 responses requires adjustments to PFM processes and associated digital solutions. Measures implemented by governments to address the crisis, such as providing more resources to health services in a timely fashion, have included the utilization of emergency procurement processes, adoption or expansion of large cash transfer programs to protect vulnerable households, initiatives to provide loans and guarantees to the private sector, and the creation of special funds and/or extrabudgetary entities responsible for managing COVID-19 resources (IMF 2020a). These measures generate new requirements for PFM digital solutions, including (1) adjustments to the embedded controls related to budget execution in the FMIS; (2) enhancing the processing capacity of information systems to respond to higher demands of transactions; and (3) improving financial controls over emergency procurement processes.

³ See the blog post "[The COVID-19 Crisis and Budgetary Space for Health in Developing Countries](#)" by S. Gupta and H. Barroy, Center for Global Development.

Adjusting FMIS for Rapid Implementation of Emergency Responses

Prioritizing adjustments to the embedded controls related to budget execution in the FMIS is a key action to ensure the smooth implementation of emergency responses. Based on the PFM legal framework, the FMIS controls each financial transaction and related budget and accounting data. For example, the amount of each transaction is cross checked against the budget appropriation, the commitment ceiling, certification, and payment order, generally in sequential order and by various users according to different amount thresholds. Similarly, procedures related to budget reallocations also follow a sequential approval process by different users. Only when all budget reallocations procedures and authorizations are completed, the agency responsible for delivering the service (e.g., a health care unit) is authorized to disburse the resources.

Streamlining the controls related to budget execution processes and adopting higher thresholds for control could help expedite the rollout of emergency response packages. For example, procedures to register at the same time all budget execution stages—commitment, liquidation, and payment—of a cash transfer scheme would avoid repetitive sequential reviews and authorization in the FMIS. In fact, many countries have already adopted such processes in their FMIS for registering and paying certain types of expenditures (e.g., public utility bills and salary payments). Countries as diverse as Cambodia and the Dominican Republic have adopted such techniques in the current crisis. Another option is to register and account for several identical transactions related to emergency responses—for example small subsidies to households—as a single bulk entry. Adjusting thresholds for required spending authorizations could help expedite urgent spending, such as health supplies. This would need to be done in line with the legal framework. In some cases, ex post control would have to be reinforced while allowing for ex ante flexibility, and external control would have to undertake a more proactive stance to mitigate misuse of emergency resources.⁴ Additionally, the FMIS should be adjusted to provide for more flexible budget reallocation procedures if such changes are introduced in the PFM legislation.

Specific user profiles could be generated for audit entities to allow them access to COVID-19 related spending information in the FMIS database in real time. In order to enhance the control and oversight of emergency spending, the MoF might create specific user profiles with query permission only for internal audit units in MDAs and supreme audit institutions (SAI). This type of users is already included, for example, in Argentina's FMIS. If a fiscal council is functional in the country, staff of this independent body could also have access to tailored reports online. This would allow control and oversight entities timely access to information, improving control and accountability over the emergency spending.

Processing capacities of PFM digital solutions could be enhanced to respond to a higher demand of transactions and payments. The implementation of large-scale initiatives related to direct cash transfers in many countries, as well as the large volume of procurement transactions, may imply both increased demand on the processing capacities of information systems as well as additional user licenses for commercial-off-the-shelf solutions (COTS⁵). Some functionalities in the FMIS, such as a digitized register of beneficiaries and providers, and related payment processes might have to be expanded to cater to a large number of new beneficiaries. This is the case of the direct cash transfer program in Costa Rica, where the payment module of the treasury system needs to expand to process 30,000 payment orders in each lot. In the case of Brazil, where the number of beneficiaries under the direct cash transfer emergency program jumped from 14 million to 50 million, the processing capacity of the treasury system was rapidly scaled up using cloud computing infrastructure. In several developing countries, where tax agencies have been adopting cloud computing solutions, it would be feasible to implement similar strategy to expand FMIS processing capacities.

⁴ See IMF (2020e) on measures to mitigate misuse and corruption vulnerabilities.

⁵ COTS solutions are IT products or packages that are designed to meet generic market needs rather than the needs of a financial management system in a specific country.

Improving Procurement Systems and Their Interface with the FMIS

Existing e-procurement platforms should be used for COVID-19 procurement activities, and their linkage to the FMIS could be enhanced to register procurement plans and projected cash flows. In order to identify COVID-19 related spending, Guatemala's e-procurement platform, *Guatecompra*, included new categories in its embedded processes to identify all the purchases related to the emergency. In the absence of integration between the procurement system and the FMIS, procurement plans and cash flow projections could be shared across systems using a custom-built interface.

