# Smart payments playbook: A guidebook to implement smart payments in the government payments ecosystem

25 Years | MSC MicroSave Consulting

# Acknowledgement

# Executive
# summary

## Current landscape

Government spending fuels socioeconomic development across the world. Financial transfers or payments are essential to the efficient implementation of development programs. They also ensure timely payments to third-party contractors and vendors alongside timely benefits to citizens. Efficient service delivery and effective program or project implementation on the ground depend extensively on smooth public finance management (PFM). However, specific PFM challenges related to fund release and payments processing continue to strain the capacity of government officials when they execute their roles and responsibilities on the ground.

A public financial management (PFM) system usually processes and monitors such transfers. While PFM systems increasingly use digital tools to ensure efficiency, many depend heavily on manual interventions. Manual processes and interventions place the burden of responsibility and execution on individuals or teams. Manual interventions leave scope for discretionary payments and decision-making, which often lead to delays in payments and uncertainty for the recipients. Broadly, the combination of high administrative burden and low accountability in decision-making leads to considerable friction in expenditure management for government departments.

The twin challenges of unspent funds and unpaid dues have plagued government payments in countries, such as India. For instance, at least 56% of the USD 37 billion (INR 3.1 trillion) released toward centrally-sponsored programs in India for FY 2023 remained unspent with the single nodal accounts (SNAs) of states to implement programs until March 2023. Moreover, unpaid dues by the government added up to almost USD 115 billion (INR 9.5 lakh[1] crores[2] ) in various economic sectors in 2020. Friction in expenditure significantly impedes the actual achievement of impact on the ground despite high budgetary allocations, especially in social sectors, such as health and agriculture, among others. These issues are not specific to governments in India but also commonly affect government payments worldwide.

**1** There are 1.4 billion unbanked adults globally relying on cash payments

**The World Bank, 2022**

**2** In India, 45-50% funds marked for road construction remained unspent over the past four years, with payments delays of more than six months

**MSC diagnostic study on the PMGSY scheme**

**3** Some empanelled hospitals under PMJAY (national health assurance scheme in India) have not been paid for the last two and a half months

**Valley Hospitals, Daily Excelsior**

[1] lakh = 100,000
[2] crore = 10,000,000

A smart payments solution framework can mitigate or minimize many such challenges for government officials who make payments worldwide. By reducing the need for manual interventions, such solutions can decrease administrative burden and enable frictionless expenditure while promoting higher systemic accountability. Smart payments solutions enable the autonomous processing of payment conditions through "if-then-else" rule-based processing. Deployment of the framework can help improve the quality of data collected by existing payment systems. It can also streamline access to cleaner and more targeted data for a wide range of government departments and agencies.

The framework itself does not comprise a management system. It is an enhancement layer over and above existing PFM systems, such as the Public Financial Management System (PFMS) in India or the Integrated Financial Management Information System (IFMIS) in Kenya and Indonesia. Smart payments use emerging technology to:

a. Digitally track each payment condition;

b. Make compliance checks for conditions and their validation digital

c. Trigger payments or instructions to pay when all conditions to pay are digitally met and validated.

Smart payments can help enhance the degree of observability within existing PFM systems while ensuring rules-based payments processing to facilitate near-autonomous or fully autonomous transactions. The smart payments framework offers benefits, such as higher efficiency, augmented monitoring capacity, and improved data integrity. These advantages make the framework valuable for government officials and policy practitioners to explore.

The smart payments framework is built on flexible technology pillars to accommodate either a basic, intermediate, or advanced solution based on the user's preference and the existing technological landscape. These pillars ensure that smart payments can enable each of the three actions mentioned above (points a) to c) through process automation, workflow automation, and rule-based processing. Further, the framework is rooted in PFM principles, such as single source of data, just-in-time funding, and observability, which require tools to be developed in the backend. These tools include IT workflows, API integration, and virtual treasury single accounts.

(See section 2.4.3)

**The digitization of tax payments and other related processes can save nearly USD 300 billion every year in government revenue for developing and emerging countries.**

**Better Than Cash Alliance (2020)**

**Effective information management and greater data sharing can potentially release GBP 7 billion per year of additional benefits, equivalent to 25% of total spend in the infra sectors in the UK.**

**Centre for Built Britain and Digital Framework Task Group (2018)**

**The Mexican government is estimated to have saved nearly USD 1.27 billion in 2012 when it digitized and centralized its federal salaries.**

**Better Than Cash Alliance (2013)**

**The Government of India has effectively channeled USD 22.5 billion in welfare payments by using digital payments during the COVID-19 pandemic.**

**Better Than Cash Alliance (2021)**

# Who benefits from smart payments?

While smart payments are designed to ensure observable and timely payments between stakeholders, the benefits extend beyond the reliable receipt of payments for end-beneficiaries. Governments worldwide make billions of transactions each year, often through repetitive, manual, and cumbersome processes. The efficient discharge of actions by government officials is vital for effective program delivery and administration. The smart payments solution can significantly streamline and automate many of these functions to enhance the capacity of government officials to carry out program implementation, monitoring, and supervision.

The lack of trust between beneficiaries and approval authorities has been a concern in many government payments transactions and a systemic challenge to overcome. Autonomous machine-enabled, timely, and accurate transfer of funds in the smart payments framework builds an element of trust for the associated stakeholders.

Audits are a vital mechanism to explain many of the challenges in government accounts, as they permit public management and accounting of government funds. However, audits are a tedious process. Sometimes, verification of each entry in government transactions takes a year due to the considerable manual effort involved and the sheer volume of transactions. In an ideal scenario, the smart payments framework allows observability, visibility, and verifiability of government transactions, which thus reduces misspending and other audit objections. Trust-based autonomous transactions and verification can lead to a reduction in time spent on the audit of financial transactions.

## Nodal authority

- Instils discipline as stakeholders stick to their commitments of defines timelines and processes
- Legal and process requirements are fulfilled autonomously without compromising the quality of validation
- Can help enable "just-in-time" funding
- Increases observability and transparency of fund flow and process

## Finance officer

- Allows the sectorial budget to be harmonized with the availability of funds, which prevents line ministries from overshooting defined budgets
- Funds are transferred automatically without delays through digital signatures and verification

## Fund regulator/ PMU/PIU

- Burden for manual checking is reduced through digitally recorded, traceable, and validated payment conditions
- Reduces rent-seeking behavior and prevents lapses in process despite reduced manual effort
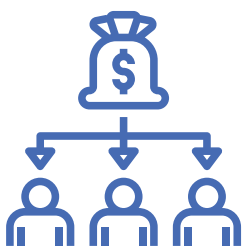
## Beneficiary

- Ensures timely and reliable receipt of funds
- Allows observability of process and fund flow for beneficiaries and other stakeholders
- Helps ensure accuracy of funds received by reduced manual discretion of authorities and adherence to pre-defined norms

Figure 1: Benefits of implementing smart payments for each stakeholder

# How does this playbook help?

This playbook introduces the concept of smart payments. It presents ways it can address diverse challenges presented in the lifecycle of a government payment. It covers payments made to different parties, including other government tiers or departments (G2G), contractors or businesses (G2B), and individuals (G2P).

The playbook covers multiple aspects related to smart payments and solutions, including:

- The public financial management principles on which the smart payments framework is based;

- The elements that comprise a smart payments framework and user requirement-specific scenarios to select an optimal solution;

- Specific technology solutions used in such frameworks;

- An outline of prerequisites to highlight the required capabilities and competencies to deploy such a solution. These prerequisites can be in terms of "people" (for instance, workforce development), "process" (for instance, shifts needed from current payments processes and policy changes), and "platform" (technology interfaces where the framework can be applied).

This playbook will show how the smart payments solution framework can be applied across three types of government payments with the help of specific use cases from India within each. The three payments are the 15th Finance Commission (FC) grants transfers (for G2G payments), the rural roads construction program, PMGSY, under the Ministry of Rural Development (for G2B payments), and the Government of Odisha's MUKTA program for guaranteed employment of migrant workers (for G2P payments).

# Who will find the playbook most useful?

The playbook will be most helpful to those practitioners who engage closely with or operate PFM systems. Such practitioners typically include personnel at the Finance Ministry or Treasury, central bank officials, personnel at departments who oversee budgeting and accounting processes, and those involved in the implementation of programs or development projects. Alongside officials responsible for finance functions, the playbook will also prove helpful for officials engaged in workflow management systems who oversee project or program implementation as it provides a solution to automate and conduct rule-based processing of government functions. We expect the playbook also to find use among individuals who seek to develop a conceptual understanding of smart payments and its practical applications.

# For relevant government and central bank personnel:

The playbook highlights how the smart payments framework can help mitigate several challenges. These include unspent funds (idle float), discretionary payments, delays in payment, underutilization of funds, forecasting errors, and issues related to the overall capacity of governments to deliver services. The playbook will allow stakeholders to take evidence-based decisions, as the data across all levels of program implementation will be visible and available in real time. For central bank officials, the solution's implementation would help integrate it with national and sub-national treasuries or government bank accounts to provide seamless, observable, and real-time transactions for government payments.

The playbook recommends a step-wise approach to the framework implementation. This includes identification of relevant challenges, selection of best-fit scenarios, assessment of current technology readiness, and identification of planning requirements around personnel, processes, and platforms (see section 2.4). The framework holds enormous potential to enable frictionless payments and reduce administrative burdens. This document is structured to explain each framework component and highlight its application through a relevant use case. We believe this structured approach will make the framework accessible to those associated most closely with the management of a country's PFM processes and platforms.

# Technology specialists:

The playbook dives deep into potential solutions and tools to enable smart payments for government transfers. It can find use among technology specialists, such as solutions architects and developers. They can use it to learn about the technological landscape behind smart payments and assess which improvements to existing processes and tools can help adopt the solution. Furthermore, technologists can use the playbook as a reference document to build and develop smart payments solutions and help governments plan and design the implementation framework for such digital-first approaches. (See section 3.1)

# Development professionals, finance professionals, consultants, think tanks, and public policy experts:

Smart payments for government transfers can potentially increase administrative accountability and transparency in PFM processes exponentially. More broadly, it holds the promise of more efficient development planning and execution. The framework is based on two fundamental PFM principles—a single source of truth (data) and observability. Both principles are fundamental to preserve the reliability and accuracy of the data PFM officials work with and significantly reduce the time and effort spent to process it.

Development professionals, public policy experts, and researchers will benefit immensely from the data such a system will provide access to, specifically in terms of promoting interoperability among government information systems. Thus, improved observability can result in better public financial management, payment systems, and reporting for performance and decision-making. (See section 1 and section 2)
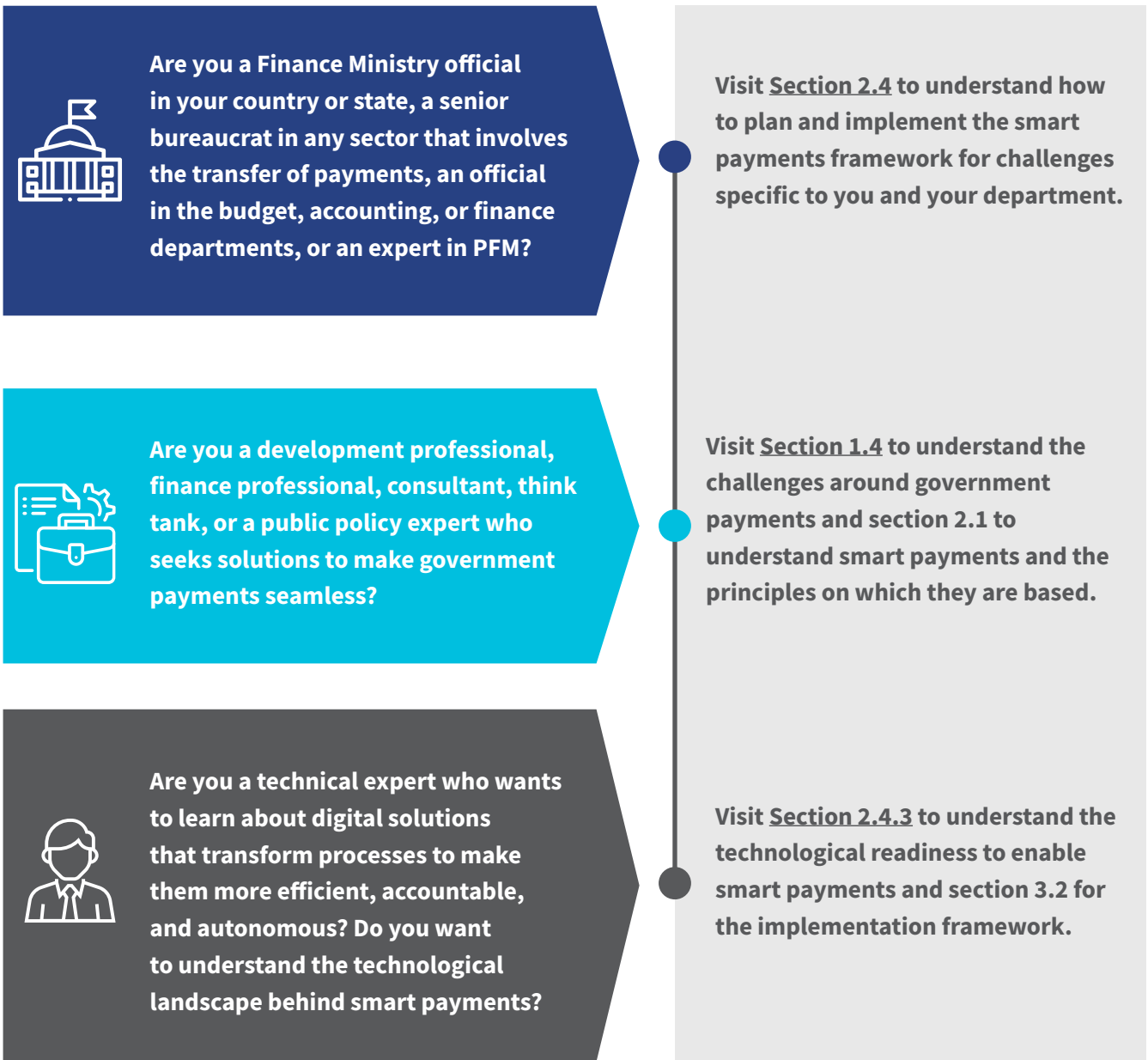
**Are you a Finance Ministry official in your country or state, a senior bureaucrat in any sector that involves the transfer of payments, an official in the budget, accounting, or finance departments, or an expert in PFM?**

