

Public Financial Management and the Digitalization of Payments

Marco Cangiano, Alan Gelb, and Ruth Goodwin-Groen

Abstract

The ability of digital payments to deliver better outcomes for governments, businesses, and individuals—including driving financial inclusion—has been one of the success stories of the digital age. Payments are central to how governments transfer and receive financial resources; however, the way such payments are made—and how they could be made more effectively—is often not mainstreamed in public financial management (PFM) despite the fact that many of the direct benefits from effective digitalization of payments are identical to those traditionally expected from strong PFM systems. The digitalization of payments does not provide a silver bullet for solving PFM problems; therefore it needs to be approached in an integrated way, with strong leadership from central agencies, including the Ministry of Finance, to exploit the synergies between the many different types of payments facilitated by digital technology. The paper explores the linkages between the digitalization of payments and PFM, including through four case studies.

Center for Global Development
2055 L Street NW
Fifth Floor
Washington DC 20036
202-416-4000
www.cgdev.org

This work is made available under
the terms of the Creative Commons
Attribution-NonCommercial 4.0
license.

BETTER THAN CASH
ALLIANCE 



Public Financial Management and the Digitalization of Payments

Marco Cangiano
Overseas Development Institute

Alan Gelb
Center for Global Development

Ruth Goodwin-Groen
Better Than Cash Alliance

This is a revised and updated version of the paper “Integration of Government Digitalization and Public Financial Management—Initial Evidence,” which was published as Chapter 12 of Gupta, Sanjeev, Michael Keen, Alpa Shah, and Genevieve Verdier (eds.), 2017. *Digital Revolutions in Public Finance*, Washington, DC: International Monetary Fund. We wish to thank Fleishman Hillard, Rodrigo Mejia Ricart, Rosita Najmi, and Camillo Tellez for their insightful comments, and Matthew Coghlan for excellent editorial suggestions. The usual disclaimer applies.

This paper is co-published by the Better Than Cash Alliance and the Overseas Development Institute.

The Center for Global Development is grateful for contributions from the Bill & Melinda Gates Foundation in support of this work.

Marco Cangiano, Alan Gelb, and Ruth Goodwin-Groen, 2019. “Public Financial Management and the Digitalization of Payments.” CGD Policy Paper 144. Washington, DC: Center for Global Development. <https://www.cgdev.org/publication/public-financial-management-and-digitalization-payments>

Center for Global Development
2055 L Street NW
Washington, DC 20036

202.416.4000
(f) 202.416.4050

www.cgdev.org

The Center for Global Development works to reduce global poverty and improve lives through innovative economic research that drives better policy and practice by the world’s top decision makers. Use and dissemination of this Policy Paper is encouraged; however, reproduced copies may not be used for commercial purposes. Further usage is permitted under the terms of the Creative Commons License.

The views expressed in CGD Policy Papers are those of the authors and should not be attributed to the board of directors, funders of the Center for Global Development, or the authors’ respective organizations.

Contents

1. Introduction.....	1
2. Defining Digitalization of Payments.....	2
3. Digitalization and Public Financial Management: Complementarity and Caution.....	5
3.1 Complementarity.....	5
3.2 A Cautionary Tale from FMIS Implementation	6
4. Selected Country Cases	9
4.1 India.....	10
4.2 Mexico.....	14
4.3 Estonia	15
4.4 Ghana.....	16
5. Digitalization Challenges: What Can We Learn and Where Do We Go from Here?.....	18
5.1 High-Level Leadership	19
5.2 An Integrated, Comprehensive Approach.....	19
5.3 Appreciation of the Risks	21
5.4 Directions for Future Work	21
6. Concluding Remarks.....	22
References.....	23
Annex 1.....	27
Annex 2.....	30

1. Introduction

Payments are central to how governments transfer financial resources. But the way such payments are carried out has largely been peripheral to developments in public financial management (PFM) systems. This paper seeks to explain how digitalization of payments should be mainstreamed as part of functional PFM to improve the management of public resources, broaden reform goals, and help ensure that countries take a strategic approach to integrating digital technology into their operations.¹ This implies a critical role for ministries of finance in coordinating a wide range of public and private institutions and actors.

Every year governments, the private sector, and development organizations make billions of dollars in cash payments in low-income and emerging-market economies. It is estimated that in 2014 more than one billion people were receiving government transfers and other payments, and that the developing countries on average operated some 20 social safety net programs at an annual cost of 1.6 percent of GDP (World Bank, 2015). Including transfers, subsidies, payroll, and pension payments, public payments to individuals typically represent 12 percent of GDP in developing countries and often far more.

A growing body of data and experience shows that shifting from cash to electronic payments provides more security for recipients, especially women, greater efficiency and accuracy in reaching the financially excluded, and a broader range of financial services. It can also save very significant time and human resources that can be then used for more productive purposes, supporting overall economic productivity.

By digitalizing payments, governments aim mainly to foster an inclusive economy.² The Group of Twenty (G20) has well defined the benefits for governments, including enhanced transparency and accountability and cost savings. The transparency of payments under digitalization can enhance accountability between governments and citizens, more clearly linking the services governments provide and taxes levied and paid (Pillai, 2016). In addition, the opportunity for driving financial inclusion through the general digitalization of payments has been shown to benefit households (Suri & Jack, 2017, for Kenya) and entire economies.³

¹ While often used interchangeably, digitization and digitalization refer to two different concepts: the former refers to the storage of information in digital form; the latter to the integration of digital technologies into broader systems, such as PFM (see the introductory chapter in Gupta et al., 2017)). This paper uses the latter term to connote the integration of digital technologies into payments systems.

² Digitalization of payments may be a key element of a government's broader digital economy initiatives. Open data portals, which provide open access to government data online (OECD, 2016), are another digital government initiative. While neither initiative is synonymous with a digital economy, they are both helping build a basis for it.

³ According to IMF Managing Director Christine Lagarde: "Greater financial inclusion has tangible economic benefits, such as higher GDP growth and lower income inequality. By providing access to accounts, credit, infrastructure, women and low-income users, financial inclusion helps make growth more inclusive." (Lagarde, 2016).

Despite rapid progress in the technology for digitalizing payments, and noteworthy leadership from governments such as China and Mexico, policymakers in other economies, either emerging or even advanced ones, have been slower to embrace it. This is in part because a coherent and tailored framework to manage this shift has been lacking, as the Better Than Cash Alliance (BTCA) noted in a 2016 report reviewing the experience of digitalization in 25 countries (Janis & Shah, 2016).⁴ Without a broad and cohesive framework to guide implementation, governments and businesses in some instances have struggled to leverage the experiences and learnings of other markets and other players. The BTCA report thus identifies ten “accelerators” to implement digital payments effectively across an economy.⁵ Of particular relevance for this paper is the digitalization of government payments and receipts.⁶

At the G20 2016 Hangzhou Summit, leaders endorsed eight High Level Principles for Digital Financial Inclusion. These included a recommendation to provide incentives to digitalize all payments to and from governments, where feasible (GPFI, 2016a,b). So far, however, digitalization has been pursued, and largely implemented, outside the complex network of systems and processes that constitute the emerging architecture of PFM (Cangiano et al., 2013).

This paper seeks to explain why digitalization of payments should become an integral component of any modern PFM system. It first defines digitalization of payments and notes its main objectives. It then considers how digitalization and PFM are—or should be—complementary. The paper then offers a cautionary example of the challenges of developing a financial management information system (FMIS), demonstrating that technology alone cannot be a solution by itself, and presents case studies from Estonia, Ghana, India, and Mexico. Though varied, the cases show that successful digitalization of payments and PFM bring significant benefits; however, the transition often faces opposition from entrenched interests. The final section of this paper sets out some important lessons and directions for future research.

2. Defining Digitalization of Payments

Governments, businesses and international organizations distribute and receive vast sums in cash payments in payrolls, benefits, pensions, social programs, humanitarian aid, fines, fees, taxes, and other payments. With mobile phone usage growing rapidly—reaching some five

⁴ The BTCA was launched in 2012 in response to public and private sector demand for more strategic advocacy, research, and guidance on digitalizing cash payments to accelerate the shift from cash to electronic payments. It is funded by the Bill & Melinda Gates Foundation, Citi, MasterCard, Omidyar Network, United States Agency for International Development, and Visa. The BTCA is an Implementing Partner of the G20 Global Partnership for Financial Inclusion, working closely with the Markets and Payments Systems Subgroup. Its Secretariat sits within the UN Capital Development Fund.

⁵ Transaction volumes in the 25 countries grew an average of 32 percent annually over the past decade.

⁶ Relevant literature classifies these financial flows as government-to-person (G2P), government-to-business (G2B), and vice versa (P2G and B2G).

billion unique users in 2017—and innovative payment options also expanding quickly, opportunities to digitalize such payments is expanding at a similarly rapid rate.⁷

Digitalization of payments involves the shifting of paper-based payments—that is, cash and checks—to some form of electronic or digital payment (BTCA, 2012). Box 1 presents the definition and classification of electronic or digital payments adopted by the Bank of International Settlements’ Committee on Payments and Markets Infrastructure (CPMI).