ENHANCING FMIS FUNCTIONALITY FOR CASH FORECASTING AND MANAGEMENT

Improving cash management is often a key priority considering fiscal pressures and financial constraints during the COVID-19 crisis. Typical needs are to (1) adjust cash plans to include COVID-19-related spending and revised revenue and expenditure estimates due to the expected slowdown of the economy; (2) improve consolidation of and/or access by the Treasury to all sources of government liquidity given the expected financing constraints; and (3) enhance the monitoring and forecasting of cash flows to avoid interruption of emergency and ongoing expenditure (IMF 2020b).

Some functionalities of an FMIS can be upgraded in a relatively short timeframe, with adequate political support, for better cash flow monitoring, forecasting, and management. Enhancing the FMIS to provide daily reports on the government's cash position and weekly updated cash forecasts will support the MoF operations during the crisis, especially the budget, debt, and cash managers. Some of these enhancements in the FMIS can be made using COTS cash management solutions or bespoke applications.⁶ While some upgrades, such as the automation of bank reconciliation, might require significant effort, the crisis may give an impetus to such reforms given the urgent need for better cash management. However, the pace with which these changes can be introduced depends on the existing technology, the level of customization of the COTS application, the flexibility in the bespoke application architecture, the availability of vendor support and funding.⁷

Improving Cash Flow Monitoring through the FMIS

Using preliminary information on cash flows in government bank accounts as input for the FMIS cash management module could improve the timeliness of monitoring the cash position. Most FMIS modules are populated with accounting data that has been reconciled with bank account data, with a delay ranging from a few days to several weeks. For cash balance monitoring at the aggregate level during the crisis, these extra steps are not essential, as errors are often small and tend to equalize each other at the aggregate level. Inputting preliminary cash balance information in a cash management module on a daily basis would be a significant improvement for many EMEs and LIDCs. However, to adopt this measure, central and commercial banks would need to be assured that the cash flow data will be updated with the reconciled data later and that the preliminary data will only be used for monitoring the aggregate cash position.

If the bank interfaces are in place, an FMIS can help consolidate overall government cash position by aggregating balances of all bank accounts, including those outside the Treasury Single Account (TSA). If the Treasury achieves the objective of registering all, or at least a significant percentage of government bank

⁶ Most COTS solutions have cash and liquidity management functionalities available in separate modules or dedicated applications that can be effectively interfaced with the FMIS.

⁷ For example, service-oriented architecture (SOA) applications have been used in several countries (e.g., India) and could facilitate quick development of new web pages to capture additional information for cash flow forecasting from the MDAs.

accounts in the FMIS, and bank interfaces are in place, customized reports can be developed to aggregate the daily cash position irrespective of bank and account ownership. COTS applications have standard web-based Application Programming Interfaces (APIs) to share information using SWIFT formats.⁸ For example, in India, the FMIS can consolidate cash in the bank accounts maintained by government entities in hundreds of banks. Such expansion of the coverage of bank accounts in the FMIS is just for reporting purposes.⁹ In many LIDCs, bank accounts of development partners are not routed through the FMIS because of donor policies. This does not mean that reporting on cash flows through these accounts cannot be interfaced with the FMIS. Such interfaces are especially important for accounts holding COVID-19 emergency funding provided by development partners, whether channeled through the TSA or separate bank accounts. In Rwanda, a dedicated bank account has been opened as a subaccount of the TSA in the FMIS to track and report on COVID-19 spending. Over the medium term, the goal should be to bring all these accounts within the TSA and process their transactions through the FMIS.

Bank reconciliation of the receipts and payments recorded in the FMIS with records of central bank and commercial banks can be facilitated by developing interfaces between respective information systems.

For example, if commercial banks operate their accounts through a Core Banking Solution (CBS) system, it should be possible to develop interfaces with the FMIS relatively quickly. These interfaces can be developed utilizing file-based integration technology, existing middleware (like BizTalk in India), or other open source message-brokers like RabbitMQ or APIs. Messaging standards can be adopted based on international (SWIFT) or peer-country examples. These can be configured (in many cases preconfigured in COTS solutions) for sharing electronic bank statements which can then be inputted to the bank reconciliation module of the FMIS. Alternatively, some countries have had success with relatively low-tech approaches, e.g., uploading bank statement information into the FMIS using simple data base files.