**Visit Section 2.4 to understand how to plan and implement the smart payments framework for challenges specific to you and your department.**

**Are you a development professional, finance professional, consultant, think tank, or a public policy expert who seeks solutions to make government payments seamless?**

**Visit Section 1.4 to understand the challenges around government payments and section 2.1 to understand smart payments and the principles on which they are based.**

**Are you a technical expert who wants to learn about digital solutions that transform processes to make them more efficient, accountable, and autonomous? Do you want to understand the technological landscape behind smart payments?**

**Visit Section 2.4.3 to understand the technological readiness to enable smart payments and section 3.2 for the implementation framework.**

Figure 2: Navigating the contents of this playbook

# Table of contents

# Abbreviations

| 15th FC | 15th Finance Commission India |
|---|---|
| AI | Artificial Intelligence |
| API | Application Programming Interface |
| CDS | Centralized data store |
| DMS | Document management system |
| ERP | Enterprise resource planning |
| FC PMU | Finance Commission Project Management Unit |
| FIFO | First-in-first-out |
| G2B | Government-to-business |
| G2G | Government-to-government |
| G2P | Government-to-person |
| GPS | Global Positioning System |
| GSDP | Gross state domestic product |
| HRMS | Human resource management system |
| IFMS | Integrated Financial Management System (India) |
| IFMIS | Integrated Financial Management Information System |
| IoT | Internet of Things |
| IT | Information technology |
| JIT | Just-in-time |
| KPIs | Key performance indicators |
| LGD | Local government directory |
| M2M | Machine-to-machine |
| MIS | Management information systems |
| MoF | Ministry of Finance (India) |
| MoHUA | Ministry of Housing and Urban Affairs (India) |
| MPCs | Million-plus cities |
| NMPCs | Non-million-plus cities |
| OCR | Optical character recognition |
| PFM | Public financial management |
| PFMS | Public financial management systems |
| RPA | Robotic process automation |
| SFC | State Finance Commission |
| SLA | Service-level agreement |
| SLBs | Service-level benchmarks |
| SPARROW | Smart Performance Appraisal Report Recording Online Window |
| TAT | Turnaround time |
| UCs | Utilization certificates |
| ULBs | Urban local bodies |

# Background and context
## for the playbook

Despite significant fund outlays, relevant personnel, and the best intentions, state capacity challenges often plague a country's governance, which have detrimental effects on policy implementation. Implementation-related challenges often undermine the most well-intentioned regulations and policies introduced by governments. These challenges include weak administrative capacity, individual bias, discretionary authority, low efficiency, and reduced transparency or accountability. Most policies introduced worldwide are designed to be read, interpreted, and implemented by individuals (officials), which often brings ambiguity when the policies are translated on the ground. States increasingly use digitization and principles of effective governance to solve these challenges and achieve things not possible earlier.

Across governments, policies and regulations are implemented through rule-based compliance, and decision-making at the governance level involves an "if-then-else" readability of these rules. Rules-as-codes (RaC) have emerged through the use of technology, coupled with rule-based compliance, to enable governments to automate the implementation and enforcement of their policies. This is done through the translation of the legislations into code and their integration into software systems that deploy these policies, which allow the compliances to be broken down into "if-then-else" rules. Governments can automate contractual compliance and reduce manual intervention through the adoption of rules as code, which converts written text into machine language. Systems-enabled implementation eliminates individual discretion and consistently enforces policies across different stakeholders and platforms. Such automation can lead to significant savings of time and money for governments and help the public benefit from receiving faster services and resolution of matters[3].

Many countries have been exploring RaC to improve policy implementation and compliance in different areas of governance, such as tax compliance, regulatory compliance, customs and immigration, procurement, and healthcare, among others. India, too, has several successful examples of the government enabling RaC to automate and discharge its functions efficiently toward citizens. A foremost example is the income tax portal, which has eliminated paper-based filing of taxes. The current system comprises a regularly updated portal that calculates taxes after it receives the requisite inputs from its users[4].

Another recent example is DigiYatra, which uses technology to reduce manual intervention at airports. It involves a facial recognition system that eliminates the need for paper-based verification of passengers' identity by security officials, and a baggage tracking system that uses RFID tags to monitor the movement of luggage throughout the airport, resulting in faster and more efficient travel in airports.

Many states in India use RaC effectively to solve governance challenges, and RaC has many use cases. Yet the one we are most interested in is the use of automation and observability to improve government payments and functions. A primary challenge in the effective discharge of government services and functions is significantly delayed payments from governments to its other government departments, vendors, and to the public at large. The present system of making government payments involves a need to approve the conditions to pay (compliance) and approve the final payment transaction. As discussed previously, this results in significant manual intervention, individual discretion, low accountability, and low traceability in the approval of processes and payments, which ultimately lead to delayed payments.

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[3] McKinsey (2022). 'Unlocking the potential of public-service digitization.' Available at: https://www.mckinsey.com/industries/public-and-social-sector/our-insights/unlocking-the-potential-of-public-service-digitization

[4] Singarapu, M. (2021). 'Rules as code can be the new model for governance.' Available at: https://www.livemint.com/money/personal-finance/rules-as-code-can-be-the-new-model-for-governance-11632248473812.html

Digitization and rule-based compliance can be used to automate the payment conditions and the payment to be made. An implementation of this scenario is smart payments, which uses technology to track each condition for the payment, verify and validate the proof of compliance, auto-calculate the payment to be made, and make the payment in a near-autonomous manner. Smart payments are a use case of RaC that allows the system to approve the conditions for payment and its approval with limited human intervention. This can enable frictionless expenditure, lower administrative burden and maintain high accountability when government payments are involved. A simplistic example of this is an ATM transaction, where no individual is stationed to approve the payment being disbursed by the machine, and the user receives cash after the machine conducts basic checks.

This playbook introduces the reader to the different types of government payments, the challenges associated with making these payments, and ways to resolve them through smart payments. It acts as a practical guide to enable practitioners, public policy professionals, and technologists to implement smart payments and solve government payment challenges through technology to limit manual intervention. Smart payments are a versatile solution that allows customization suited to the implementing agency's needs and brings in as much or as little automation as the process and technological environment require.

The very nature of RaC, and hence, of smart payments, is that they do not require users to reinvent the wheel. Instead, they discharge government processes efficiently by breaking down complex tasks into machine-readable processes. In this case, the system autonomously approves the conditions for payment and releases the final payment to the end users with enhanced speed and transparency.

# Section 1: Introduction

## 1.1 Government payments: An overview

Governments worldwide make payments and transfers either to sub-national government tiers or directly to private businesses or citizens—depending on the country's governance structure. Payments vary depending on the nature of payment in funds or grants, tied or untied, benefit claims, conditional cash transfers, or contractual payments. Over a period, countries have adopted digital initiatives to streamline payment transfers. Figure 3 gives an overview of the fund flow in different government payments systems.

These notably include the use of integrated public finance management systems (PFMS), payment gateway integration, real-time monitoring systems, process automation, API integration, IoT-fed data capture, intelligent workflow, business rule engine, and rule-based automated payment processing, among other technological enhancements. As a result, countries with a technology-enabled ecosystem saw a significant increase in payment efficacy, value, and transaction volume (see case studies on page 22).
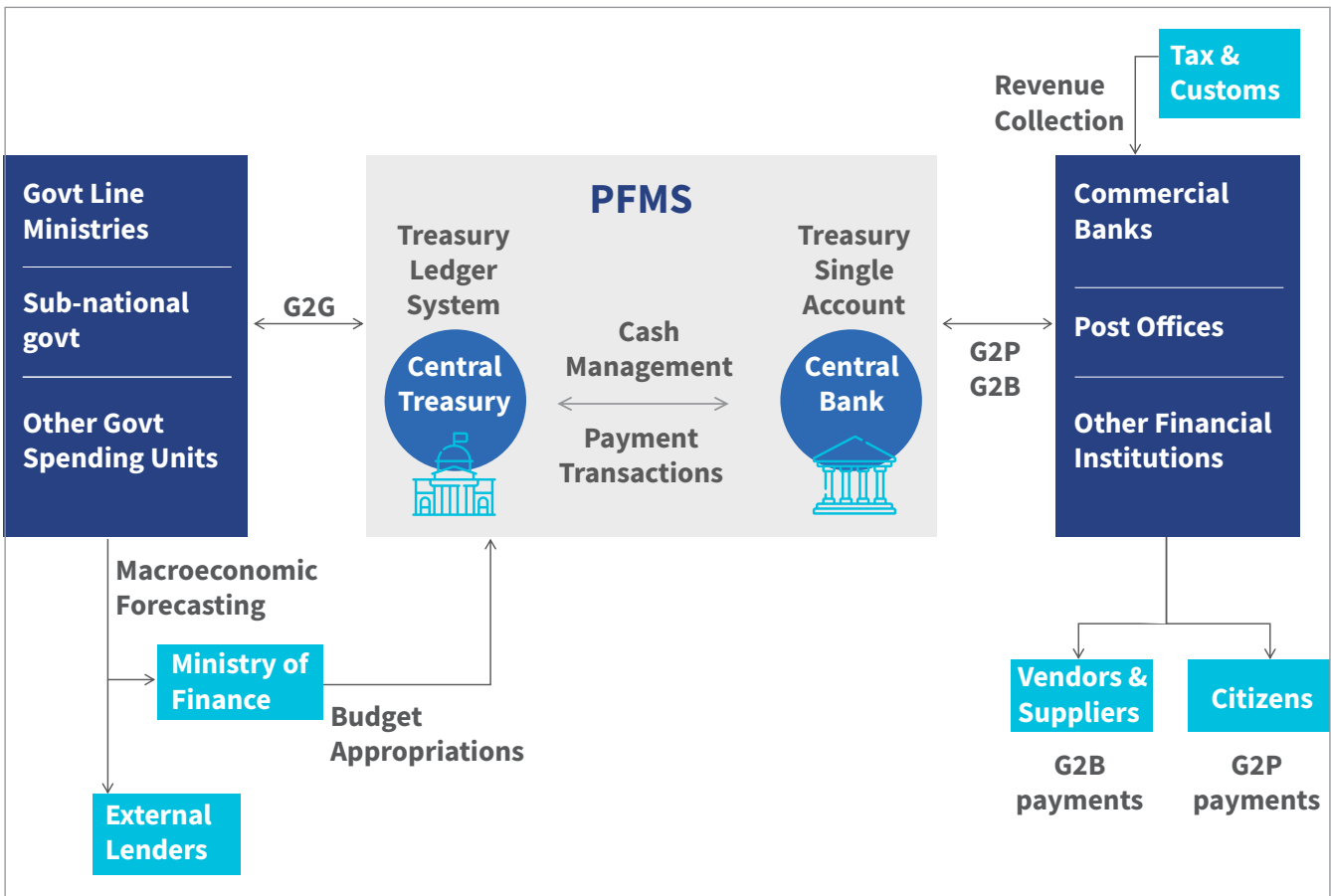


Figure 3: Overview of fund flow in different government payments

## 1.2 Types of payments and how they impact the payment process

We must understand different types of government payments or expenditures to understand how each type affects payment processing. Considering the nature of engagement with different parties, we may categorize government payments into three types. Figure 4 below explains this in detail.

| (G2G) Inter-government transfers | (G2B) Contractual payments, subsidies, and refunds | (G2P) Beneficiary payments |
|---|---|---|
| These are primarily two types of payments: 1. Grant-in-aid 2. Scheme budget allocation (Sponsored by the central or state government or both in proportion) | 1. **Contract-based payments** based on the type of terms and conditions of the contract (e.g. lump sum/fixed price/cost plus/time and material contracts/unit price, among others) 2. **Refund payments** wherein an amount paid is returned on account of excess payment **(e.g. Tax refund)** 3. **Subsidy payments** are conditional payments for a fixed amount or proportion that a business can avail by registering under a particular program | These are primarily of three types: 1. Direct benefit transfers 2. Conditional cash transfers 3. Claims against social security benefits |
| **Source documents:** | | |
| • **Grant-in-aid guidelines, approved budget, and payment schedule** • **Scheme guidelines, approved budget, and payment schedule** | • **Signed contract** • **Scheme guidelines, process and payment schedule** | • **Scheme guidelines, process, and payment schedule** |

Figure 4: Different types of government payments

## 1.2.1  Government-to-government (G2G) payments

G2G payments are transactions carried out between different tiers of governments and line ministries, that is, intergovernmental transactions. These payments are in the form of sharing proceeds from centrally levied taxes with other government tiers, grants-in-aid, and entirely or partially sponsored government programs. G2G payments usually have high transaction values. Yet, these transactions are less frequent and rarely carried out in cash.