Box 1. Electronic Payment Instruments: Definition and Classification

The Bank for International Settlements’ Committee on Payments and Market Infrastructures promotes the safety and efficiency of payments, clearing, settlement, and related arrangements for financial stability and the wider economy. CPMI (2015, page 12, paragraph 46) recognizes that “payment services providers include banks and other deposit-taking institutions, as well as specialized entities such as money-transfer operators and e-money issuers.” It classifies electronic payment instruments in three broad categories:

- **Electronic-funds-transfer-based instruments:** These are direct (that is, account-to-account) credit transfers and direct debit transfers. As account-to-account payments, these instruments can be processed fully electronically.
- **Payment-card-based instruments:** These include credit, charge, and debit card payments, and typically still involve a plastic card. With few exceptions, payments with cards are initiated, authorized, authenticated, cleared, and settled fully electronically.
- **Electronic-money-based instruments:** In general terms, these e-money instruments involve the payer maintaining a prefunded transaction account with a payment service provider (PSP), often a nonbank. Specific products include online money when the payment instruction is initiated by internet, mobile money when by mobile phone, and prepaid cards.

The definition of digitalization of payments in Box 1—in essence, digital access to and use of formal financial services—shares key foundational features with an FMIS, which is typically defined as “an information system that tracks financial events and summarizes financial information.”⁸ However, it should be noted that core FMISs may or may not

⁷ In the first quarter of 2000 there were 467 million unique mobile phone subscribers (7.7 percent of the global population). By the same quarter of 2017, there were 4.97 billion unique subscribers (66.3 percent of the global population), representing 15 percent annualized growth over that period (GSMA, 2017). In 1995, 1.6 mobile subscriptions existed for every 100 people in the world. By 2015, that number had reached 98.3 (23 percent annual growth), and today there are more mobile subscriptions than there are people in the world (International Telecommunication Union through World Bank, World Development Indicators). Compared to growth in ownership of mobile phones, the International Telecommunication Union estimates the number of internet users per 100 people increased from 0.8 in 1995 to 43.8 in 2015.

⁸ Diamond and Khemani (2005) define an FMIS as the “computerization of public expenditure management processes including budget formulation, budget execution, and accounting with the help of a fully integrated system for financial management of the line ministries (LMs) and other spending agencies. The full system should

include payment/transfer (including tax collection) functions.⁹ Whether digitalization should precede full development of an FMIS remains an open question. Certainly both digitalization and information technology infrastructure are necessary elements of the emerging PFM architecture.

Table 1 below provides a framework for the multiple types of payers and payees. It includes payments from governments to businesses and individuals as well as between government agencies and from businesses and individuals to governments.

Table 1. Payment Grid: Types of Payments by Payer and Payee

		Payee		
		Government	Business	Person
Payer	Government	G2G Budgetary allocations, funding	G2B Grants, payments for goods and services	G2P Welfare programs, salaries, pensions
	Business	B2G Taxes, fees for licenses	B2B Payments for goods and services	B2P Salaries and benefits
	Person	P2G Taxes, utilities	P2B Purchases	P2P Remittances, gifts
	Development Community	D2G Taxes	D2B Payments for goods and services	D2P Cash transfers

Source: Better Than Cash Alliance (BTCA, 2012).

Note: G = government, B = business (nonfinancial private sector), P = person. D = development community partner. For further explanation of the payment grid, see BTCA (2012).

also secure integration and communication with other relevant information systems.” They also clarify that “because of the integration requirement, the FMIS is commonly characterized as an integrated financial management information system. Unfortunately, using the term “integrated financial management information system” can sometimes be erroneously interpreted as describing a system that can capture all the functional processes, and the relevant financial flows, within public expenditure management.”

⁹ Indeed, much of the most authoritative literature on the subject (e.g., Diamond & Khemani, 2005; Khan & Pessoa, 2010; Dener, Watkins, & Dorotinski, 2011; Dorotinski & Watkins, 2013; and Una & Pimenta, 2016) makes a distinction between “core” modules (such as general ledger, budgetary accounting, accounts payable and receivable) and “noncore” modules (such as payroll, procurement, project ledger, and asset registry). Actual payment or transfer functions thus may be considered outside of the core FMIS modules.

3. Digitalization and Public Financial Management: Complementarity and Caution

3.1 Complementarity

In general, PFM “relates to the way governments manage public resources (both revenue and expenditure) and the immediate and medium-to-long-term impact of such resources on the economy or society. As such, PFM has to do with both process (how governments manage) and results (short, medium, and long-term implications of financial flows)” (Andrews et al., 2013). While ideally PFM should be an integrated unified system, it is often a set of systems managed in parallel, often giving rise to fragmentation with resulting inefficiencies. There is thus no consensus on how to define more precisely PFM, as discussed in Annex 1 of this paper, or about its objectives, or its desirable features.

Surprisingly, the way payments are processed is often overlooked in existing PFM literature—the word “digitalization” is rarely used. This is despite the benefits of digitalizing government payments in terms of transparency, accountability noted earlier and its cost savings being widely documented, including by the World Bank in its 2012 *Guidelines on Government Payments* (Cirasino et al., 2012), and more recently by the G20 (Klapper, 2014).

Crucially, digitalization of payments—when integrated into PFM systems—can help realize the full potential gains in effectiveness and functionality these systems can offer. Digitalization substantially strengthens core PFM functions: making regular and timely payments, reaching the correct beneficiaries, improving accounting and reporting, and strengthening accountability by providing a more reliable audit trail. Digitalization also enhances the quality of information on fiscal developments.¹⁰ Other direct benefits for PFM include expediting in-year budget execution reports, providing more timely information on governments’ cash positions, thus enhancing cash management functions, and better reconciliation between fiscal transactions, such as transfers, and corresponding recording in the government relevant bank accounts.

Digitalization of G2P and P2G payments also offers other indirect PFM benefits. It can help support a digital financial infrastructure for private transactions that minimizes the use of cash. This can help reduce the size of shadow economies and hence opportunities for tax evasion (Rogoff, 2016). The same infrastructure can help shift remittances away from informal money transfer mechanisms, helping address leakages in balance of payment transactions, thus closing off another avenue for tax evasion. Increasing digital P2P remittances between identified participants also strengthens compliance with the

¹⁰ Quality of fiscal information is at the core of fiscal transparency. In reformulating its 2014 Fiscal Transparency Code, the IMF defines this quality as the comprehensiveness, clarity, reliability, timeliness, and relevance of public reporting on the past, present, and future state of public finances.

recommendations of the Financial Action Task Force,¹¹ and diminishes the likelihood of “de-risking” by correspondent banks—that is, withdrawal of banking relationships in response to perceived risks of sanctions for violating anti-money laundering and financing of terrorism regulations.¹²

Country experiences show different possible digitalization pathways. It can be encouraged by initiatives to digitalize government payments and receipts, as has been the case in India. Digitalization can also emerge from private sector initiatives to digitalize P2P payments, as has been seen in Kenya, Tanzania, and Bangladesh. However, the overwhelming weight of experience shows that only through coordination across the public and private sectors can the benefits of digitalization be maximized. This requires governments to recognize the complementarity between digitalization and PFM and to demonstrate leadership in integrating public and private digitalization pathways to better serve financial management objectives.

3.2 A Cautionary Tale from FMIS Implementation

Whereas digitalization is still a relatively new concept that remains underutilized by many governments, FMISs have existed for many years. There is thus a growing body of evidence pointing to a mixed record of their success in helping strengthen PFM systems for the reasons discussed below.

3.2.1 Experience to Date

In a recent review of World Bank experience with implementing FMISs, Hashim and Piatti-Fünfkirchen (2018) propose several recommendations and prerequisites for successful FMIS project implementation. The recommendations point to the strong desirability of: identifying government needs; developing customized solutions; and strengthening institutional capacity.¹³ Prerequisites include: the existence of some of the basic components of a modern PFM system; improvement of budget classification; development of a unified chart of accounts integrated with budget classification; improvement of treasury single-account

¹¹ The Financial Action Task Force (FATF) is an inter-governmental body established in 1989 by the Ministers of its Member jurisdictions. It sets standards and promotes effective implementation of legal, regulatory, and operational measures for combating money laundering, terrorist financing and other related threats to the integrity of the international financial system. The FATF is a “policymaking body” that works to generate the necessary political will to bring about national legislative and regulatory reforms in these areas. The FATF currently comprises thirty-six member jurisdictions and two regional organisations, representing most major financial centers in all parts of the globe.

¹² Center for Global Development, 2015.

¹³ More technical aspects that can be used in FMIS projects to improve the reliability, cost-effectiveness, and accountability of information systems also include: using Electronic Payment Systems (EPS) for all government payments; benefiting from digital/electronic signatures for all financial transactions; and electronic records management.

operations; development of commitment control and monitoring mechanisms; and establishment of cash management functions.¹⁴

The list of prerequisites, however, provides little clarity around the terms “improvement” or “development.” Furthermore, it is inconsistent with the reality in most low-income countries where FMIS projects have been implemented in the absence of most—in some instance all—of these prerequisites, as clearly mentioned later on in the same study in pointing to “the significantly higher failure rate for projects in Africa.” Diamond and Khemani stress lack of ownership of FMIS as among the most frequent challenges. They also note that “establishing an FMIS should not be viewed as merely computerizing existing procedures.”¹⁵ This often reflects the lack of a unitary vision of governments’ priorities and objectives within the overarching PFM architecture.