Enhancing Cash Flow Forecasting and Management through the FMIS

There are several options to improve cashflow forecasting and management through the FMIS, including by interfacing with a standalone application. Ideally, a cash management module could be added to the FMIS as this is not overly complex and can be developed in a matter of months, if given priority, since COTS have standard cash flow forecasting and liquidity management modules. However, developing such an additional module for in-house or bespoke FMIS would be more time-consuming. Alternatively, basic stand-alone applications could be linked to the FMIS for the uploading or downloading of data. Cash forecasting modules and standalone applications have the benefit of easily downloading data from the FMIS and running forecast scenarios. For example, Argentina and Uruguay have been utilizing dedicated applications, integrated with the FMIS, to perform this function. FMIS data from modules such as accounts receivables, accounts payables, payroll, and commitments, particularly in the entities executing health and social sector budgets and related emergency packages, could be analyzed using such software. Scenario analysis functionality in these applications can be very useful for analyzing possible cash flow outcomes given the huge uncertainties during the present crisis. This initiative would support the response to the present crisis, and at the same time would bring long-lasting benefits for cash management.

Accelerating the switch from checks to electronic fund transfers (EFT) would help achieve significant gains in efficiency and minimize the need for human interaction during the crisis. Many LIDCs continue to be highly dependent on check and cash payments. Check processing represents a significant workload in any

⁸ This functionality is quite common in COTS applications, since private sector companies require bank statements electronically from their bankers.

⁹ See more details on how to monitor and forecast government daily cash balances on Misch and others (2017).

country, but by interfacing the FMIS with the banking system, directly through the interbank payment system or indirectly through the central bank, these manual processes and inefficiencies can largely be eliminated. This would significantly reduce the need for personal interactions during this pandemic. In Eswatini, for example, during the crisis the government has migrated monthly payments to citizens older than 60 from cash distribution through post offices to EFT. For cash management purposes, elimination of checks does away with the sometimes-sizeable stock of uncashed checks (the “float”) and thus reduces uncertainty about the cash balance. Payments through EFT provide a secure and efficient method for government to business (G2B) payments and other government creditors. Also, EFT are the best option for government-to-persons (G2P) payments, if certain preconditions are in place. (IMF 2020c)

PFM DIGITAL SOLUTIONS FOR IMPROVED TRANSPARENCY

Transparency in designing, implementing, and overseeing the responses to COVID-19 is key to ensuring their legitimacy and accountability (IMF 2020d). Digital solutions have an important role to play in enhancing fiscal transparency based on their capabilities to process, store and report financial information.

Identifying, Tracking, and Reporting COVID-19–Related Spending

Effective implementation of COVID-19 responses and financial accountability require that all COVID-19 related spending be tracked to produce comprehensive and timely information for policymakers and citizens. Where an FMIS is in place, such tracking should be done through the information system, taking account of the following issues.

The chart of accounts (COA) embedded in the FMIS could be modified/adapted, where needed, to tag and track COVID-19-related spending. Where the COA is multidimensional, it might be possible to use the COA to identify all COVID-19 related spending.¹⁰ This could be done by assigning an available code in the FMIS, which was not utilized before within one of the COA segments, to track COVID-19-related spending, or by introducing a new code if the FMIS allows it. For example, in Rwanda, the funding source segment within the existing COA was used to assign a code for “COVID-19 Response” and to track spending.¹¹ This option is also being considered in Malawi.

Creating a dedicated budget program in the MDA responsible for COVID-19 related spending is another option. Some countries might choose to create a special program or different programs as part of their budget and include these programs in the FMIS classification. This option might work better where a single program is located within an administrative unit (e.g., an MDA) that is responsible for managing the entire COVID-19 response, such as the Office of the President, or the Ministry of Finance or Health. For example, Angola established an inter-ministerial commission to manage the COVID-19 response and introduced a specific COVID-19 program in the budget classification for this purpose.

As an alternative, the FMIS could provide for a dedicated “virtual” spending entity to track COVID-19 spending. A “virtual” spending entity could be configured within the administrative classification segment of the COA in the FMIS to process all COVID-19 related spending which is financed from different types of resources. This “virtual” spending entity should be attached to one administrative entity to ensure accountability. This option could be relevant where a special entity has been established and through which all related activities are being executed and where a program budget structure is not in place. In such cases, the “virtual” entity could ensure

¹⁰ Cooper and Pattanayak (2011) provides a more detailed discussion of the structure of the COA and its relation with the FMIS.