## 1.2.2  Government-to-business (G2B) payments

G2B payments and transfers include payments made to vendors, suppliers, service providers, and self-help groups, among others, to procure goods and services. They may also include extending other incentives to businesses, providing loans or financial assistance, and corporate tax refunds. G2B payments involve a high number of transactions in terms of volume. Yet, the transaction values may differ comparatively depending on whether they are contractual payments, payments for goods and services, or small bills[5].  Large-value G2B transactions typically occur through digital payments, while those worth smaller values may or may not be cash transactions.



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[5] "G2B payments are characterized by a large number of transactions with values that vary widely and range from large-value procurement contracts to very small payments made with a government credit card or debit card." Bank for International Settlements and World Bank Group (2016).

## 1.2.3 Government-to-person (G2P) payments

Government transfers and payments occur directly, mainly for social welfare through subsidies, insurance, pensions, and social protection measures. They also include payment of wages and salaries for government employees. They may be in the form of cash or digital payments. Since national governments transfer such payments to individuals, the number of transactions is significantly high but may have smaller transactional values.

## 1.3 Government payment process and its components

Theoretically, each type of government payment, whether it is a G2G, G2B, or G2P payment, follows a well-defined workflow, which can be broken into five or six distinct steps. A clear set of rules and components guide the workflow and process. These rules define the payment lifecycle, including conditions, verifiable compliances, validation and entitlement calculation methodology, and approval protocols.

These components and payment rules determine the integrity and efficiency of the process by providing a clear mechanism to process any government payment. Table 1 below contains detailed components of a payment process.

Table 1: Different components of a payment process

| Components | Description |
|---|---|
| **Conditions to initiate a payment** | It is a prerequisite to the payment process and refers to conditions that need to be met to initiate the payment process, such as the submission of an invoice or request for advances. These can be categorized into two types, based on their role in the payment process and impact on it:<br><br>a. Eligibility conditions: A list of requirements that an individual or entity should comply with or submit to be eligible for submitting a payment claim or receiving a payment<br><br>b. Entitlement conditions: A list of requirements that an individual or entity should comply with or submit to calculate or validate the payout amount in the context of a payment |
| **Compliances to be submitted for payment processing** | All necessary data, information, or proof of conditional compliance that the entity or individual seeking payment needs to submit, based on:<br><br>a. A payment schedule that defines timelines for such a submission<br><br>b. A defined or prescribed format and<br><br>c. A verifiable benchmark that sets the criteria for acceptance or rejection of a proof of compliance |
| **Inspection and validation of submitted compliances** | These are steps the approving authority needs to take to validate compliances submitted against a payment based on source documents, such as program guidelines, grant-in-aid guidelines, contract terms, and conditions, among others. They include:<br><br>a. Defined stages or number of validation checks<br><br>b. Methodology and means to be followed for validating compliances<br><br>c. Acceptance or rejection criteria for each compliance submitted<br><br>d. Escalation mechanism in case of exceptions |
| **Entitlement calculation** | This involves the calculation of the final amount to be paid after inspection of compliances and mandated deductions, such as delay penalty, advance adjustment, recoveries, and applicable tax, among others. |
| **Authorization for payment release** | Once the entitlement calculation is done, the final approvers authorize the release of the final payment amount after reviewing the prior chain of events, including:<br><br>a. Compliances submitted<br><br>b. Validations in place<br><br>c. Entitlement or payout after deductions |
| **Instruction to pay the due amount** | After the payment is authorized, the payment authorizer issues instructions to pay to designated bank accounts used to disburse such payments after it checks the availability of funds in them. |

While all government payments follow a standard lifecycle defined by key components or stages (as shown in Table 1), the rules of payment and process criteria tend to vary. The variations are based on the type of payment and are defined within a source document or several source documents, which provide details on each component of the payment process.

Figure 5 below outlines the payment lifecycle for various government payments and shows how the components differ between them.

| Milestones | CONDITIONS for initiating a payment | 1. COMPLIANCES to be fulfilled for payment processing | 2. INSPECTION or validation of submitted compliances |
|---|---|---|---|
| **G2G** | • Approved grant-in-aid or budget<br>• Defined grant or budget disbursement schedule | • Submission of statement of accounts<br>• Grant or program-specific compliances as mandated by the payer | • Verification of submitted proof of compliances<br>• Validation of proof of compliances |
| **G2B** | • Goods, services, or works contract defining payment milestones<br>• Contracted payment delivery schedule | • Delivery of contracted goods, services, or works<br>• Submission of bill or invoice<br>• Other contract-specific compliances as required or mandated for payment | • Inspection of goods, services, or works delivered in context of contract conditions<br>• Verification of submitted proof of compliances |
| **G2P** | • Beneficiary registration in a scheme or program<br>• Scheme payment schedule | • Scheme-specific proof of compliances for availing benefits (e.g. reimbursement claims for pensioners, school attendance record for scholarships, etc.) | Verification of submitted proof of compliances |

Figure 5: Payment lifecycle for different types of government payments

| 3. ENTITLEMENT calculation for finalizing payout | 4. AUTHORIZATION for payment release | 5. INSTRUCTION to pay the approved amount |
|---|---|---|
| • Proportion of funds due (=budgeted - utilized) as per committed budget or grant-in-aid arrangement | • Sanctioned budget/pre-approved grant<br>• Validated compliances<br>• Finalized entitlement<br>• Digital/manual approval | • Verified source of funds (state or central treasury)<br>• Payment instructions to bank via a PFMS* |
| • Amount based on milestone or time and material billing<br>• Adjustments (advances, penalties, delays, etc.) | • Defined contractual milestone<br>• Validated compliances<br>• Finalized entitlement<br>• Digital or manual approval | • Verified source of funds (e.g. program/admin. funds)<br>• Payment instructions to PFMS/IFMS** payer-designated bank |
| • Scheme defined pay-out per person/household on periodic basis (e.g. monthly/quarterly/half-yearly/yearly)<br>• Clearance of a periodic claim | • Scheme-defined budget<br>• Validated compliances<br>• Finalized entitlement<br>• Digital or manual approval | • Verified source of funds (e.g. program funds)<br>• Payment instructions to PFMS/IFMS/payer-designated bank |

*PFMS or Public Finance Management System is a payment portal used by central government agencies (and by states in some cases) to transfer funds across central- and state-level agencies, contractors, or individuals in India

**IFMS or Integrated Financial Management System is a financial management system used by states in India for fund transfer across state-level government agencies, contractors, or individuals

Some examples from digitization, automation, and real-time payments from across the world:

**1** **The Philippines, InstaPay:** Real-time instant transactions can be carried out through InstaPay, a platform that has also facilitated EGov Pay for digital disbursements and collection of government payments. Since its launch in November 2019, the platform has seen transactions grow in volume by 688%.

**2** **Estonia, X-Road:** X-Road is a frequently cited platform for data-sharing and data management. It facilitates exchange of information between public and private sector information systems for seamless digitization of citizen and government services.

**3** **Singapore, SingPass:** SingPass is a single platform for citizens to connect with all government agencies with a common password across 57 government agencies and 270 e-services, which range from passport-related services and tax filing to company registration, among others.

**4** **Brazil, *Bolsa Familia*:** The Government of Brazil transformed the Bolsa Familia, one of the world's largest social benefit programs, from cash to digital payments, which resulted in savings in transaction costs from 14.7% to 2.6%.

**5** **UK, Connect:** The UK tax authority has claimed an additional GBP 3 billion in tax revenue after it launched the Connect tool in 2008, which links approximately 1 billion data items from sources, such as land and vehicle registers, social media, and trade associations, and also helps identify tax evasion.

**6** **Rajasthan-India, Bhamashah:** Under the Bhamashah program in the state of Rajasthan, the Bhamashah Resident Digital Hub (BRDH) integrates beneficiaries of state and central programs onto a common platform. The Bhamashah ID acts as a household-level identity card and provides a bank account for women to receive cash benefits, as part of a broader plan of financial inclusion. Beneficiaries can also use the Bhamashah ID for non-cash benefits from welfare programs.

# 1.4 Challenges faced in government payment processes

Despite technology adoption across the PFM systems, prescribed payment processes, rules, and various challenges affect government payment processing, which leads to delays and uncertainties. These challenges stem primarily from a practice of redundant parallel manual processing, a high level of individual discretion combined with limited traceability of events, and low visibility of funds.

Table 2 below highlights these challenges and potential outcomes.

Table 2: Challenges that impact government payment processes

| Challenge | Outcome |
|---|---|
| **High individual discretion to pay** | • Inconsistent interpretation of rules<br>• Additional conditions being imposed ex-post at times, which delays payment processing[6]<br>• Rent-seeking behavior among officials involved in the payment process |
| **Redundant parallel manual processing** | • Multiple sources of data to validate proof of compliance leads to additional verification steps and delays in payment processing due to a lack of trusted data sources[7]<br>• Tedious and repetitive work at workflow levels<br>• Increased scope of error[8] |
| **Lack of traceability of payment events** | • Low observability for the officials involved in the payment process and the final approver<br>• Low trust in the payment process and inability to pinpoint the locus of accountability<br>• Delay in the decision to pay |
| **Low visibility of funds** | • Uncertainty of fund disbursement despite payment approval<br>• Delay in the decision to pay |

The adverse outcomes result in various systemic issues, including forecasting errors, misallocation of funds, inconsistencies in reporting, and underutilization of funds. In turn, this hurts the capacity of government departments to deliver services by constraining their ability to execute programs efficiently and effectively. From a resource perspective, this leads to departments and agencies maintaining a considerable amount of idle float in the form of excess cash or bank balances in their accounts for many years in a bid to address an unforeseen exigency.

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[6] As part of the 14th Finance Commission in India that recommended grants to local bodies as well as sectoral grants, funds were allocated to local bodies based on specific conditions. It was stipulated that no further conditions be imposed than those specified by the Commission in their allocation. However, some Union Ministries had imposed further conditions during the release of grants, which were transferred to the local bodies via nodal Ministries, resulting in delays and undermining the need to augment local body resources. Accountability Initiative, Centre for Policy Research (2019).

[7] The *Pradhan Mantri Gram Sadak Yojana* (PMGSY) program in India provides road connectivity to unconnected habitats as part of a poverty reduction strategy. PMGSY suffers from a significant lack of control over data for reliable validation checks due to manual entries in the recording of information pertaining to road construction and maintenance. As a result, MIS reports from the online dashboard of the program (OMMAS-Online Management Monitoring and Accounting System) are often inaccurate or unreliable. CAG Report, 2016 (Comptroller and Auditor General of India, Report 23 of 2016).

[8] Under the PMGSY program in India, the lack of an efficient monitoring system led to 22 states in the country spending approximately USD 16 million on road works in habitations where connectivity was already present between 2000 and 2005. CAG Report, 2006.