3.2.2 A Unified PFM Architecture

FMISs have generally fallen short of expectations in part because they have been increasingly seen as a silver bullet solution to governments’ PFM shortfalls. Governments—not just in low-income environments—are frequently hampered by incomplete information when deciding between conflicting objectives with limited financial resources.¹⁶ As a result, FMISs have tended to evolve into an IT-driven solution in search of a problem — a risk flagged by Khan and Pessoa (2010) in their IMF technical note—rather than the other way around. As such, they have often been conceived and developed as a way to speed up information flows with the aim of improving transparency and hence accountability. Unfortunately, experience both in the private and public sectors shows that faster processing of obsolete procedures has resulted in more dysfunction rather than the expected efficiency gains and transparency goals.

Successfully developing and implementing an FMIS requires a unified vision of the whole PFM architecture. But first and foremost, there is the need to re-state the objectives a government wishes to pursue, as well as the essential functions that seeks to perform, so that these objectives are achieved efficiently and effectively. Re-shaping the government’s processes and procedures and their internal and external incentive mechanisms (including procedural as well as numerical rules) so as to modify behaviors, should follow a

¹⁴ By budget classification, it is usually meant as the manner in which the budget is articulated, approved, executed, and reported. The chart of accounts is a tool that allows governments classifying, recording, and reporting information on financial plans and transactions in a systematic and consistent way, much like a private sector business. The treasury single account is an arrangement for consolidating and managing governments’ cash resources, thus minimizing borrowing costs, in countries with fragmented government banking arrangements. Finally, commitment means an obligation to effect a future payment subject to the fulfillment of certain conditions (contractual or otherwise).

¹⁵ As Diamond and Khemani point out (2005), it is worth noting that “computerization promotes two kinds of reform: efficiency reforms that accelerate the operation of existing procedures and effectiveness reforms that change existing procedures ... and that the real payoff from IT is when it makes organizations more effective, not simply more efficient.”

¹⁶ See, for instance, IMF (2012) on the quality of information available to countries entering the global financial crisis.

government’s overarching objectives. This is of course easier in theory than in practice, and indeed in reality is rarely done. As a result, governments often confuse ends with means, processes with objectives, and procedures with functions. FMISs tend to follow a similar path; without due attention and caution, the ongoing digitalization agenda is at risk of similar shortcomings as well.

Governments have been shaped historically, culturally, and politically across often poorly coordinated layers, and often operate in a fragmented fashion. Citizens are simultaneously beneficiaries of the government’s social objectives as well as payers of a range of taxes or fees. The relationship between the government and the individual is therefore regulated via complex legislative frameworks; various identifiers, such as social security and taxpayers numbers; and an endless number of procedures. The position of individuals—and their families—in relation to the many ways a government affects their lives is very difficult to ascertain. On the one hand, this adds to individuals’ compliance costs; on the other, it can lead to inefficiencies and abuses of position. Only a unified view of the PFM system and how it can support governments’ objectives can overcome these difficulties. The persistence of expenditure arrears and “ghost” workers in countries such as Ghana and Malawi, where FMISs have been “satisfactorily” adopted according to the World Bank review, is a case in point. Annex 2 illustrates the limits of a fragmented and technology-driven approach in the case of Malawi.

3.2.3 Additional Cautionary Lessons

Digitalizing payments has to proceed in a way that acknowledges the lessons of FMIS implementation discussed in the previous section—identifying government needs; developing customized solutions; strengthening institutional capacity; and developing a unified view not only of the PFM system but also of the complex financial relations between governments and individuals. Diamond and Khemani (2015) find that computerization can promote two kinds of reforms: efficiency reforms that accelerate the operation of existing procedures, and effectiveness reforms that change procedures resulting in higher overall impact. The benefits of information technology are maximized when it makes organizations more effective, not simply more efficient.

Experiences in Malawi also show that digitalization should not be IT- or donor-driven. Rather, to realize its potential to boost effectiveness, digitalization should focus on functionalities that can address problems while keeping in mind medium-to-long-term policy goals. As Andrews (2013) argues, those managing digitalization should accept a certain degree of experimentation and that arises from within a given system. They should embrace learning by doing, and be prepared to develop capabilities in parallel with the proposed solutions. For example, they should accept the likely need for at least some cash transfers to continue in the face of challenging contextual factors (ODI 2016; Sturge, 2017), including limits to connectivity.

Another key lesson is to avoid developing “silos” in which different systems and IT infrastructures become an impediment to reconciling the *whole* relationship between the government and the individual. This has an important implication for digital payments as

both of its foundations—the ability to identify recipients and to make payments—are inherently multiple-use capabilities that cut across programs and sectors of public activity. It is therefore inefficient to approach digitalization through siloed payments solutions on an application-by-application basis.

Finally, very little work has been done on the costs and benefits of introducing large computerization systems. While these have delivered gains in many cases, they have also contributed to the waste of resources in others. This reinforces the importance of properly assessing expected efficiency and effectiveness gains from the beginning of digitalization efforts.

4. Selected Country Cases

The four country case studies described in this section illustrate how PFM and digitalization of government payments are indeed two sides of the same coin and point to factors that have helped determine their success. Table 2 summarizes the cases. Although each is different, they point to some common factors that the previous section identified as desirable for any digitalization project: identifying the problems and needs, developing tailored solutions, and strengthening institutional capacity. Perhaps most importantly, the cases also point to the way problems beyond the specific ambit of the existing PFM systems were addressed and how digitalization contributed to a unitary vision of government priorities and objectives.

The first case considered is India’s fast-track digitalization approach combining the Aadhaar program and financial inclusion to drive both efficiency and effectiveness in delivering government benefits. The second is Mexico’s long-term development of its “Single Treasury Account” and the digitalization of payments—developed at first in parallel before becoming aligned—and how this has improved efficiency and effectiveness and worked towards inclusion goals. With perhaps the most comprehensive digitalization of government services in the world, Estonia has seen improvements in public effectiveness as well as developing an approach to data privacy and protection that is of great interest for all countries moving towards digital governance. Ghana’s efforts to standardize digital identification and shift away from a cash-based economy are still facing challenges, but ghost workers have largely been eliminated from public payrolls where the approach has been applied.

Together, these cases (across four continents) set out in Table 2 illustrate many common challenges in aligning PFM and digitalization. While believed to be substantial, the estimated savings from the initiatives are nonetheless indicative. They are not always grounded in rigorous analysis and are not comparable. Far more rigorous, comparable research is needed to understand the economic impact of digitalization, including in developing economies.

Table 2. Summary of Country Cases

Country	Years	Main Objectives	Main Reforms	Indications of Effect	Estimated Savings
India	2009-ongoing	Rationalize subsidies, reduce leakage and corruption, financial inclusion, strengthen tax collection	Unique digital identification, reforming subsidies and transfers, e-KYC, enhancing payments and interoperability	Over 1.1 billion enrolled in Aadhaar, 280 million new accounts, comprehensive reform of liquefied petroleum gas subsidies, rollout of subsidy and payment reforms across states, service improvements	\$7 billion claimed over 2.5 years up to March 2017
Mexico	2007-ongoing	Transparency, cost savings, modern PFM system, financial inclusion	Single Treasury Account, digital payments, measures to encourage financial inclusion including tiered KYC	Payments now through single Treasury account and digital at Federal level	\$1.27 billion per year
Estonia	2001-ongoing	Efficient government, digital platform for private economy, data protection	Unique identification, digital data framework (X-road): regulatory regime for digital society	Unique e-identity, X-Road connects 170 public sector databases for over 1,500 public and private services, 98% digital tax filing.	Savings from almost universal digital services; citizen and government time, perhaps 2% of GDP
Ghana	2008-ongoing	Eliminating ghost workers, financial inclusion, improving tax collection	Unique identities, public wage payments through e-Zwich, smartcards	Increasing use of e-Zwich to deliver payments, elimination of 40% of public payroll where applied.	\$35 million per year from one application

4.1 India

In 2009, India created the Unique Identification Authority of India with the mandate to issue a unique identifying number, the Aadhaar, to every resident. Aadhaar was introduced, together with digital payments, as part of an ambitious project to shift the country toward an inclusive digital economy, with a strong initial focus on reforming and rationalizing a massive array of subsidy and payments schemes. Together these accounted for some \$60 billion in annual public expenditures, with studies suggesting huge leakage and diversion in many

programs. By early 2017, enrollment had topped 1.1 billion; it now includes almost all adults and is being extended to children. Aadhaar relies on digital technology and biometrics to uniquely identify people and to enable them to authenticate themselves for transactions. The largest identity management program in the world, it is also a platform for a number of related digital services.¹⁷

The strategy involves linking subsidies and benefits to identified individuals, paying benefits and transfers through financial accounts, and then enabling additional financial services to encourage their use. The so-called JAM strategy links (1) financial accounts under the Pradhan Mantri Jan Dhan Yojana program,¹⁸ (hence the J from Jan) (2) Aadhaar (hence the A) and (3) a mobile number (the M). Digital identity and payments come together in several ways. Know-your-customer procedures based on Aadhaar (e-KYC) have drastically reduced the cost of gaining new bank customers and enabled the opening of almost 300 million accounts, most used to receive digital transfers. E-KYC has also helped expand mobile banking and create new payment banks, an essential step to increase the density of the payments infrastructure. In addition, with the Aadhaar Payments Bridge, G2P payments are easily made to any identified individual without having to key in the details of his or her account. Extending this further, the Aadhaar-Enabled Payments Service enables seamless P2P digital payments between any two accounts linked to Aadhaar numbers or the associated mobile numbers, even if they are with different banks. Use of this Unified Payments Interface (UPI)—a free retail payments switch provided by the National Payments Corporation of India—has been increasing rapidly, with a transactions volume of some 150 million payments per month by the end of 2017.