¹¹ In other cases, if the COA accommodates fewer segments, its revision would be a longer-term initiative and should probably not be undertaken at this time.

that all related inflows and expenditures are recorded, and budget execution controls are applied. This is the case, for example, in Botswana (IMF 2020e).

FMIS reporting capabilities should be enhanced to configure and generate required reports on COVID-19 spending with comprehensive coverage. Reporting requirements will vary significantly across different categories of users and stakeholders. At one end of the spectrum, managers in MDAs might need reports of transactions at a detailed level. At the other end, the cabinet and the legislature will need relatively aggregated reports. Internal auditors and the SAI will require access to the complete database of transactions for risk profiling and audit. The FMIS generally includes a range of capabilities for reports that are pre-programmed for either periodic or ad hoc generation. Additionally, many FMISs include capabilities to configure and run special purpose reports, which can be used for reporting on COVID-19 related activities. Some countries, such as The Gambia, are adjusting the FMIS reporting capabilities to report COVID-19 spending in a timely manner. The reports should include all COVID-19 related activities, including those financed by development partners (DPs), even where these activities are executed either directly by the DPs or through project implementation units that are outside the government's administrative structure and public sector information systems. Where the activities are financed by loans or grants to the government, both the disbursements and corresponding expenditure should be recorded in the FMIS, at least on an ex post basis. Additionally, non-cash or in-kind transactions should also be tracked, wherever possible.

Alternatively, data warehouse (DW) and/or business intelligence (BI) applications can be used for generating reports. If the FMIS reporting functionality does not allow adequate flexibility for ad hoc report configuration, an existing DW and/or BI application would be a potential efficient solution in the short run. Such a tool could be used to process the entire FMIS database under certain pre-defined parameterization to generate timely reports. For example, A DW and BI solution was adopted successfully in Brazil, and Honduras has started to use a BI solution to report [COVID-19 spending](#).

Digital solutions should be leveraged to enhance the transparency of COVID-19 related procurement activities. If an e-procurement system is in place, disclosure of procurement information should be relatively easy. If an e-procurement platform is not in place, government portals can nevertheless be used to publish awards made, including details of the items procured, method of procurement, prices paid, the name of the supplier, and the beneficial ownership information of firms that are awarded procurement contracts, thus promoting greater transparency in procurement activities.¹²

Promoting Transparency through Fiscal Transparency Portals and Open Data

Fiscal transparency portals that are integrated with the FMIS database allow for high levels of transparency. Several countries have implemented online portals to provide users with access to the FMIS database and for reports to be run and data analytics to be conducted. In Estonia, for example, the [Riigiraha](#) open data portal provides users with the facility to drill down into the government's financial database, generate reports and prepare analyses of the government's financial flows and stocks at a highly disaggregated level. The U.S. Treasury Department data portal www.USASPENDING.gov and Mexico's [Transparencia Presupuestaria](#) similarly provide a platform through which fiscal data can be accessed, analyzed, and downloaded. And, Egypt's [Ministry of Finance Digital Gate](#) portal also provides a single-entry point through which macroeconomic and fiscal data can be accessed and reports run and downloaded.

¹² See also [Emergency Procurement for COVID-19: Buying Fast, Smart, and Open](#).

Where such portals already exist, they can be used effectively to publish COVID-19 related fiscal data.

While it might not be feasible to establish a new fiscal transparency portal in the immediate term, where they already exist, such portals should be used to promote higher levels of transparency around COVID-19 response, including also information in open data formats.¹³ This is the case of Brazil, where the portal [Monitoramento dos Gastos da União com Combate à COVID-19](#) was developed through a BI application on the FMIS database and allows for real time monitoring of crisis related expenditures, comparing outturns with budgeted amounts. The portal also contains information on the legal instruments that created the emergency response measures.

Existing government websites can also be used to achieve higher levels of transparency on COVID-19-related spending.

Even where an open data portal does not exist, government websites provide an important means through which information on the COVID-19 responses and spending measures can be communicated. South Africa's [COVID-19 Online Resource and News Portal](#), for example, provides comprehensive information on COVID-19 developments in the country, including the range of fiscal relief measures being implemented by the government and their legal basis. In Mauritius, the [government portal](#) includes a dedicated section on COVID-19 support detailing the various relief measures in implementation. In São Tomé and Príncipe, the MoF plans to publish on its website monthly reports with identified COVID-19-related spending.

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¹³ See also "[Fiscal Openness in Emergency Response: COVID-19](#)" by Global Initiative for Fiscal Transparency.