**1**

**Forecasting errors**

Predicted and real values may vary dramatically given the uncertain timelines of receiving funds

**2**

**Misallocation of funds**

The management of funds is improper due to the unpredictability of receipts and payments

**3**

**Reporting inconsistencies**

Delays and inconsistencies in reporting plague financial reporting

**4**

**Underutilization of funds**

Instability in receipt of funds, diversions to other sectors or accounts, and lack of timely receipts result in underutilization

**5**

**Service delivery capacity of governments**

Constrained ability to execute programs due to systemic issues in fund flow

**6**

**Idle float**

A considerable amount of idle float is created in departments and agencies due to time gaps and delays in transfer to the end beneficiary

**7**

**Lack of trust**

Limited visibility and dependence on individual discretion results in a lack of trust among different stakeholders

**8**

**Ineffective resource planning**

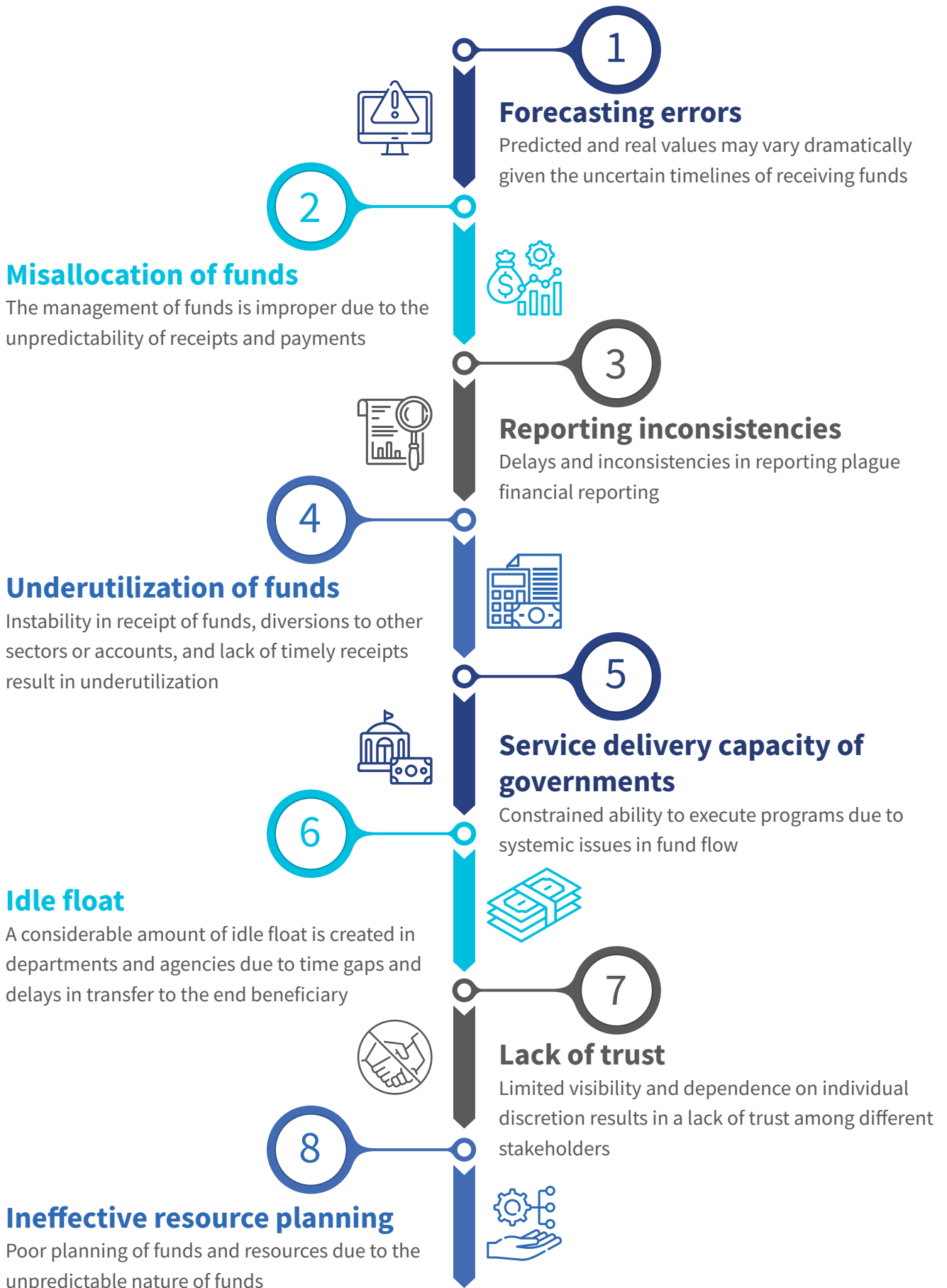Poor planning of funds and resources due to the unpredictable nature of funds

Figure 6: Consequences of delays and uncertainties in government payments

# Section 2:
# Smart payments

## 2.1 What are smart payments?

The smart payments framework as a solution has evolved based on the challenges observed in the government payment lifecycle. It seeks to evaluate the challenges mentioned in Table 2 and their impact on different components of the payment lifecycle. The concept of smart payments is built upon core PFM principles and technology pillars, which take a comprehensive view of the people, processes, and platforms involved in a payment process. The solution enables the autonomous processing of payment conditions through an "if-then-else" rule-based processing to ensure that:

- Each condition of the payment can be tracked digitally;

- The proof of compliance is digitally verifiable and validated by the system workflow in real time;

- Entitlement is auto-calculated;

- The instruction to pay or release payment is triggered in a near-autonomous manner when all payment conditions are validated digitally.

Table 3 below provides the detailed requirements to ensure each of the above components can be implemented in a smart payments framework.

Table 3: Smart payment framework components

| Component | Criteria | Requirements |
|---|---|---|
| **Payment condition processing** | Digitally tracked | 1. Available in specified digital formats.<br>2. Digitally traceable to a single source or primary unit of activity. |
| | Digitally verifiable | 3. A digitally available benchmark for verification or compliance.<br>4. Can be submitted or shared digitally via another system. |
| | Digitally validated | 5. Validated using a digital interface or by a digital system workflow itself.<br>6. The locus of accountability for each actor responsible for validation is mapped on a digital workflow with an exception and escalation mechanism. |
| **Entitlement finalization** | Auto-calculated | 7. Single source of data for validated payment conditions.<br>8. Rules-based processing is used to calculate the final payment amount based on an algorithm or if-then-else scenarios to capture all conditions relevant to payment calculations and adjustments. |
| **Payment approval** | Auto-triggered | 9. The entire payment process until approval is digitally traceable with the highest level of observability for the final approval.<br>10. A rules-based processing algorithm or if-then-else scenarios triggers an auto-approval when the payment condition compliances and entitlement amount is validated.<br>11. Digital authority to pay enables authorization for the transfer of funds from a single dedicated source account. |

A transformative digital process that involves process automation, workflow automation, and rule-based processing can realize each of the four enablers of smart payments mentioned above to digitize and automate the process[9].

**BOX 1: What is the difference between process automation, workflow automation, and rule-based processing?**

**Workflow automation implies the automation of the flow of tasks, information, and data when a user gives an input to receive an output through defined business rules.**

**In effect, workflow automation refers to the automation of the entire flow of activities, while process automation refers to the automation of a standalone activity. Both workflow automation and process automation are carried out through pre-defined business rules engine via rule-based processing, that is, pre-defined rules are used to execute processes and automate the workflow.**

**The automation of a business process involves automation of both process and workflow.**

## 2.2 What are the guiding principles of PFM for smart payments?

The adoption of a smart payments framework across the payment lifecycle requires considerable process engineering to mitigate payment-related challenges and their impact—as mentioned in section 1.4. Thus, the implementation relies on select principles that stem from best practices of PFM (see Figure 7) to implement smart payments in the true sense instead of merely as technology or software integration[10].  As the later sections explain, these principles guide the overall structuring of the smart payments implementation approach and its different scenarios.

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[9] "Workflow automation automates the flow of tasks, documents, and information across work activities as per defined business rules. The focus of workflow automation is to automate flow among work activities across the process, while the focus of RPA (robotic process automation) is to automate the individual work activities. Work activities that are highly based on rules or procedures are excellent candidates for RPA." Proctor, J. (2019) InteqGroup Blog.

[10] The four core principles of smart payments have been inspired by some of the most impactful enabling actions under digital PFM. Mathew, S. & Sharma, D. (2020), State Capacity by Design. Enabling officials to succeed.

| Core principles | Objective | Tools |
|---|---|---|
| **Single Source of Data** | Data input from primary unit of activity | IT Workflow for program management |
| | Data is accessible across political & administrative boundaries | GPS codes in physical and financial data Local Government Directory (LGD) |
| **Observability & Telemetry** | Machine-to-machine exchange of payment requests and status | Interoperable IT systems, IoT or smart devices and open APIs |
| **Just-in-time funding** | • Real-time automated UCs<br>• Machine-to-machine exchange of payment requests and status | • IT Workflow for program management<br>• Interoperable IT systems and open APIs<br>• Open APIs by IFMIS / PFMS<br>• Virtual treasury single account |
| **De-monopolizing access to public services** | Anonymization, randomization and FIFO at regulatory touch points | Demand registration through APIs |
| | Job- aids (Equipping officials with job-aids that can make it easier to achieve their goals) | • Job-aids using workflow<br>• Upgraded SPARROW; open APIS from workflow<br>• Training Management |
| | Decouple work and workforce from workplace | Job-aids tailored to the needs/ role of frontline officials |
| | Trust Scores for officials by back-checking their statements | Accuracy meters |

**Smart payment**

Source: Adapted from the State Capacity Booklet

Figure 7: PFM principles and the tools to enable smart payments in government settings[11]

[11] UCs: utilization certificates); FIFO: first-in-first-out; IT: information technology; IoT: Internet of Things; API: Application Programming Interface; SPARROW: Smart Performance Appraisal Report Recording Online Window

## 2.2.1 Single source of data

The term finds its roots in the concept of a "single source of truth." This refers to certain data with one official source to be accessed by users for the most up-to-date and authentic version of that data. For government payments, such data must be from the primary unit of activity or be closest to it. They should be accessible across administrative boundaries and interoperable systems. This would reduce the burden of encountering multiple sources for the same or similar information and the duplication of then collating this information for higher authorities.

Inspired by this principle, Estonia has developed X-Road, a decentralized system that provides a distributed data exchange layer. It facilitates the exchange of queries between separate computer systems and multiple databases, thus providing a "single source of data[12]."

## 2.2.2 Observability and telemetry

Observability allows the measurement of key metrics and performance parameters of personnel, processes, and platforms by the systems themselves. This measurement can be done through relevant tools that measure metrics, events, logs, and traces.

Telemetry enables the capture of metadata generated remotely. It allows navigation from a performance issue to its root cause.

## 2.2.3 Just-in-time funding (JIT)

Funds for most government department transactions are commonly transferred from the central treasury to the department before the actual spending occurs, based on the department's forecasted spending needs. However, the funds remain parked in commercial banks outside the consolidated fund of the center and state until they need to be spent, which results in the creation of idle float[13].

JIT funding allows transactions to occur in real time, which enables funds to be "pulled" when the request is made and passed directly to the bank account of the end-user. It is facilitated using real-time automated utilization certificates (UCs) and machine-to-machine (M2M) exchange of payment requests across PFM systems[14].

## 2.2.4 De-monopolizing access to public services

Governments often enjoy monopoly power over public services and payments. This creates a substantial administrative burden on officials or allows discretion to decide the recipient and extent of services and benefits they would receive.

The use of various tools can help de-monopolize public services. These tools include anonymization, randomization, first-in-first-out at regulatory touchpoints, digital authorities to release funds, and "trust scores." They enable accurate decision-making, monitoring, and mainstreaming of accountability. Based on the above principles underlying smart payments, governments can adopt different tools or solutions, as shown in Figure 7.

Based on the above principles underlying smart payments, governments can adopt different tools or solutions, as shown in Figure 7.

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[12] Hoe, W. (2017) Harvard Kennedy School. Ash Center for Democratic Governance and Innovation.

[13] The Finance Ministry's Economic Survey 2015-16 estimated that nearly INR 1 trillion lay unspent in government bank accounts across the country. This money has been reported to the Parliament as having been spent. Ministry of Finance, Economic Survey 2015-16.

[14] The Government of India (Ministry of Finance) has recommended universal implementation of Treasury Single Account (TSA) to facilitate JIT funding. TSA allows autonomous bodies of the government to draw down cash as per their requirement through an online system and avoid the parking of funds in banks. Controller General of Accounts (CGA) (2021).

## 2.3 How can smart payments be applied across the stages of a payment lifecycle?

A smart payments framework and features can be enabled across the different stages of payments by ensuring the following:

I.  **PAYMENT CONDITIONS and process workflow are well-defined and digitized:** The smart payments framework clearly defines and digitizes all payment terms and methodology for payment processing. All payment conditions, compliances, rules, actors and their roles, and acceptance or rejection criteria must be machine-readable.

    These predefined payment conditions alongside the process will lay the foundation for the prerequisites that enable smart payments and execution of the remaining stages in the process.

II. **CONDITIONAL COMPLIANCES are digitally submitted and verified:** The system must permit the submission of compliances through a digital platform to initiate a payment claim against a set timeline or milestone, or both, in a time-bound manner via a predefined mode and format.

III. **ENTITLEMENT is auto-calculated:** Auto-calculation of the payout must be carried out using a predefined entitlement calculation model built into a digital algorithm. The algorithm will validate conditional compliance data and carry out predefined adjustments (e.g., penalties, advances, taxes, etc.), which are traceable.