Partly because of the way in which Aadhaar was introduced—before defining its purpose and scope in legislation—there has been much debate on the appropriate scope of this digital system. While the recent Supreme Court judgment placed restrictions on the mandatory use of the Aadhaar outside the area of benefits, it endorsed its mandatory linkage to the tax Permanent Account Number (PAN), thus cementing a critical linkage between taxation and benefits administration.¹⁹

A particularly interesting feature of the digitalization program is how it has been rolled out. While the Aadhaar itself and its associated services are central technology projects, individual states, and even some districts, have been free to adopt it in their own way, applying the technology toward problems and priorities they have identified. Reforms are moving forward rapidly in some areas but more slowly in others and may involve a good deal of experimentation and innovation in their implementation. In the most advanced states, reforms have been ongoing for five years or more; in the least advanced, they have barely gotten off the ground. Incentives exist to move forward at the state level, where

¹⁷ This is only a brief treatment of Aadhaar, the associated India Stack, and the digitalization of programs and payments. For more detail, see ID Insight 2017 and 2018.

¹⁸ See the Pradhan Mantri Jan Dhan Yojana website for more information: <https://pmjdy.gov.in/>.

¹⁹ <https://indianexpress.com/article/india/aadhaar-verdict-full-text-judgment-supreme-court-order-5374794/>

discretionary spending power is increasing as more tax revenue is devolved to states, thanks to awards by the Fourteenth Finance Commission.²⁰ States that save money by strengthening the administration of their social programs will therefore have more resources available for other purposes.

Krishna District, Andhra Pradesh, offers perhaps the most advanced example of these reforms. The subsidy, benefit, and pension systems have been digitalized, as has the supply chain for subsidized commodities provided through an extensive system of Fair Price Shops—a public system to distribute rations to the poor. This enables real-time monitoring of payments and subsidies effected through the system. Budget execution and the disbursement of payments and subsidized rations can be monitored in the aggregate, by town, by individual program or service point and, drilling down, even at the level of the individual beneficiary—creating a complete audit trail for each transaction. No longer can shopkeepers divert unclaimed products for private gain; the system reconciles stocks and flows to ensure that they are held over for the subsequent month's distribution.

As in other cases, digitalization in India faces opposition from vested interests that have benefited from the previous system. These have included entities on the front line of delivering payments, subsidies, and services who are no longer able to divert public spending for their own advantage. In some cases, they can be bought off with increases in service margins—if these are not set at reasonable levels there will be no incentive to implement the transfers. In other cases, they can be bypassed by concluding new contracts with competitors enthusiastic about providing services under the new systems. As with FMIS, implementation involves far more than technology. It requires vision, clear objectives, and sustained commitment from government and its agencies.

Another example of the application of these systems in India is the reform of fuel subsidies. For reasons of equity and health, and to cushion households against volatile prices and reduce deforestation, the country has long provided subsidized fuel to households. Liquefied petroleum gas (LPG) is a favored clean fuel, relative to kerosene. In the first stage of reform, the Pratyaksh Hanstantrit Labh (PaHaL) program changed the form of subsidy on LPG cooking gas cylinders, moving to market prices and transferring the subsidy directly into the financial accounts of beneficiary households for up to 12 cylinders per year. The reform has weeded out a considerable number of duplicate and fake connections and reduced diversion to unsubsidized commercial users. The second stage involves a massive rollout of the LPG program launched by Prime Minister Narendra Modi in 2016 (the Pradhan Mantri Ujjwala Yojana or Ujjwala scheme) to supply more low-income households.

One metric for assessing digitalization is fiscal savings. Among various estimates, in March 2017 the Ministry of Communications and Information Technology put savings at Rs49,000 crore, (about \$7 billion) over the previous two and a half years. The detailed basis for this estimate has not been made available and it is probably optimistic, but even a modest

²⁰ For more information please see <http://indiabudget.nic.in/es2014-15/echapvol1-10.pdf>

fraction of such savings would represent an enormous rate of return on the investments made in digital technology.²¹ Several factors complicate estimates of savings, however, including the need to specify a clear counterfactual and whether savings are to be considered ex ante or ex post. Savings from the LPG reforms, for example, depend on the per-cylinder subsidy, which fell sharply as world energy prices declined. Energy markets are unpredictable, however, and the reform has put in place a system that will better enable the government to respond to future price shocks which are bound to recur. Another complication is that the objective of that reform was not simply to cut subsidies—it was to strengthen the administration of the program so that it could be rolled out more widely across India. The use of the common Aadhaar identifier also enables subsidy programs to be rationalized; households that had previously received kerosene subsidies can be struck off the list as they are provided with LPG connections.

Fiscal savings are, of course, not the only, or the best, measure of the impact of digitalization from a PFM perspective. Perhaps even more important is whether the reforms have improved the accuracy, timeliness, and quality of service delivery. Until recently, there was little empirical evidence for India. One rigorous study evaluated the impact of pre-Aadhaar reform using biometrically authenticated payments infrastructure (smartcards) for beneficiaries of the National Rural Employment Guarantee Scheme (NREGS) and the Social Security Pension (SSP). A large-scale randomized control trial was carried out for the rollout over 158 sub-districts and 19 million people. The new system was found to deliver more timely, more predictable, and less corrupt NREGS payments without undermining program access. The investment was cost-effective, as time savings to NREGS beneficiaries alone were equal to the cost of the program rollout. Leakage of funds between the government and beneficiaries in both NREGS and SSP programs was also significantly reduced. Beneficiaries overwhelmingly preferred the new system for both programs (Muralidharan, Niehaus & Sukhtankar, 2014).

More recently, evidence has started to emerge from wider beneficiary surveys of digitized program delivery. Almost 3,000 beneficiaries were surveyed for the State of Aadhaar Report, 2017-2018, across three states (ID Insight 2018). Substantial majorities preferred the new systems to the old ones, essentially for two reasons basic to PFM: more regular payment/delivery and less likelihood that benefits are diverted. These conclusions largely mirrored those from a previous survey of beneficiaries in Rajasthan by Microsave and the Center for Global Development (Gelb, Mukherjee & Navis, 2018) that covered three programs: LPG, pensions, and subsidized rations. That survey also confirmed the huge impetus to financial inclusion from the digitalization of government programs, particularly for women; all had bank accounts compared with only one-third prior to the reforms. FINDEX data confirms India's progress in this area, with the gender gap in financial

²¹ The costs of the Aadhaar system through its first billion-plus registrations were about \$1.16 per head. The overall costs have been projected at around \$2 billion. For more discussion of costs and benefits see Gelb and Diofasi 2018.

inclusion shrinking from 20 percent in 2014 to only 6 percent in 2017 as the overall financial inclusion soared to 80 percent.

This is not to say that digitalization has solved all problems. Many challenges remain, including the need to reconcile data inconsistencies and errors, and there is still concern that digitalization should not exclude legitimate beneficiaries—as may have been the case for applications in some states (Dreze, Khalid, Khera & Somanchi, 2017). But India’s reforms, though in the early stages, leave little doubt over the potential gains.

4.2 Mexico

Mexico illustrates the benefits of combining PFM modernization with the digitalization of government payments to drive efficiency and financial inclusion.²² The Mexican government’s 2013 National Digital Strategy, known as Digital Mexico, was championed by the president as part of the 2013-18 National Development Plan. It included a commitment to “encourage the innovation of digital services through the democratization of public spending” and to financial inclusion. This 2013 strategy reflected over 15 years of successive presidents’ commitments to centralize payments through a Single Treasury Account and to digitize government revenues and expenses as part of building a modern PFM system, as well as a more recent government focus on financial inclusion.²³

Prior to the 2013 Strategy, Mexico’s commitment to financial inclusion had been on a parallel track. The 2007-2012 National Development Plan cited the long-term objectives of increasing the number of people and enterprises with access to financial services and protecting such newcomers. In 2007, the Mexican Congress issued the new Transparency of Financial Services Law, which established more precise transparency standards for the fees charged by financial institutions, principles for disclosure statements, and the obligation for banks to offer basic savings products. In 2008, the Mexican Congress approved reform of the Banking Law to enable the use of nonfinancial entities as banking agents (Goodwin-Groen, 2010). A presidential decree in September 2011 created the National Council for Financial Inclusion. As president of the G20 in 2011, Mexico led the Maya Declaration on financial inclusion. All these steps contributed to the launch of the president’s National Financial Inclusion Policy in 2016, which committed to merge both agendas by promoting

²² This section draws from Babatz (2013).

²³ As early as 1997, President Ernesto Zedillo had mandated all Dependencias of the federal government to collaborate with the Ministry of Finance to implement the Sistema Integral de Administración Financiera Federal. This was the start of the process to develop both the IT infrastructure and the business process re-engineering for an efficient Single Treasury Account. In 2007, President Felipe Calderon and the Head of the Treasury, Maria Eugenia Casar, with the support of the Central Bank Governor Agustín Carstens, enshrined the Single Treasury Account into law. In 2010, a Presidential Budget Decree mandated all government departments to shift to centralized electronic payments. This was the first time in Mexico that the “promotion of the use of electronic payments and the bankarization of beneficiaries,” that is, financial inclusion, was mentioned as one of the objectives of developing a modern PFM system.

the use of electronic payments. Another significant step was the adoption of tiered Know-Your-Customer (KYC) requirements, to facilitate the opening of basic payment accounts.

Mexico's experience pointed to the synergies between digitalization and PFM when the two came together after 2013. It also indicated the vital role of consistent senior-level sponsorship and support, and the need to coordinate across agencies. At a technical level, the shift was designed and supported by a core group of skilled senior civil servants within *Tesorería de la Federación* (the Mexican Federal Treasury), in cooperation with other key agencies such as the central bank. Without this technical competence, the complexity of the process may well have caused it to stall.²⁴ The reforms have had to overcome opposition including, initially, from banks that anticipated decreased earnings as government was enabled to reduce the volume of deposits held as float. Overall, it has been estimated that the Mexican government is saving some \$1.27 billion a year, or 3.3 percent of its combined spending on wages, pensions, and social transfers. The methodology and assumptions behind these estimates are described in Babatz (2013),²⁵ and they should be understood as indicative not definitive. Nonetheless, this order of magnitude of savings is hard to ignore.

4.3 Estonia

Estonia has prioritized digitalization across the whole government for almost 20 years. As Lindpere (2017) notes, the objective was to bring all citizens into the national digital economy to get the maximum cost-effectiveness benefit. Unlike many other countries with extensive legacy systems, as a newly independent country, Estonia was able to initiate its transition to a digital economy in a remarkably comprehensive way.

One essential step was the creation of an advanced digital identity system so that citizens could authenticate themselves for digital transactions. Estonia's system is among the most highly developed in the world, allowing not only authentication, but also the digital signing of documents. Some 1.1 million of 1.3 million citizens have a digital identity (Margetts & Naumann, 2016) and, in a global first, the same identification system is being offered to non-residents through the e-Residency program.

Another major step was the creation, in 2001, of the X-Road, a data exchange layer that enables secure internet-based data exchange between information systems. Public and private sector entities can connect their information systems with the X-Road without a fee. This shared infrastructure, hosted by the government, makes it easier for public and private institutions to innovate together, as they can leverage the already-existing infrastructure for

²⁴ For instance, the 2011 presidential decree could not have forced the shift overnight. But it was a decisive moment, alongside sustained pressure by senior champions.

²⁵ Cost-savings estimates in Babatz (2013) were calculated for salaries, pensions, and transfer programs using data and assumptions on three line items: (1) the interest earned by not having to deposit funds in advance of payments (the cost of the float), (2) the savings through not having to pay fees to banks for effecting transfers, and (3) the estimated savings from reduction in losses due to unauthorized or incorrect payments.

data exchange, thus saving resources (Janis & Shah 2016).²⁶ Citizens can access the system to check on who has requested access to their data and for what purposes; unauthorized access is punishable by law.

Data on the cost-effectiveness of this initiative, which has been run as Estonia modernized its entire PFM system,²⁷ is compelling, even if not all estimates are the result of rigorous analysis against a fully-specified counterfactual. By eliminating the need for in-person interactions, X-Road estimates it saved the equivalent of 820 years of working time in 2016 (Government of Estonia, 2017).²⁸ If each digital service provided by the system would otherwise have required 15 minutes of in-person attention, the savings would represent about 10 percent of public sector employment. The Estonian government has estimated overall savings from its digital systems at about 2 percent of GDP.²⁹

The digital tax return statistic also sets Estonia apart. In 2016, over 98 percent of returns came in through the e-Tax, the electronic tax filing system set up by the Estonian Tax and Customs Board, through X-Road (Margetts & Naumann, 2017), which also links employment tax records to each citizen's tax filings.

4.4 Ghana

Ghana offers an example of the potential for digital payments to eliminate ghost workers, even if their application has been limited. Despite many years of effort to implement public-sector reforms, the country has long struggled to contain recurrent spending, which is high relative to GDP compared with countries at a comparable income level. Overstaffing is chronic and containing the public-sector wage and benefits bill has been a particular challenge; it absorbs over 9 percent of GDP. Another PFM challenge for Ghana has been the prevalence of cash-based payments across the economy; these undermine tax administration and reduce collection.

As Breckenridge (2010) explains, Ghana's e-Zwich payment system, "the world's first biometric money," drew on a technology developed in South Africa to transition toward digital payments even without full, or reliable, connectivity. It also aimed to extend financial

²⁶ As of May 2017, X-Road had connected 170 public sector databases and provided 1,571 public and private services, all based on one standard, obligatory digital identity for each citizen. X-Road receives more than one million requests per day and processed more than 500 million transactions in 2016 (Government of Estonia, 2017).

²⁷ Estonia has been and remains a frontrunner in reforming its PFM systems since the 1991 restoration of independence. From an early adoption of results-oriented budgeting to accrual accounting and, more recently, accrual budgeting, reforms have been supported by an effective treasury and budget execution system and a remarkable degree of transparency and accountability.

²⁸ The 820 years figure assumes that every request to the X-Road saves 15 minutes of an officials' time and 5 percent of requests submitted through the X-Road involve communication between people. Using e-services then helped save 7,182,262 working hours in the previous year (Government of Estonia, 2017). These are obviously simplistic assumptions, but usefully indicate the magnitude of savings.

²⁹ <https://www.ipinst.org/2016/05/information-technology-and-governance-estonia#2>

inclusion to people who were not literate and less able to cope with PINs to secure and manage their transactions. The e-Zwich system captures clients' fingerprints during enrolment, de-duplicates them to ensure that identities are (statistically) unique,³⁰ and stores the template on a smartcard. For each withdrawal from an ATM equipped with a biometric reader, cardholders' fingerprints are checked against the template stored on their card. The system can work offline, reconciling the card balance with that of the underlying account when connectivity is available. To ensure an auditable trail, the ATM records the last 10 transactions on the card and the card records the last 10 transactions on the ATM.

The e-Zwich system was anticipated to serve two key PFM objectives. First, it would clean up government payrolls by consolidating all salary payments into a single, de-duplicated digital system. This would immediately flag multiple payments, since different accounts belonging to a single individual would all be mapped to the same identity. Second, as it was rolled out across the economy, initially to large employers, it was anticipated that it would strengthen tax administration by ensuring that a greater number of formal sector employees would see their wages and salaries being paid into digital accounts.

E-Zwich has been a mixed success. Take-up has grown more slowly than anticipated, although growth has been higher in recent years. Transactions went up from 2.2 million in 2014 to 5.3 million in 2016 as its usage increased to pay beneficiaries of public programs (Citifmonline, 2017). But as IMF (2016) notes, plans to use e-Zwich to pay all public salaries have encountered opposition, particularly from Ghana's public sector unions. They argue that the system imposes additional costs and inconveniences payees, in that it does not yet have a sufficiently dense network of service points.

In retrospect, it would have been better to have separated out the unique identification system from a particular financial technology, the approach taken by India. Nevertheless, it is reported that one single application, to Ghana's scandal-plagued National Service System, uncovered 35,000 fictitious employees—almost half the initial payroll of 75,000—potentially saving the Ghanaian government \$35 million a year.³¹ This would only be a small gain relative to the \$3-billion public sector wage bill, but would represent a huge rate of return on the initial investment in the e-Zwich program.³²

³⁰ Statistical uniqueness means that the probability that any individual has two or more distinct identities is extremely small. No system can guarantee perfect uniqueness.

³¹ B&FT Online. 2016. "E-Zwich Helps Flush Out 35,000 Ghost Names From Payroll ... Saves Gov't GH¢146m." April 21 <http://con-imedia.net/GhIPSS/news-and-events/27-e-zwich-helps-flush-out-35-000-ghost-names-from-payroll-saves-gov-t-gh-146m>

³² Net-1, the provider of the system, was paid an upfront fee of \$20 million plus \$3 per card. Wide coverage, at around 7 million cards for the whole of Ghana, would involve payment of \$41 million (Gelb & Clark, 2013). This does not of course include all costs of instituting the system, but it is indicative.