IV. **AUTHORIZATION of payment is time-bound and autonomous:** The system must permit auto-approval of payments. Due diligence for the decision to pay must be performed through an algorithm that runs predefined criteria. This would provide the final approver observability and traceability of all events in a payment lifecycle and allow the approver to act if clarification is needed for any data or compliance point.

V.  **INSTRUCTIONS to pay are executed and reported in real-time:** Just-in-time fund release must be enabled to ensure seamless payment disbursal. Real-time transactions and reporting must be observable once a digital authority issues instructions to pay.

### Box 2: What does an implementing agency need to do to implement smart payments?

**Before the implementation of smart payments, a user must assess: 1) Where and what is the cause of delay in payments, 2) The readiness or maturity of their existing systems being used, 3) Where they want to be in future in terms of improvements to the payment process, and 4) How to begin laying the foundational steps or the prerequisites to its implementation. Following an assessment of the current state and depending upon their specific requirements and resources, the implementing agency can then select the desired state they want to progress to. The desired state can range between three possible scenarios—basic, intermediate, or ideal states of smart payments deployment.**

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## 2.4  Steps to be taken before the implementation of smart payments

As a reform measure, smart payments require adequate planning to execute the right interventions to address payment delays and ensure future readiness for the implementing agency. The proposed smart payments solution framework allows an implementing agency to intervene in each stage of the payment process based on the existing situation of its systems against the challenges identified in its process.

We recommend following a four-step approach when planning for smart payments implementation:

**1**  **Identify the challenge landscape**

**2**  **Assess existing technology readiness in the payment ecosystem**

**3**  **Select the best-fit scenario that can address payment challenges and future readiness needs**

**4**  **Plan in line with people, process, and platform requirements identified**

## 2.4.1 STEP 1: Identify challenges across the payment life cycle

The need to implement smart payments must be assessed before planning. Therefore, as a first step, an implementing agency should evaluate the gaps and challenges in its payment processes. Different government agencies and users might face distinct challenges typical to their existing systems. For instance, one user might struggle to calculate the entitlement due, as they would not have access to all information/ variable required for calculating it. Another user may have automated their entitlement calculation but may face challenges in compliance verification. We suggest that the user map out their existing process in terms of the five stages and identify any challenges along the way. See Figure 8 for indicative challenges associated with the payment stages.

Notably, smart payments seek to address payment process-related challenges alone. The smart payments framework cannot cover any challenges beyond the control of the implementing agency itself, such as challenges post instructions to pay issued or delays in disbursements by banks or financial institutions.
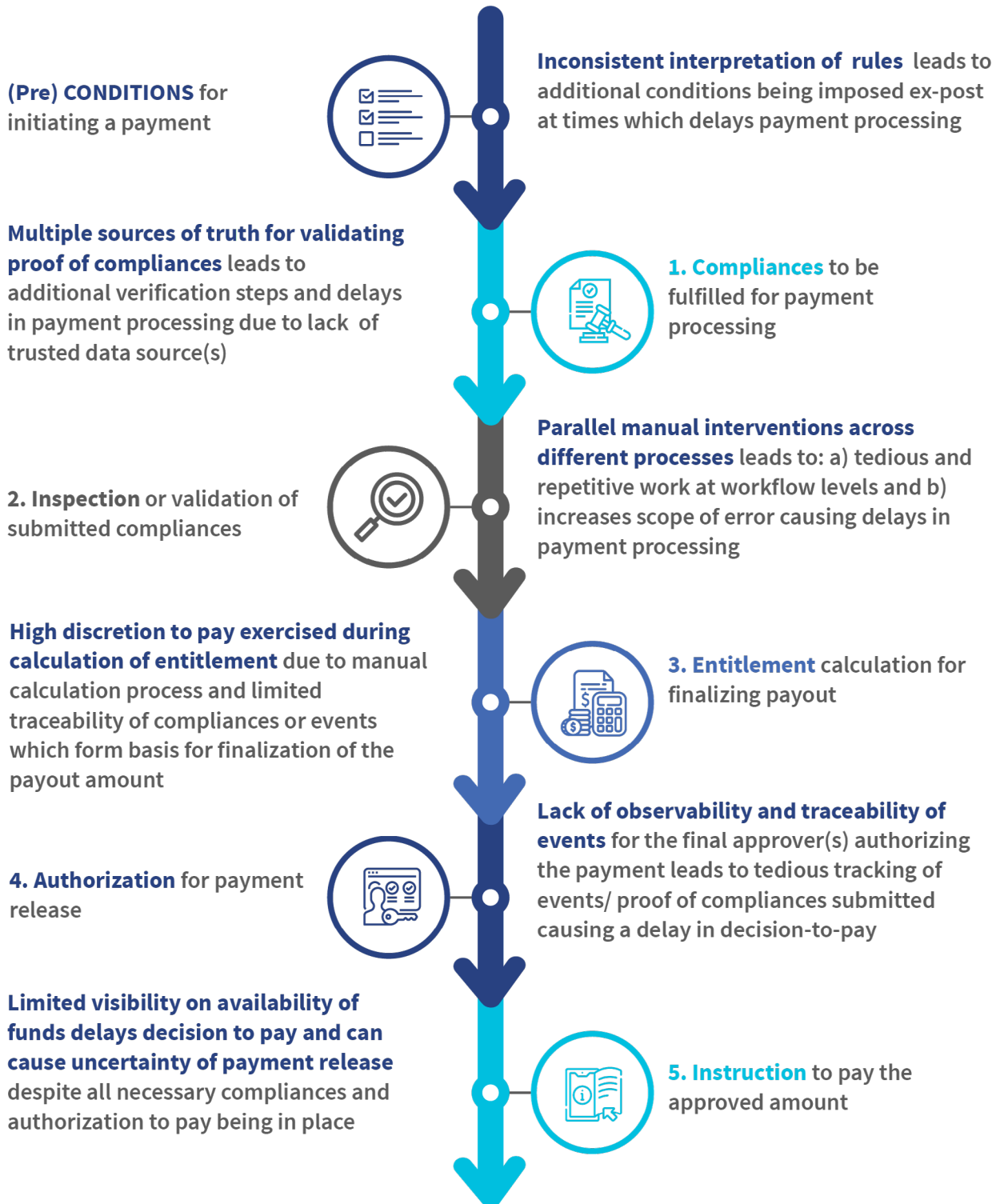
**(Pre) CONDITIONS** for initiating a payment

**Inconsistent interpretation of rules** leads to additional conditions being imposed ex-post at times which delays payment processing

**Multiple sources of truth for validating proof of compliances** leads to additional verification steps and delays in payment processing due to lack of trusted data source(s)

**1. Compliances** to be fulfilled for payment processing

**2. Inspection** or validation of submitted compliances

**Parallel manual interventions across different processes** leads to: a) tedious and repetitive work at workflow levels and b) increases scope of error causing delays in payment processing

**High discretion to pay exercised during calculation of entitlement** due to manual calculation process and limited traceability of compliances or events which form basis for finalization of the payout amount

**3. Entitlement** calculation for finalizing payout

**4. Authorization** for payment release

**Lack of observability and traceability of events** for the final approver(s) authorizing the payment leads to tedious tracking of events/ proof of compliances submitted causing a delay in decision-to-pay

**Limited visibility on availability of funds delays decision to pay and can cause uncertainty of payment release** despite all necessary compliances and authorization to pay being in place

**5. Instruction** to pay the approved amount

Figure 8: Indicative view of payment challenges mapped across the government payment process

> ## Box 3: Key questions to evaluate the challenge landscape
>
> 1. **What are the key challenges identified across different stages of the payment process?** (Use the challenge framework mentioned in Table 2 as reference)
>
> 2. **How do the challenges impact the payment process and cause delays?** (Use the challenge framework mentioned in Table 2 as reference)
>
> 3. **What are the reasons for these challenges in the payment process?** (For instance, unclear or redundant process guidelines or high administrative burden, capacity to deliver, inadequate system, or technology support, among others)
>
> 4. **Have any efforts been undertaken already to mitigate these challenges identified?** (Identify efforts or changes introduced in the existing processes in the past few years to reduce the gaps)

## 2.4.2 STEP 2: Assess the payment ecosystem's existing technology readiness

A government payment process generally relies on multiple IT systems to process payments. These could range from a simple program MIS (management information system) to an ERP (enterprise resource planning) solution or the use of smart devices, IoT, or M2M exchange. Given the complexity of government payment ecosystems, we understand that IT systems used tend to vary across payment types and geographies. In addition, they tend to be at different stages of maturity and offer varying levels of functionalities. Therefore, if the implementing agency plans to adopt smart payments, it must assess the existing technology landscape deployed for payment processing.

We identified four technology pillars to carry out such an assessment, which represent different aspects of payment processing needs and enabling solutions. An implementing agency can use this to understand its current state of readiness and desired future state for addressing identified payment challenges, both at the level of people or processes.

Table 4 below shows the technology capabilities relevant to each scenario. Users can consider the three scenarios and adopt one best suited to their needs based on the individual user journey and digital readiness. Different enabling solutions will facilitate the implementation of the smart payments framework for each technology pillar. See the annexes for a detailed explanation of each pillar.
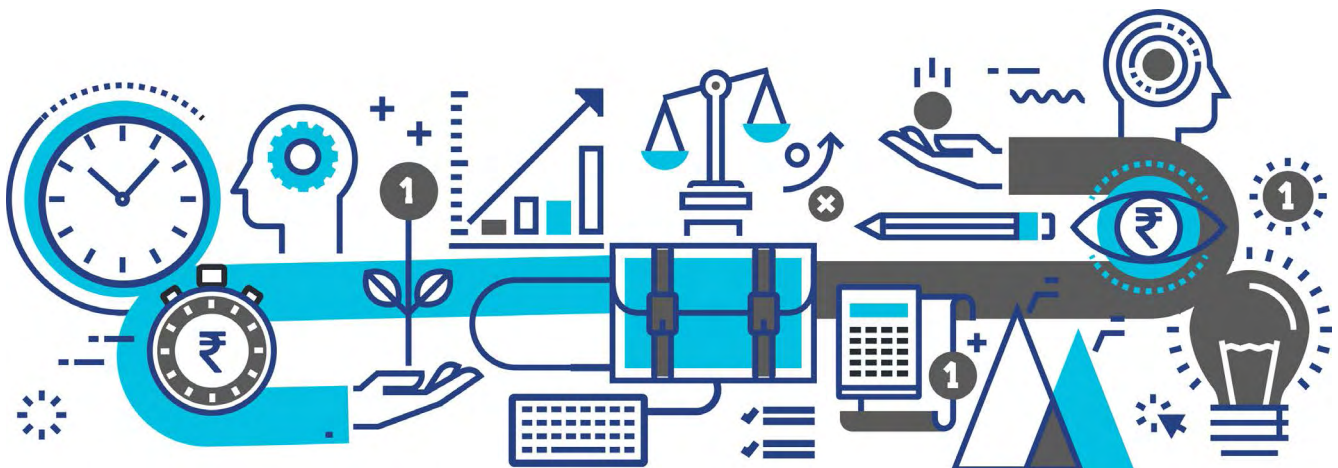
Table 4: Technology pillars to evaluate digital readiness for smart payments[15]

| Technology pillars | Basic | Intermediate | Ideal |
|---|---|---|---|
| **Scenarios** | The technology capabilities listed below allow traceability of the payment process workflow and events. They facilitate observability for officials involved in validation, entitlement calculation, and payment release. | Technology capabilities facilitate a near-autonomous payment process. They allow autonomous processing of compliance verification, validation, and entitlement calculation. They do not allow autonomous payment authorization and release. | Technology capabilities facilitate the autonomous execution of the entire payment process. They facilitate straight-through processing of payment condition compliance, entitlement calculation, authorization, and payment release. |
| **Digital and engaging experience**<br><br>Stakeholders should be provided with a digital channel, such as a web portal, mobile app, chatbot, etc., for anytime-anywhere access | • Access via digital channels for key stakeholders<br>• MIS reports<br>• Secure information access based on rights and privileges | • Access via digital channels for all stakeholders<br>• Static dashboards for data insights to decision-makers and policymakers<br>• Secure information access based on rights and privileges | • Anytime-anywhere, seamless access via digital channels for all stakeholders<br>• Dynamic dashboards for data insights to decision-makers and policymakers<br>• Secure information access based on rights and privileges<br>• Actionable insights |
| **Simplified processing**<br><br>Applications should be capable of system-based workflows and rule-based processing to improve service quality, reduce costs and time spent to provide services, and increase overall productivity. | • Workflow-based business processes<br>• System-based approvals and sanctions | • Integrated business processes workflows<br>• System-based approvals and sanctions<br>• Rule-based processing capability<br>• TAT measurement | • Simplified and integrated business processes through configurable and extensible workflows<br>• SLA-driven autonomous execution of transactions or events based on business rules for better productivity and informed decision-making<br>• Straight-through processing<br>• System-based approvals and sanctions |

---

[15] TAT: turnaround time; SLA: service-level agreement; OCR: optical character recognition; AI: artificial intelligence

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| Intelligent automation | | | |
|---|---|---|---|
| Users employ automation to complete tasks faster and with fewer resources. Process automation helps automate workflow execution by optimizing and digitizing features, such as OCR, AI, IoT, etc. | • Data is available in a digitized format<br>• The system captures user actions<br>• System-based calculations assist in payment-related decisions | • Online data entry by all stakeholders<br>• The system captures user actions<br>• System-based calculations to assist in payment-related decisions | • Paperless documents and online data entry<br>• Process automation to reduce human intervention as much as possible<br>• Automation of notifications and alerts<br>• Apps and IoT devices for inspections and data capture |
| **Platform approach**<br><br>A platform-based approach enables configurability, flexibility, and extensibility of the business features in a plugin-based design and enables isolation and extensions to the core functionalities. | • Capability for integration with other systems via API or data feeds<br>• Data security<br>• Single source of truth | • Standardized data, APIs, and interfaces for integrations across systems<br>• Data security<br>• Single source of truth<br>• Traceability for the user action | • Platform-based approach to enable integration, reuse, and extensibility<br>• Standardized data, APIs, and interfaces for flexible, extensible, and future-proof integrations across systems and devices<br>• Telemetry, monitoring, and tracing for better observability<br>• Data security<br>• Single source of truth |

## Box 4: Key questions to assess existing technology readiness in the payments ecosystem

1. **How do the stakeholders at the last mile record or enter field-level data when they implement the program?** (e.g., do the stakeholders record the beneficiary data manually in physical registers or via digital tools, such as mobiles, web platforms, etc.?)