5. Digitalization Challenges: What Can We Learn and Where Do We Go from Here?

Traditional approaches to PFM have not paid detailed attention to the digitalization of payments, particularly to entities external to the government. Central fiscal agencies (by and large treasuries and ministries of finance) responsible for managing public resources through their PFM systems are often still at the margin of the digital revolution. However, as outlined in the case studies, the problems addressed using digital payments, together with (unique) identification technology, are highly relevant for the sound management of public finances. In fact, most of the questions about government payments to individuals and firms are essentially the same as for payments internal to the government and at the core of a functional PFM system:

- Are payments delivered securely, to the intended recipients, in a timely manner, and at reasonable administrative cost?
- Are there serious problems of ghost workers, leakage, or corruption?
- Can government “follow the money” in real time as resources flow through banks or other intermediaries to the ultimate recipients? Is there an auditable trail?

In addition, one needs to consider the wider role of the payments infrastructure that can be supported through digital G2P payments, in helping the shift from a cash-based economy towards a financialized one, reducing the scope for tax evasion.

The four case studies—Estonia, India, Mexico and Ghana—present a diverse range of approaches to developing a functional PFM that could meet such policy objectives. In Estonia, digitalization has gone far beyond payments, to encompass virtually all government functions and engagement with citizens. The aim has been to govern effectively and inclusively at lower cost. India’s digital transition is driven by multiple objectives, but the first and most important has been to improve the efficiency of its vast array of subsidies, transfers, and schemes by eliminating leakage and redundancy, as well as creating auditable trails. Financial inclusion has also been a major focus while improving tax administration through facilitating digital payments more widely is emerging as another priority. Through consolidating payments services and going digital, Mexico aimed to rationalize payments and reap savings, as well as to encourage financial inclusion. Ghana’s program, though far more limited in scope, had similar objectives—in the first instance to substitute for shortcomings in managing public payrolls through channeling payments into biometrically enabled accounts. Building on financial inclusion, the next stage intends to focus on broadening the tax net to include all formal wages and salaries.

Looking more generally beyond these four countries, the transition toward digital payments and the wider digital economy is happening naturally to some extent with the adoption of new technology, but often far less rapidly and comprehensively than possible, including in countries where the potential benefits are greatest. The transition also needs to avoid

common mistakes and draw from recent reviews of efforts to introduce large computerization programs within governments.

In addition, the case studies largely confirm the need for high-level leadership, an integrated and comprehensive approach to digitalization and PFM whereby the former becomes a constituent element of the latter, and an appreciation of the risks and challenges. These key success factors are briefly discussed below.

5.1 High-Level Leadership

Senior and sustained political and technical leadership that brings together these agendas is needed for success. This requires more active involvement on the part of central fiscal agencies, which should ideally play a leadership role or, at a minimum, be part of coordination efforts to ensure that all benefits are reaped. As Mexico and Estonia illustrate, these reforms take time. And, as India shows, senior political and technical leadership is required to deal with the many implementation problems that will inevitably arise, including the need to neutralize the opposition of those who have benefited from the previous system. Technology alone is ineffective without political will. Ghana's inability to apply its digital payments system more widely across the public sector illustrates this point.

The approach in India shows how much more there is to these reforms than simply installing a new computer system or payments infrastructure. It is more about developing a strategy to use digital payments effectively, which requires a top-down view and a broad framework of reference. This is true even when digitalization is being driven largely at the subnational level, with the added spur of greater devolution of fiscal revenues to states or at the level of individual programs. The other cases mentioned above faced different problems and priorities, but also had specific and broader PFM objectives in mind when developing aspects of their digital strategies.

5.2 An Integrated, Comprehensive Approach

It is important to build a comprehensive digital and regulatory infrastructure that will permit an inclusive approach to PFM. Examples above include X-Road, the India Stack, and E-Zwich. Digitalization of government payments, as in Mexico and India, is only one stage of a wider transition toward digital (noncash) payments across the economy. It can be a critical stage, however, since it can help build and sustain a first round of infrastructure needed for wider P2P digital payments, including POS and cash-in-cash-out facilities. Digital government payments can also increase a population's familiarity with digital systems, including through the opening of large numbers of accounts for new clients of the financial system. In the first years, many of these accounts will not be used for purposes other than receiving government payments, but this will slowly change.

Causality is not one way, however. In turn, wider P2P digitalization complements the initial G2P stage to start to build the digital ecosystem. It reduces the need to cash out payments and transfers immediately and lowers reliance on cash-in-cash-out infrastructure. It also

increases the transparency of payments and transactions across the economy to improve tax administration further down the road. The digital infrastructure should also be ready if, and when, it is decided to more actively reduce the role of cash in the economy, whether through eliminating large-denomination banknotes or other measures.

One regulatory priority is a telecommunications regime that encourages universal connectivity. Even with the astonishing spread of mobile devices—now almost one for every man, woman, and child on Earth—some less densely populated areas of poor countries lack basic 2G connectivity, and higher-capacity broadband internet is still restricted and costly in many countries.

A second regulatory requirement is a level playing field for financial providers, one that encourages entry and competition and facilitates the inclusion of low-income clients. For example, countries should apply a risk-based approach to know-your-customer, graduating the requirements so that small accounts that provide basic services to low-income clients face less stringent customer due-diligence requirements.³³

Interoperability should be another strong focus to enable cross-provider payments with negotiated and low-interchange fees. There are advantages and disadvantages in setting up the equivalent of a regulated public utility. One example is India's Unified Payments Interface, the payment system launched by the National Payments Corporation of India and regulated by the Reserve Bank of India that facilitates the instant transfers of funds between all users of the mobile platform. Interoperability can also help ensure a sufficiently dense network of financial agents to enable convenient cash-in-cash-out transactions and other services.³⁴ On the other hand, too early a stress on interoperability may blunt the drive of first-movers to expand coverage.

Based on these examples, unique identification is another prerequisite for a well-functioning digital payments system. Without such a mechanism to verify identities (particularly, but not only, for adults), it is difficult to develop a strong digital payments ecosystem. In Ghana, for example, 98 percent of people report having at least one form of ID, but market participants across the country struggle with numerous forms of identification and identity databases. With nine separate biometric databases in use across government and public entities, it is difficult to perform efficient know-your-customer functions. To verify either the form of ID or the holder of a current account, the company must be able to access the accompanying database. Yet, Ghana lacks a national, centralized identification method and database, hampering the development of its inclusive digital payments ecosystem (BTCA, 2016). Indeed, such a system could benefit PFM in many other ways, and it is surprising to see governments sometimes supporting a diverse and costly range of identification systems that

³³ For further discussion of regulation to improve financial inclusion see Center for Global Development (2016) as well as GPMI (2016).

³⁴ It is logical to permit reasonable interchange fees for access to agents of another network as this involves the provision of real (non-virtual) services.

are not interoperable, rather than focusing attention on the core systems of civil registration and national identification.

5.3 Appreciation of the Risks

The movement toward a digitized economy also comes with risks, both to citizens and government systems. For citizens, digital transactions and interactions leave a trail—in contrast to cash, which is anonymous—potentially extending to all aspects of an individual’s life. The Responsible Digital Payment Guidelines (2016), of the Better Than Cash Alliance, have researched and documented eight good practices for digital payments that, if followed, would significantly reduce risks to citizens. Guideline 7 to protect client data, for example, may be less of an issue for G2P payments (at least from the perspective of access by government), but is a consideration for the wider payments ecosystem. Where one shops, what one buys, who one pays—all these become matters of record and translate into data of considerable commercial value.

Countries need to take steps to ensure the security and safety of payments and related data, and to ensure that the growing digital cloud of information does not unduly compromise either the privacy of citizens or the privacy of classified government information, as both engage in the digital economy. This raises legal and regulatory issues that go far beyond the scope of this paper, but it is important to stress them since only about half of all developing countries have data privacy laws in place. The need for continuous upgrading of digital security is now a sine qua non for all such systems and the importance of qualified internal experts cannot be overemphasized.

5.4 Directions for Future Work

The very limitations of these cases from Estonia, Ghana, India, and Mexico serve to highlight the need for more rigorous, comparable research to document, and then systematize, how governments are building inclusive digital economies in which the PFM and broader inclusion agenda work together. The speed of innovation in payments makes the importance of robust research all the more important so the learning is substantive and actionable, not superficial. Also urgent, though, is the need for research on the counterfactual of not integrating PFM with the broader government digitalization agenda and of not digitally connecting the increasingly complex relations between government and citizens, for which PFM is the foundation.

These examples also highlight the imperative for training national and international PFM experts to position a modern functional PFM at the center of the government’s broader digitalization and inclusion agendas and address the evolving risks. This is a call to action for the skills development agenda of the IMF, World Bank, United Nations, and bilateral funders active in this sector.

6. Concluding Remarks

The train toward a digital economy has left the station and is moving rapidly. Its destination: a more inclusive society where everyone can benefit from lower costs, increased speed in processing financial transactions, and greater effectiveness in delivering government services.

That future can be reached faster if digitalization becomes a constituent element of a modern and functioning PFM and is combined with broader reform agendas such as financial and social inclusion or digital identification. There is much to be learned from the record of large government computerization initiatives in managing risks and from the experience of leaders in digital services, when embarking on these initiatives.

Digital payments are not a silver bullet. It will take significant intellectual capital and infrastructure investment. But if the digitalization agenda runs on a parallel track to PFM, the greater risk is a missed opportunity. The cases presented in this chapter, although limited in number, are examples of the components of an integrated approach between digitalization and more traditional PFM objectives. The call is to mainstream digitalization of payments as part of a functional PFM system which will, in turn, facilitate achievement of PFM goals and a broader inclusion agenda.