2. **After recording of the data, is it visible to all the stakeholders in real time or after an interval of time?**

3. **Can IT systems be identified for program governance from the planning to implementation stage? If multiple systems exist, are they connected through existing digital linkages?**

4. **What is the level of functionality that you seek from the IT system to deploy the smart payments solution?** (See table 5 for the gradual advancement of solutions and the scenario most feasible to you based on your existing systems to plan the required enabling solutions)

5. **What changes or new IT systems need to be developed to roll out the smart payments system?**

## 2.4.3. STEP 3: Select the best-fit scenario that can address payment challenges and future-readiness needs

After an assessment of its current processes, an implementing agency needs to set priorities or a vision for future readiness. Based on this priority or vision, the user who implements smart payments can select their desired state to deploy smart payments between a basic, intermediate, and ideal scenario. Each scenario seeks to address challenges across the payment landscape and offers a certain level of digital maturity in systems or processes. The three scenarios are evolved keeping in mind that each user may not need a fully mature solution (ideal state of deployment), or the user may not have the desired resources or digital landscape to reach an ideal scenario and may settle for a basic or intermediate scenario.

Keeping these scenarios and benefits in view, the implementing agency can choose the best-fit scenario (see Table 5) to help the execution achieve its intended priority or vision while implementing smart payments.

Table 5: How each smart payments scenario benefits the payment process capability of a user

| Scenario | Increased locus of accountability | Increased payment process observability | Reduced discretion to pay | Reduced delay in the decision to pay |
|---|---|---|---|---|
| **Ideal:** Autonomous payment processing<br><br>All requirements of smart payments are met. | 👍 | 👍 | 👍 | 👍 |
| **Intermediate:** Near-autonomous payment processing<br><br>Only the requirements of payment conditions and entitlement finalization are met. | 👍 | 👍 | 👍 | 👎 |
| **Basic:** Observable and traceable payment process<br><br>Only the requirements of payment conditions processing are met. | 👍 | 👍 | 👎 | 👎 |

### 2.4.3.1 Ideal scenario: Autonomous payment processing

The ideal scenario meets all requirements (listed in table 3, section 2.1) for smart payments. The scenario seeks to create an ecosystem of autonomous execution of the payment process. An example of this is straight-through processing, which has growing precedence. Straight-through processing has become popular, especially in the case of business-to-person payment and income tax refunds processed and credited to an individual's bank account from the central direct taxes department in India.

The scenario seeks to address all critical challenges in payment processing and allows a user to minimize the administrative burden for officials responsible for ensuring compliance with the payment condition, calculation of entitlement, and approval or authorization of the fund release.

### 2.4.3.2 Intermediate scenario: Near-autonomous payment processing

This scenario typically retains all the benefits of an ideal scenario, barring its ability to address the delays and uncertainty related to the decision to pay. We recommend the intermediate scenario in a situation where decision-to-pay-related delays are minimal or negligible. This means a situation where payment approvals

are timely, but other aspects of the payment process, such as payment condition tracking, validation, and entitlement calculation, need streamlining to address payment delays.

### 2.4.3.3 Basic scenario: Observable and traceable payment process

A basic scenario is generally not a recommended approach to enable smart payments. However, the implementing user can explore it as a test-bed for the adoption of smart payments or deploy it when the primary concern for payment delays is the traceability of the payment process workflow and events. In this scenario, a user can reduce payment delays significantly through automation of the payment process. Automation would make the process more observable for officials concerned with validation or compliance of payment conditions, entitlement calculation, and final approval for release of payment.

**Box 5: Key questions to evaluate the best-fit scenario that can address payment challenges and future-readiness needs**

1. **What steps do you plan to undertake to overcome the challenges identified in step 1?**

2. **Which is the best-fit scenario for you, based on your assessment of the challenges and your department's individual requirement?** (See table 4 to understand the extent of reform in each of the three scenarios)

3. **What innovations or interventions does your department plan to roll out in the future to optimize the implementation of the smart payments solution?**

4. **What is the scale of observability, traceability, and autonomy the department expects to provide after it implements smart payments?**

5. **Does the department have enough financial resources available to implement the smart payments solution?**

## 2.4.4. STEP 4: Plan for people, process, and platform requirements

A three-dimensional view of people, processes, and platforms  (see box below) is critical to the implementation of smart payments. We recommend a comprehensive planning exercise before the actual implementation. See Table 6 for the interventions needed under each dimension to implement the framework.

## Box 6: Basic technology infrastructure is a critical prerequisite to the implementation of a smart payments framework[16]

he adoption of digital technologies is essential to facilitate easy access and processing of millions of transactions, which range from very low to high values. Countries seek accountability for public funds, transparency for timely and reliable information around fund flows, and predictability to take informed decisions around fund use. Public financial management systems in countries, therefore, must have a basic technology platform in place, such as a centralized digital workflow or MIS, to implement the smart payments framework.

A central digital tool for public financial management is a prerequisite in the government's financial ecosystem before it can plan to implement the smart payments framework. Such a tool should permit digital payment, accounting, and reconciliation of government transactions, and serve as a process management tool.

One instance of such a tool is the Public Financial Management System (PFMS) introduced in India by the Controller General of Accounts (CGA) in 2009 to track the release of funds under the planned government programs. It is now key for transferring funds to beneficiaries through direct benefit transfer (DBT) to their bank accounts, for fund flow management, and to track receipts and accounting.

Step 4 in smart payment implementation planning is primarily included to ensure that the key stakeholders involved in the payment process accept and adopt the selected solution. Accordingly, the proposed plan should cover necessary interventions or activities, ensuring a swift transition from the current to the desired state.

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[16] MicroSave Consulting (2020) Public Financial Management System. Ideas and lessons from India

Table 6: Indicative view of three-dimensional planning for effective smart payment system

| Dimension | People | Process | Platform |
|---|---|---|---|
| Changes | Any changes in the roles or responsibilities of the officials involved in the payment process | Any changes in the payment process itself or the standard operating procedures (SOP) being followed | Any changes in the existing IT system or inclusion of new IT systems to facilitate payment processing |
| Interventions to manage change | • Certifications, training, and periodic assessments of personnel<br>• Role benchmarking as per transparent and predefined parameters<br>• Incentive models for executing personnel or users<br>• Creating a group of reform champions and advisors to steer change management | • Drafting new processes or guidelines or re-engineering existing ones to sustain smart payment<br>• Using circulars and official communication channels to ensure officers are made aware that the locus of accountability is limited to the specific role that they are entrusted to carry out | • Observable payment conditions and verification or validation protocols<br>• Trusted data sources or trust scoring for existing data sources<br>• Automated, digitized rules for entitlement calculation<br>• Integration of platforms with payment gateways and dashboards or MIS, etc.<br>• Dynamic query engine to ring-fence queries or exceptions |

The following section (Section 3) provides a detailed view of the prerequisites and what each of them entails. The section also provides an abstract smart payments framework, which can be applied to any of the three government payment scenarios (G2G, G2B, and G2P).

**People:** Senior leaders in New Zealand were introduced to best practices in digital innovation through a daylong executive class, along with a live hackathon that consisted of digitizing citizen interactions.

**Process:** Mexico's Law to Regulate Financial Technology has stipulated the formation of a Financial Innovation Group to plan development and regulation systematically. The group consists of members of the Ministry of Finance and Public Credit and Bank of Mexico, among others.

**Platform:** The UK government has facilitated a single website – gov.uk, which consists of all 24 ministerial departments and 331 other agencies and public bodies

## Box 7: Key questions to identify the people, process, and platform requirements

1. **What key challenges do you expect your department officials to face when they adapt to the smart payments framework?**

2. **How do you plan to conduct the training and capacity building of officials to deploy new solutions?**

3. **How can you identify existing processes and guidelines that need to be modified to implement the smart payments framework?**

4. **What is the level of access and clearances different stakeholders have when they handle program-related data? Do the program guidelines clearly define the roles and responsibilities related to program-level data?** (E.g., does it clearly define who can enter, edit, or delete data?)

It would be prudent for the reader to carry out the four steps explained above for an effective implementation exercise in smart payments. The subsequent sections provide details on a practical approach to implement the smart payments solution for any type of government payments. The sections also examine the solution's implementation with specific use cases across each payment type (G2G, G2B, and G2P).

# Section 3:
# Smart payments framework to automate government payments

## 3.1. Smart payments framework for government payments

### 3.1.1 Prerequisites to smart payments in government payments

The implementing agency must keep particular prerequisites in mind when it builds the foundation to implement smart payments, which would help automate the flow of funds from the fundholder to the payee. The payee might be another government tier or department, business or contractor, or individual. These prerequisites are characterized by the 3Ps—people, process, and platform. We have highlighted practical points under each prerequisite in the following section.

"People" refers to the changes needed at the stakeholders' level, whether they are fundholders, approvers, or end beneficiaries. "Process" outlines the specific actions and steps needed to bring the change. These could encompass specific changes around legislation, specific project guidelines, or any other process improvement to facilitate the implementation of the smart payments framework. Lastly, "platform" refers to the technological aspect that would be revisited in this scenario to bring about the change, namely automation.

Table 7: Prerequisites for smart payments implementation in government payments

| Prerequisites to implement smart payments | |
|---|---|
| **People** | |
| **Payee setup** | • Valid documents for fund transfer from the respective government department (sub-national or local government), contractor or individual are available in a digitized format<br>• The payee's bank account setup is complete |
| **Personnel training** | • Relevant personnel are trained and oriented to carry out functions through the digital channel |
| **Process** | |
| **Payment details and payment schedule** | • Project-specific details such as payment terms and work completed, among others are available in a digital format<br>• Payment milestones or payment schedules are available in a digital format |
| **Eligibility conditions** | • Authorization of the respective government authority to allocate the payment amount under a specific program or project is available in a digital format |
| **Entitlement conditions** | • Requirements for calculating and validating the payment claim raised by the respective beneficiary or payee in compliance with the project details are available in a digital format |
| **Platform** | |
| **Integration with other systems** | • Integration of APIs or data feeds of various online digital channels with other systems |
| **Single source of truth** | • Data pulled in from a single source through a digital interface, such as mobile, web, or telemetry devices |

## 3.1.2 Smart payments framework to automate government payments

The smart payments implementation framework comprises detailed parameters for each of the five stages under smart payments. These five stages include compliance, inspection, entitlement calculation, authorization to pay, and instructions to pay. All three states—basic, intermediate, and ideal—have defined parameters for each stage in the payment process. A user can use the smart payments implementation framework to map the journey of their current process and explore if and how they want to progress to the next stage.