References

- Andrews, Matt. 2013. *The Limits of Institutional Reform in Developing Countries: Changing Rules for Realistic Solutions*. Cambridge, MA: Cambridge University Press.
- Babat, Guillermo. 2013. "Sustained Effort, Saving Billions: Lessons from the Mexican Government's Shift to Electronic Payments." Better Than Cash Alliance, New York.
- Bankable Frontier Associates (BFA) for the Better Than Cash Alliance. 2012. "The Journey Toward Cash-Lite: Addressing Poverty, Saving Money and Increasing Transparency by Accelerating the Shift to Electronic Payments." Boston.
- Better Than Cash Alliance (BTCA). 2012. "The Journey Toward 'Cash Lite': Addressing Poverty, Saving Money and Increasing Transparency by Accelerating the Shift to Electronic Payments." BTCA, New York. <https://www.betterthancash.org/tools-research/reports/the-journey-toward-cash-lite-addressing-poverty-saving-money-and-increasing-transparency-by-accelerating-the-shift-to-electronic-payments>.
- . 2016. "Responsible Digital Payments Guidelines." *Research*, July 20. <https://www.betterthancash.org/tools-research/case-studies/responsible-digital-payments-guidelines>.
- Breckenridge, Keith. 2010. "The World's First Biometric Money: Ghana's E-Zwich and The Contemporary Influence of South African Biometrics." *Africa* 80 (4). 642-62.
- Cangiano, Marco, Teresa Curristine, and Michel Lazare. 2013. *Public Financial Management and its Emerging Architecture*. Washington, DC: International Monetary Fund.
- Center for Global Development. 2015. "Unintended Consequences of Anti-Money Laundering Policies for Poor Countries." CGD Working Group Report, Center for Global Development, Washington, DC.
- . 2016. "Financial Regulations for Improving Financial Inclusion." CGD Task Force Report, Center for Global Development, Washington, DC.
- Chang, Ha-Joon. 2006. "Understanding the Relationship between Institutions and Economic Development." WIDER Discussion Paper No. 2006/05, United Nations University World Institute for Development Economics Research, Helsinki.
- Chang, Ha-Joon, Antonio Andreoni, and Ming Leong Kuan. 2013. "International Industrial Policy Experiences and the Lessons for the UK." Evidence paper for the Government Office for Science, London.
- Citifmonline*. 2017. "E-Zwich Patronage Grew by 140% in 2016." February 15. <http://citifmonline.com/2017/02/15/e-zwich-patronage-grew-by-140-in-2016/>.
- Cirasino, Massimo, Hermnat Bajjal, Jose Antonio, Garcia Garcia Luna, and Rahul Kitchlu. 2012. "General Guidelines for the Development of Government Payment Programs." World Bank Working Paper No. 96463, World Bank, Washington, DC.
- Committee on Payments and Market Infrastructures (CPMI) and World Bank. 2015. "Payment Aspects of Financial Inclusion." Consultative Report, World Bank, Washington, DC. <http://www.worldbank.org/en/topic/paymentsystemsremittances/brief/pafi-task-force-and-report>.
- Dener, Cem, Joanna Watkins, and William Leslie Dorotinsky. 2011. "Financial Management Information Systems: 25 Years of World Bank Experience on What Works and What Doesn't." World Bank Study, World Bank, Washington, DC.

- Diamond, Jack, and Pokar Khemani. 2015. "Introducing Financial Management Information Systems in Developing Countries." IMF Working Paper WP/05/196, International Monetary Fund, Washington, DC.
- Dorotinsky, W. and J. Watkins. 2013. "Government Financial Management Information Systems." *The International Handbook of Public Financial Management*, edited by R. Allen, R. Hemming, and B. Potter. New York: Palgrave Macmillan.
- Dreze, J., N. Khalid, R. Khera and A. Somanchi. 2017. "Aadhaar and Food Security in Jharkhand: Pain Without Gain?" *Economic & Political Weekly*. December 16. Vol. 52, No. 50.
- Global Partnership for Financial Inclusion (GPFI). 2016. *Global Standard-Setting Bodies and Financial Inclusion: The Evolving Landscape*. Washington, DC: CPFI. http://www.gpfi.org/sites/default/files/documents/GPFI_WhitePaper_Mar2016.pdf
- Government of Estonia. 2017. X-Road. Republic of Estonia Information Systems Authority Facts about the X-Road. Accessed on May 17, 2017. <https://www.ria.ee/x-tee/fact/#eng>.
- G20 Global Partnership for Financial Inclusion (GPFI). 2016a. "G20 High-Level Principles on Digital Financial Inclusion." <http://www.gpfi.org/news/new-g20-high-level-principles-digital-financial-inclusion>.
- . 2016b. "Global Standard Setting Bodies and Financial Inclusion: The Evolving Landscape." Consultative Group to Assist the Poor, Washington, DC.
- Gelb, Alan, and Caroline Decker. 2012. "Cash at Your Fingertips: Biometric Technology for Transfers in Developing Countries." *Review of Policy Research* 29 (1): 91-117.
- Gelb, Alan, and Julia Clark. 2013. "Identification for Development: The Biometrics Revolution." Center for Global Development Working Paper 315, Center for Global Development, Washington, DC.
- Gelb, Alan, and Anna Diofasi Metz. 2018. *Biometric Revolution: Towards Sustainable Development in the Digital Age*. Center for Global Development, Washington, DC.
- Gelb, A., Mukherjee, A. and Navis, K. 2018. "Digital Governance in Developing Countries: Beneficiary Experience and Perceptions of System Reform in Rajasthan, India: Center for Global Development, Working Paper 489, July.
- Government of India. 2017. "Direct Benefit Transfer." Savings Report to the Prime Minister's Office. New Delhi. <https://dbtbharat.gov.in/>.
- Goodwin-Groen, Ruth (ed.). 2010. "Innovative Financial Inclusion." Principles and Report on Innovative Financial Inclusion from the Access through Innovation Sub-Group of the G20 Financial Inclusion Experts Group. Consultative Group to Assist the Poor, Washington, DC. https://www.gpfi.org/sites/default/files/documents/Principles%20and%20Report%20on%20Innovative%20Financial%20Inclusion_0.pdf.
- GSMA. 2017. GSMA Intelligence Data. Accessed on May 17, 2017. <https://www.gsmainelligence.com/>
- Gupta, Sanjeev, Michael Keen, Alpa Shah, and Genevieve Verdier (eds). 2017. *Digital Revolutions in Public Finance*, Washington, DC: International Monetary Fund.
- Hashim, Ali, and Moritz Piatti-Fünfkirchen. 2016. "A Diagnostic Framework to Assess the Capacity of a Government's Financial Management Information System as a Budget

- Management Tool.” IEG Working Paper 2016/1, World Bank, Washington, DC.
<https://openknowledge.worldbank.org/handle/10986/25267>.
- Hashim, Ali, and Moritz Piatti- Fünfkirchen. 2018. “Lessons from Reforming Financial Management Information Systems. A Review of the Evidence.” Policy Research Working Paper 8312, IEG World Bank, Washington, DC, January.
<http://documents.worldbank.org/curated/en/504361516629959446/pdf/WPS8312.pdf>
- IDInsight. 2017. *State of Aadhaar Report*. May.
- IDInsight. 2018. *State of Aadhaar Report*. May.
- IMF. 2016. “Ghana: Third Review under the Extended Credit Facility Arrangement.” Country Report No. 16/321, International Monetary Fund, Washington, DC.
- Independent Evaluation Group (IEG). 2016. “Project Performance Assessment Report: Malawi. Financial Management, Transparency, and Accountability Project (Ida-3734a, Ida-37340, Tf 90947). IEG, World Bank, Washington, DC.
- Janis, William, and Reeya Shah. 2016. “Accelerators to an Inclusive Digital Payments Ecosystem.” Better Than Cash Alliance, New York.
- Khan, Abdul, and Mario Pessoa. 2010. “Conceptual Design: A Critical Element of a Government Financial Management Information System Project.” IMF Technical Notes and Manuals No. 10, International Monetary Fund, Washington, DC.
- Klapper, Leora. 2014. *The Opportunities for Digitizing Payments: How Digitalization of Payments, Transfers, and Remittances Contributes to the G20 Goals of Broad-Based Economic Growth, Financial Inclusion, and Women’s Economic Empowerment*. Washington, DC: World Bank.
- Lagarde, Christine. 2016. “Opening Remarks—IMF-CGD Event on “Financial Inclusion: Macroeconomic and Regulatory Challenges”, April 11, 2016.
- Lindpere, Martin. 2017. “Summary of Estonia’s Digitalization Revolution.” Remarks at IMF 2017 Fiscal Forum: Digital Revolutions in Public Finance, Session IV. April 22-23, 2017.
<http://www.imf.org/en/News/Seminars/Conferences/2017/03/29/2017-fiscal-forum-digital-revolutions-in-public-finance>
- Malik, Tariq. 2014. “Technology in the Service of Development: The NADRA Story.” Essay, Center for Global Development, Washington, DC.
- Margetts, Helen and Andre Naumann. 2017. “Government as a Platform: What Can Estonia Show the World?” Research paper, University of Oxford, Oxford.
- Muralidharan, Karthik, Paul Niehaus, and Sandip Sukhtankar. 2014. “Payments Infrastructure and the Performance of Public Programs: Evidence from Biometric Smartcards in India.” NBER, Working Paper, National Bureau of Economic Research, Cambridge, MA.
- Organisation for Economic Co-operation and Development (OECD). 2016. *Open Government Data Review of Mexico: Data Reuse for Public Sector Impact and Innovation*. Paris: OECD Publishing.
- Overseas Development Institute (ODI). 2016. “Cash Transfers: What Does the Evidence Say?” ODI, London. <https://www.odi.org/publications/10505-cash-transfers-what-does-evidence-say-rigorous-review-impacts-and-role-design-and-implementation>.
- Pillai, Rashmi. 2016. “Person to Government Payments: Lessons from Tanzania’s Digitalization Efforts.” Case Study, Better Than Cash Alliance, New York.
- Rogoff, Kenneth S. 2016. *The Curse of Cash*. Princeton University Press: Princeton.
- Sturge, Georgina. 2017. “Five Myths about Cash Transfers.” ODI: London.

- Suri, Tavneet and William Jack. 2017. "The Long-Run Poverty and Gender Impacts of Mobile Money." *Science* 354 (6317): 1288-92.
- Una, Gerardo, and Carlos Pimenta. 2016. "Integrated Financial Management Information Systems in Latin America: Strategic Aspects and Challenges." Chapter 7 in *Public Financial Management in Latin America*, edited by Carlos Pimenta and Mario Pessoa. Washington, DC: Inter-American Development Bank.
- World Bank. 2012. General Guidelines for the Development of Government Payment Programs, Financial Infrastructure Series, The World Bank, Washington DC, July, available at <http://documents.worldbank.org/curated/en/883951468000286016/pdf/96463-WP-Box391445B-PUBLIC-ADD-TOPIC-payment-systems-remittances-and-other-related.pdf>
- World Bank. 2015. The State of Social Safety Nets. The World Bank, Washington DC.
- World Bank. 2017. World Development Indicators. <http://data.worldbank.org/data-catalog/world-development-indicators>

Annex 1

What is PFM?³⁵

The emergence of an analytical framework that has come to be known as PFM is a relatively new development. It is only since the early 1990s that the term has become of common usage although was often used at this time interchangeably with public expenditure management. A number of expenditure management handbooks were published at the end of the 1990s mainly by the IMF, the OECD, and the World Bank that shared certain distinctive features:

- PFM was described as “a means to an end;” concerned with *how* fiscal policies are made and implemented distinct from the *what to do* questions of policy;
- PFM was presented as being a rather heterogenous set of systems, rules, processes, and procedures, both formal and informal,³⁶ anchored to the canonical annual budget cycle—preparation, appropriation, execution, and validation;³⁷
- It was recognized that PFM is embedded in wider government institutions and intrinsically part of the political process whereby scarce financial resources are allocated among competing goals;³⁸
- Following Campos and Pradhan (1996), PFM was understood to contribute to three high-level objectives: aggregate fiscal discipline, allocative efficiency, and operational efficiency. This was often linked in turn to the size of expenditure, its composition, and its use.

Over the past twenty years, PFM as a discipline has broadened considerably as different communities of professionals have wrestled with particular policy challenges and how PFM can assist addressing them:

- Macroeconomists have pushed to broaden the coverage of public financial management with the view that oversight of finances should extend to consider the whole public sector.

³⁵ This box draws from an unpublished manuscript by Cangiano & Miller (2018).

³⁶ To the extent that provides a set of rules aimed at authorizing and controlling the use of public resources, PFM can also be seen as a governance system. Fukuyama (2013) defines governance as the “government's ability to make and enforce rules, and to deliver services, regardless of whether that government is democratic or not.”

³⁷ Definitions of budgeting have varied depending on whether it was analyzed from a public administration, public finance, or political economy perspectives.

³⁸ This tradition dates back to Wildavski (1964) and Schick (1998a and 2013), and was later reinforced by the writings of Irene Rubin (2017), among others. Budgeting remains at its core a “set of processes and procedures that relate the expenditure of funds to the accomplishment of planned objectives” (Schick, 2013), or “attempts to allocate financial resources through political processes to serve different human purposes,” to use Wildavsky's words.

- Sector specialists interested in service delivery have looked at the role of PFM in context of wider mechanisms for resource allocation and use.
- Public administration specialists have looked beyond procedures and systems to study the role of organizations and especially finance ministries in managing government finances.

Civil society organizations have leveraged the fiscal transparency agenda to foster public participation and social accountability as foundations of legitimate budgeting processes.

The combined effect has been an increasing lack of clarity as to what might be included under PFM as well as its objectives. While the central government budget remains at the core of PFM, different communities of professionals have differing views on where it starts and stops. As the coverage and scope of PFM shift—they increasingly jar with this idea of a single, unified system built around the budget cycle. For instance, across the whole public sector, governments are also typically managing multiple financial management cycles and reporting arrangements. Different policy-making processes also do not always neatly around the budget. Further, there is still a distinction between core PFM, mainly concerned with the expenditure side of the budget, and revenue administration, human resources management, and even the payment system.³⁹

As a result, PFM has become much harder to pin down. For some, PFM continues to describe the familiar traditional budgeting processes within *government*, but at other times being used to describe more broadly the *governance* of public finances. Cangiano et al. (2013) refer to an umbrella definition of PFM covering a set of systems aimed at producing information, processes, and rules that can help support fiscal policymaking as well as provide instruments for its implementation, but this would not yet be an considered a new orthodoxy. Integrating digitalization of payments within the PFM system would certainly fall under this definition and help meet stated policy objectives such as financial inclusion.

³⁹ As argued in this paper, the payment system should be integral part of PFM.

References to Annex 1

- Campos, Ed, and Pradhan, Sanjay, 1996, “Budgetary Institutions and Expenditure Outcomes: Binding Governments to Fiscal Performance,” Policy Research Working paper WPS1646, The World Bank, Washington DC.
- Cangiano, Marco and Mark Miller, 2018, “Public Financial Management. Where from? Where to?” Unpublished manuscript.
- Cangiano, Marco, Teresa Curristine, and Michel Lazare (editors), 2013, *Public Financial Management and Its Emerging Architecture*, IMF: Washington DC.
- Fukuyama, Francis, 2013. “What Is Governance?.” CGD Working Paper 314. Washington, DC: Center for Global Development, available at:
<http://www.cgdev.org/content/publications/detail/1426906>
- Rubin, Irene, 2017, *The Politics of Public Budgeting*, Eight Edition, SAGE.
- Schick, Allen, 2013, “Reflections on Two decades of Public Financial Management Reforms, in Cangiano Marco, Curristine Teresa, and Michel Lazare (Eds.), 2013. _____, 1998, A Contemporary Approach to Public Expenditure Management, Washington DC, World Bank Institute.
- Wildavsky, Aaron, 1964, *Politics of the Budgetary Process* (Boston: Little, Brown & Company).

Annex 2

The Malawi FMIS Project

Starting in 2010, Malawi developed and implemented an FMIS covering most of the budget and the key core modules, including a commitment control system. A review of this World Bank-funded project shows how even a well-managed FMIS project may not, by itself, be conducive to a well-functioning PFM system (IEG, 2016).

The review found that while the FMIS was well under development, the complementary PFM environment, although ostensibly satisfactory, did not experience behavioral change. For instance, even though controls were in place, commitments continued to be processed outside the system; spending units were reported to maintain an off-FMIS registry and to upload funding limits on an as-needed basis. Evidence suggests that spending units generated local purchase orders and payment vouchers simultaneously, using pro-forma invoices despite directives to the contrary. Over time, large payment arrears accumulated, to an estimated 9.2 percent of GDP in 2014, and \$32 million was embezzled in the so-called “cashgate” scandal.⁴⁰

Weaknesses in PFM systems, processes, and controls around the FMIS environment caused these outcomes. The review notes various technical factors that were more directly associated with the FMIS, such as weak system access controls, inadequate data capture, poor system performance due to erratic power supply, inadequate server capacity, and unreliable connectivity. However, these factors were not crucial in explaining the outcomes. Rather, it was a more widespread disregard of the regulatory framework, and a breakdown of internal controls, that were at the root of the problems. These issues reflected a general lack of both understanding of the overall PFM architecture—and the interrelationship among its many components—and of focus on basic control procedures, such as bank reconciliation.

The independent review of Malawi’s FMIS project provides several key lessons. Notably, information technology solutions should be pursued without addressing fundamental PFM challenges in parallel. In Malawi, as elsewhere, unrealistic expectations that the FMIS would solve all challenges created a tendency to blame FMIS when problems occurred.

Even a well-designed and functioning FMIS, by itself, is not sufficient to support good PFM. The breakdown of the accountability chain that led to a major corruption episode in Malawi was chiefly the result of a disregard of processes rather than a technical failure of the FMIS.

⁴⁰ <https://www.futurelearn.com/courses/public-financial-management/0/steps/14718>