A user may select any end state to implement the smart payments solution for each of the five payment stages among the following:

- **Basic state:** Steps A1 to A9 include the smart payments implementation parameters for basic state (refer to Table 8)

- **Intermediate state:** Steps B1 to B15 include the smart payments implementation parameters of the steps in the basic state and incremental changes to achieve the intermediate state (refer to Table 9)

- **Ideal state:** Steps C1 to C18 include the smart payments implementation parameters of the intermediate state and incremental changes to achieve ideal state (refer to Table 10

### Box 8: Navigating the smart payments framework

**The user journey may fall under different states (basic, intermediate, or ideal) for each stage of smart payment, both for the current process and the desired state. For instance, a user's current process might fall under the basic state for compliance and intermediate state for inspection. The user might desire to progress to the ideal state for compliance stage and remain at intermediate ideal state for entitlement calculation stage. Therefore, a user does not necessarily have to be at the same state for each stage of the payment lifecycle. Their states can vary based on their technological readiness and appetite for digital adoption. Please refer to Figure __ for an illustrative example.**

| Payment stages | Basic | Intermediate | Ideal |
|---|---|---|---|
| Compliance | X | | Y |
| Inspection | | X | |
| Entitlement calculation | | X | Y |
| Authorisation to pay | X | Y | |
| Instructions to pay | | | X |

| | | | |
|---|---|---|---|
| X | Y | | |

Figure 9: Illustrative example of the end states of smart payments framework adoption based on user's desirability

We have outlined the smart payments implementation framework for the basic state across payment stages below:

Table 8: Basic smart payments framework to automate government payments

| Payment stage | Parameters |
|---|---|
| Compliance | **A1:** All compliance data for payment claims are submitted through a digital interface available to the user responsible for submitting the claim or invoice. These could be mobile, web, or telemetry devices.<br><br>**A2:** All conditional compliances submitted as part of the payment claim are digitally verifiable as per defined benchmarks (e.g., 80% coverage of water supply in a city is achieved) |
| Inspection | **A3:** The process is automated with a digital workflow system to complete the allocation of tasks for officials that oversee inspection or approval<br><br>**A4:** An integrated workflow system will trigger stage-wise processing for:<br><br>a) Sending alerts at each stage as per the predefined schedule<br><br>b) Entitlement calculation upon completion of the inspection process |

| | |
|---|---|
| **Entitlement calculation** | **A5:** A rule-based engine executes entitlement calculation using predefined if-then-else scenarios on data captured through integrated digital platforms |
| | **A6:** A digitized business process using workflow systems to: |
| | a) Calculate adjustments (against conditional compliances) |
| | b) Calculate the amount of entitlement due after adjustments |
| | d) Record the entitlement amount and calculation details |
| | **A7:** Final auto-calculated entitlement is recorded on a digital workflow system post edit or query resolution or expiry of predefined turn (in case no action is initiated by the officials responsible for review), providing observability to final approvers and the user who submitted the claim request |
| **Authorization to pay** | **A8:** The final approvers use a digital interface to reject or query the claim requests in case of a conflict. They provide the reason for the query or rejection and clarification sought from respective stakeholders within a predefined turnaround time (TAT) and are responsible for: |
| | a) Conditional compliance submission |
| | b) Inspection and validation |
| | c) Entitlement calculation |
| **Instructions to pay** | **A9:** After the payment's authorization, an integrated digital workflow system triggers the following action: |
| | a) Submits a request for manual instructions to pay (e.g., payment voucher or scroll or bill) in a standardized format via standardized integration to the payer's (i.e., government authority or agency) bank account for funds to schedule payment within 24 hours |

A user that selected the intermediate state to implement the smart payments solution would need implementation of all parameters in the basic state, as well as additional parameters, as mentioned below:

Table 9: Intermediate smart payments framework to automate government payments

| Payment stage | Parameters |
|---|---|
| **Compliance** | **B1:** All compliance data for payment claims are submitted through a digital interface available to the user responsible for submitting the claim or invoice |
| | **B2:** All conditional compliances submitted as part of the payment claim are digitally verifiable as per defined benchmarks. For example, 80% coverage of water supply in a city is achieved |
| | **B3:** A system-based compliance check is carried out for receipt of payment claims or periodic payment claims as per a system-defined payment schedule |
| | **B4:** A digital workflow system integrated with the notification engine triggers periodic alerts for the completion of compliance submission to the payee as part of the payment claim or invoice |

| | |
|---|---|
| **Inspection** | **B5:** The process is automated with a digital workflow system to complete the allocation of tasks for officials that oversee inspection or approval |
| | **B6:** An integrated workflow system will trigger stage-wise processing for: |
| | a) Sending alerts at each stage as per the predefined schedule |
| | b) Entitlement calculation upon completion of the inspection process |
| | **B7:** Designated officials responsible for validation use a digital interface for inspection and decision-making |
| | **B8:** Designated officials perform validation actions (reject or edit) on the compliances submitted, and provide remarks or reasons in real time, based on the authorization matrix |
| **Entitlement calculation** | **B9:** A rule-based engine executes entitlement calculation with predefined if-then-else scenarios on data captured through integrated digital platforms |
| | **B10:** A digitized business process using workflow systems to: |
| | a) Check delays recorded against claim requests and compliance submissions |
| | b) Calculate adjustments (against conditional compliances) |
| | c) Calculate the amount of entitlement due after adjustments |
| | d) Record the entitlement amount and calculation details |
| | e) Trigger an alert to officials responsible for review of entitlement calculation, such as finance officer |
| | **B11:** Final auto-calculated entitlement is recorded on a digital workflow system post edit or query resolution or expiry of predefined turn (in case no action is initiated by the officials responsible for review), to provide observability to final approvers and the user who submitted the claim request |
| **Authorization to pay** | **B12:** A predefined escalation matrix enables auto-approval within the digital workflow system in the event of "no action" from the final approvers within a predefined TAT |
| | **B13:** The final approvers use a digital interface to reject or query the claim requests in case of a conflict. They provide the reason for query or rejection and clarification sought from respective stakeholders within a predefined TAT and are responsible for: |
| | a) Conditional compliance submission |
| | b) Inspection and validation |
| | c) Entitlement calculation |

MSC

| Instructions to pay | **B14:** After the payment's authorization, an integrated digital workflow system triggers the following action:<br><br>a) Submits a request for manual instructions to pay (e.g., payment voucher or scroll or bill) in a standardized format via standardized integration to the payer's (i.e., government authority or agency) bank account for funds to schedule payment within 24 hours<br><br>**B15:** The payer uses a single dedicated bank account for the disbursement of approved payment claims (i.e., G2G, G2B, or G2P), which allows:<br><br>a) Auto-update on the status of payment disbursement and transaction details in real time on the payer's defined digital workflow system |
|---|---|

A user who selected the ideal state to implement the smart payments solution would need the implementation of all parameters in the intermediate state and additional parameters, as mentioned below:

Table 10: Ideal smart payments framework to automate government payments

| Payment stage | Parameters |
|---|---|
| **Compliance** | **C1:** All compliance data for payment claims are submitted through a digital interface available to the user responsible for submitting the claim while ensuring primary data input at the source<br><br>**C2:** All conditional compliances submitted as part of the payment claim are digitally verifiable as per defined benchmarks (e.g., 80% coverage of water supply in a city is achieved)<br><br>**C3:** A system-based compliance check is carried out for receipt of payment claims and compliance submissions necessary against milestones or periodic payment claims as per a system-defined payment schedule<br><br>**C4:** A digital workflow system integrated with the notification engine triggers the following actions for the payee to submit payment claim and compliances:<br><br>a) Periodic alerts for (i) a payment request and compliance submission due and (ii) upon completion of compliance submission<br><br>b) A delay log to record delays in the submission of claim requests and conditional compliances |

| Inspection | **C5:** The process is automated with a digital workflow system to complete the allocation of tasks for officials that oversee inspection or approval, with complete observability of each step while processing |
|---|---|
| | **C6:** A rule-based engine performs the first level of validation check after the submission of compliance based on predefined acceptance or rejection criteria |
| | **C7:** An integrated workflow system will trigger stage-wise processing for: |
| | a) Listing non-compliances on claim requests and compliance submission |
| | b) Sending alerts at each stage as per the predefined schedule and escalation mechanism for actions taken and required |
| | c) Logging the delay across the inspection process and different stages of validations |
| | d) Entitlement calculation upon completion of the inspection process |
| | **C8:** Designated officials responsible for validation use a digital interface (web or mobile) or telemetry devices, or both |
| | **C9:** Designated officials perform validation actions (reject or edit) on the compliances submitted and provide remarks or reasons in real time based on the authorization matrix |
| **Entitlement calculation** | **C10:** A rule-based engine executes entitlement calculation with predefined if-then-else scenarios on data captured through integrated digital platforms |
| | **C11:** A digitized business process using workflow systems to: |
| | a) Check validations and approvals against each conditional compliance |
| | b) Check delays recorded against claim requests and compliance submissions |
| | c) Calculate adjustments (against advances or penalties for delay or taxes) |
| | d) Calculate the amount of entitlement due after adjustments |
| | e) Record the entitlement amount and calculation details |
| | f) Trigger an alert to officials responsible for review of entitlement calculation (e.g., finance officer) |
| | **C12:** Officials responsible for reviewing entitlement calculation, such as finance officers, use a digital interface to take suitable action (edit or query with remarks or reasons as suitable) within predefined SLAs or timelines. This also provides observability of the entitlement calculation process. |
| | **C13:** Final auto-calculated entitlement is recorded on a digital workflow system post edit or query resolution or expiry of predefined turn (in case no action is initiated by the officials responsible for review). This provides observability to final approvers and the user who submitted the claim request. |

| | |
|---|---|
| **Authorization to pay** | **C14:** A digital workflow system triggers or assigns tasks after the entitlement calculation process:<br><br>a) To final approvers: request a review of the payment claims and take necessary action (reject or query) in a time-bound manner;<br><br>b) To integrated bank accounts used for financing the disbursement of claims: for blocking funds in line with predefined digital authority to pay<br><br>**C15:** A predefined escalation matrix enables auto-approval within the digital workflow system in the event of "no action" from the final approvers within a predefined TAT<br><br>**C16:** The final approvers use a digital interface to reject or query the claim requests in case of a conflict. They provide the reason for query or rejection, and clarification sought by respective stakeholders within a predefined TAT and are responsible for:<br><br>a) conditional compliance submission<br><br>b) inspection and validation<br><br>c) entitlement calculation |
| **Instructions to pay\*** | **C17:** After the payment's authorization, an integrated digital workflow system triggers the following actions:<br><br>a) Submits digitally signed instructions to pay (e.g., payment voucher or scroll or bill) in a standardized format via standardized integration to the payer's (i.e., government authority or agency) bank account for funds to schedule payment within 24 hours<br><br>b) Alerts the user who submitted the claim request around the completion of the payment process and estimated timeline within which funds will be disbursed<br><br>**C18:** The payer uses a single dedicated bank account for the disbursement of approved payment claims (i.e., G2G, G2B, or G2P), which allows:<br><br>a) Predefined digital authority to pay for the final approver<br><br>b) Auto-update on the status of payment disbursement and transaction details in real time on the payer's defined digital workflow system |

*Integration of the "just-in-time" (JIT) funding component to instructions to pay allows the automatic funding of an account in real time during the transaction process. It eliminates the.

Problem of parking funds in commercial banks by transferring them directly from the payer to the payee. JIT funding can be facilitated through[17]:

i) Mapping of a transaction-based workflow in the PFMS or IFMS;

ii) Machine-to-machine exchange protocols that can be carried out through API integration with PFMS or IFMS;

iii) Digitized authority to pay;

iv) Real-time transactions with automated reconciliation and UC generation.

The above framework provides an abstract stage-wise implementation framework for the smart payments Solution, which can be applied to either of the three types of government payments, which include G2G, G2B, and G2P. The number of approval stages and officials involved in each stage, especially inspection and authorization to pay stages, would vary based on the nature of the payment—G2G, G2B, or G2P—and whether it is part of a national or sub-national government-sponsored program. There might be a higher number of approval stages and officials for fund flows from national government agencies where subnational authorities are also involved in the approval and routing of the fund flows to the end beneficiary, compared to directly sponsored national government programs. In each scenario, the smart payments solution can be tailored to incorporate the necessary number of approval stages for the fund transfer process.

[17] While these features form the essential components of JIT funding, the detailed parameters have not been integrated into the smart payments framework for the purpose of this playbook and would require a more detailed framework for its effective implementation.

# Section 4:

# A G2G payments use case: Grants-in-aid for local bodies from the Ministry of Housing and Urban Affairs (MoHUA) in India

This section explores the implementation of the smart payments framework laid out in the previous section to the flow of funds under the grants-in-aid from MoHUA to local bodies. These grants-in-aid form the pool of funds recommended by the Finance Commission in India.

## 4.1. An overview of the 15th Finance Commission grants for local bodies (MoHUA)

The Finance Commission is periodically constituted, usually every five years, to recommend sharing of taxes between the central and state governments. The 15th Finance Commission recommended measures to augment the states' consolidated funds to supplement the resources of the *panchayats*[18] and municipalities[19] during 2020-25. The commission has recommended INR 38,196 crore (USD 4.06 bn) for million-plus cities (MPCs) and INR 82,859 crore (USD 9.98 bn)[20] for non-million-plus cities (NMPCs) over the five-year award period from 2021-22 to 2025-26. However, the devolution of a portion of the grants to the local bodies may depend upon certain eligibility conditions.

## 4.2. Conditions for grant disbursal

The pool of funds for urban local bodies (ULBs) is either tied or untied to certain conditions and sectors. These funds are allocated as follows:

- **For MPCs:** Over the five years, 100% of the amount awarded is tied to performance-based grants. One-third of the grants are to achieve ambient air quality. The remaining two-thirds of the grant are for meeting service-level benchmarks (SLBs) on drinking water supply, including rainwater harvesting and water recycling, solid waste management, and sanitation.

- **For NMPCs:** Of the total awarded amount (USD 11 bn), 40% of the funds are untied, and 60% are tied to national priorities of drinking water, rainwater harvesting, solid waste management, and sanitation.

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[18] Panchayats are rural local governing bodies that form the third tier of governance in India

[19] Municipalities are urban local governing bodies that form the third tier of governance in India

[20] At USD 1 = Rs. 83

# i. Mandatory conditions for all ULBs (both MPCs and NMPCs)

Table 11: Conditions for the 15th FC grant disbursal to MPCs and NMPCs

| S. No. | Grant condition |
|---|---|
| 2.1 | Linking of ULB account for the 15th FC Grant with PFMS |
| 2.2 | Grant transfer certificate in the format specified by the Department of expenditure along with the claims for grants |
| 2.3 | Detailed utilization report for the previous installments of the 15th FC grant |
| 2.4 | ULBs to prepare and make available online in the public domain[21] annual accounts of the previous year and duly audited annual accounts of the year before previous |
| 2.5 | ULBs to publish online[22] all 28 service-level benchmarks and target for the year |
| 2.6 | States to notify property tax floor rates |
| 2.7 | ULBs to show consistent improvement in the collection of property taxes in line with the growth rate of the state's own GSDP (gross state domestic product) |
| 2.8 | States to strengthen their State Finance Commission (SFC), and its recommendations and action taken reports to be tabled in state legislatures by March 2024 |

Both MPCs and NMPCs have to identify and undertake projects for water conservation measures besides the mandatory conditions outlined above.

# ii. Million-plus cities challenge fund (conditional grant)

The reviewer assesses cities' performance based on eight service-level indicators. The Ministry of Finance (MoF) and MoHUA recommend the final share of the grant to be disbursed to the ULBs based on the marks attained out of 100. The performance-based service-level indicators for MPCs include:

| 1 | Service-level indicators for water supply and sanitation |
|---|---|
| 1.1 | Households covered with piped water supply |
| 1.2 | Water supplied in liter per capita per day (lpcd) |
| 1.3 | Reduction in non-revenue water (NRW) |
| 1.4 | Household covered with sewerage or septage services |
| 2 | Service-level indicators for solid waste management |
| 2.1 | Garbage-free star rating of the cities |
| 2.2 | Coverage of water supply for public or community toilet |

Benchmarks are given for each service-level indicator, and marks are awarded accordingly. Weighted scores are given for calculating marks for garbage-free star ratings of cities. Grants are disbursed based on the final marks attained by each ULB.

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[21] On www.cityfinance.in—the national platform for municipal finance developed by the nonprofit, Janaagraha, for the Ministry of Housing and Urban Affairs.

[22] On www.cityfinance.in

## 4.3. The as-is process for the 15th Finance Commission grant disbursal to local bodies

The current 15th FC grant disbursal process to ULBs requires a significant amount of manual intervention by each of the stakeholders involved in the process. It results in tedious verification checks, high individual discretion, and substantial administrative burden given the nature of grants to be disbursed, which are significant in both volume and value. Grants to ULBs are released in a single installment each year for MPCs and in two equal installments each year in June and October for NMPCs, based on the verification and eligibility checks carried out by the relevant authorities for each ULB. See Figure 10 for an overview of the as-is process.

Table 12: 15th FC grant stakeholders and their functions

| 15th FC grant disbursal to urban local bodies | | |
|---|---|---|
| **Role** | **Actor** | **Functions** |
| **Central level** | | |
| Granting authority | 15th Finance Commission (15th FC) | • Allocates grants-in-aid for local bodies<br>• Gives recommendations for tied (conditional) and untied (non-conditional) grants to local bodies |
| Fund holder | Ministry of Finance (MoF) | • Owner of PFM systems<br>• Debits central government account and transfers money to the state government account based on the recommendation received by the nodal ministry |
| Nodal agency | Ministry of Housing and Urban Affairs (MoHUA) | • Prepares guidelines for states and ULBs regarding specific conditions and distribution and release of grants to local bodies<br>• Receives and approves recommendations from the state government after validation checks<br>• Calculates entitlement due to each state based on the eligibility of grants<br>• Recommends release of grants to MoF |
| **State-level** | | |
| Fund receiver or regulator | State government | • Validates and approves compliance checks received by FC PMU on the cityfinance* portal<br>• Recommends release of grant to nodal ministry (MoHUA)<br>• Calculates entitlement due to each local body based on SFC recommendations or area or population ratio<br>• Releases funds received by MoF to the local body |

| Monitoring and evaluation | FC PMU (Finance Commission Project Management Unit) (through the cityfinance portal) | • Validates and inspects compliance checks received from the local bodies by the state government on the cityfinance* portal<br>• Recommends the release of grants to state government |
| --- | --- | --- |
| **ULB level** | | |
| Utilizer or payee | ULB (MPCs and NMPCs) | • Records service-level benchmark indicators in the city<br>• Submits requisite documents and information to state government<br>• Submits grant request to state government |

*The cityfinance portal is a digital platform created by Janaagraha to record and validate the information submitted by local bodies for the release of the 15th FC grants.
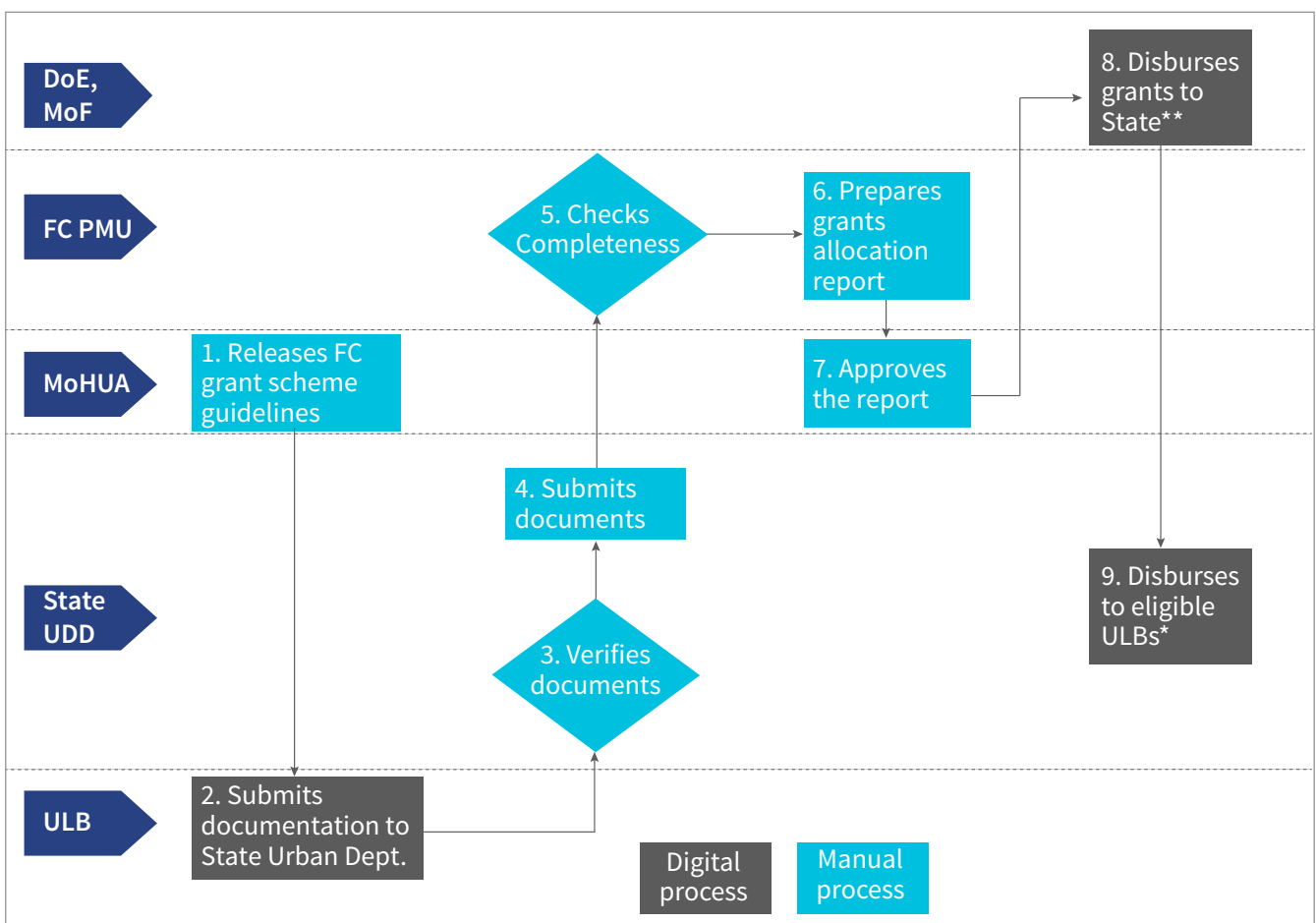


Figure 10: As-is process of the 15th FC grants disbursal

*Proposed via cityfinance portal

** via PFMS/State banking systems

The grant disbursal process involves many challenges in its current state. These challenges are outlined below:

- **Massive paper trail:** ULBs make manual submissions on the cityfinance portal, thereby creating a massive paper trail as part of the process

- **Huge administrative burden:** The large volume of claim documents, as well as lack of machine readability for them, results in a vast administrative burden while verifying them

- **Claim entitlements prone to tampering:** Authorities calculate claim entitlements manually through MS Excel, and these can be tampered with

- **Lack of transparency or observability of data:** The status of a claim or payment process and fund release is not visible to any of the different stakeholders at the ULB, state, or central level

- **Massive delays:** Timelines are not adhered to, and delays are witnessed in the release of payments to ULBs beyond 2-4 months

Implementing smart payments to the grant disbursal process for 15th FC funds would help eliminate most of these challenges by providing digital verification or validation of several payment conditions and through near-autonomous calculation and execution of payments. These conditions each have their own benchmark indicator.

## 4.4. Proposed smart payments framework for automation of the 15th FC grant disbursal process

Smart payments involve digital tracking of conditions, validated system workflow, and autonomous payment release when all the conditions are digitally met. These three functions help meet the challenges highlighted in the current grant disbursal process through automated claim processing. They provide real-time visibility of the claim or payment workflow, validate claims through system-defined if-then-else scenarios, generate a system-generated compliance score for entitlement calculation, time-bound processing, and approval matrix. Finally, the autonomous payment release is triggered.

## 4.4.1 Proposed workflow to facilitate smart payments

The deployment of smart payments solutions will require tweaks to the current process workflow in 15th FC grant disbursals. Figure 11, below, highlights how the framework can apply to the existing process when we adopt an ideal scenario to implement smart payments:

1.  The nodal ministry (MoHUA) releases program guidelines with pre-defined timelines, conditional compliances, and an approval matrix. These rules are encoded through an if-then-else algorithm in the smart payments engine.

2.  Once the state or ULB submits the requisite documents or receives them via API integration within the pre-defined timeframe, the payment processing algorithm is triggered through the smart payments system. The system triggers any objections and notifies them to the submitting agency.

3.  The rules-based engine retrieves data from trusted sources. It sends instructions to the central treasury or the MoF-designated bank account to block funds for payment.

4.  The smart payments engine runs if-then-else scenarios to check eligibility, validate compliances, auto-calculate entitlements, and inform MoHUA PMU or the accounts department.

5.  The PMU or accounts department can review or query entitlement calculations and trace the source of concern. A new event is triggered if an objection is raised. This creates an exception management loop.

6.  If the PMU or accounts department does not raise objections within a pre-defined turn-around time (TAT), the rules-based engine informs the authorized approver at MoHUA about the final entitlement or payment. The authorized approver can also raise queries in case any issues are identified.

7.  After MoHUA's approval, the authorized approver at the MoF learns about the final payment to be

released along with instructions to pay and details. This includes the basis of the payment calculation. If any concerns persist, the approver can also raise objections or queries within a pre-defined TAT.

8. If no objections or queries are raised within this pre-defined TAT, the payments are considered acceptable. The system on the cityfinance portal records the details with the updated status, and the concerned ULB is informed.

9. The engine generates a digitally signed payment advice, voucher, or scroll. Then, it sends it for payment processing or fund transfer within 24 hours through PFMS or eKuber[23] . Their API is integrated with the system. The ULB receives funds in the account linked with PFMS.
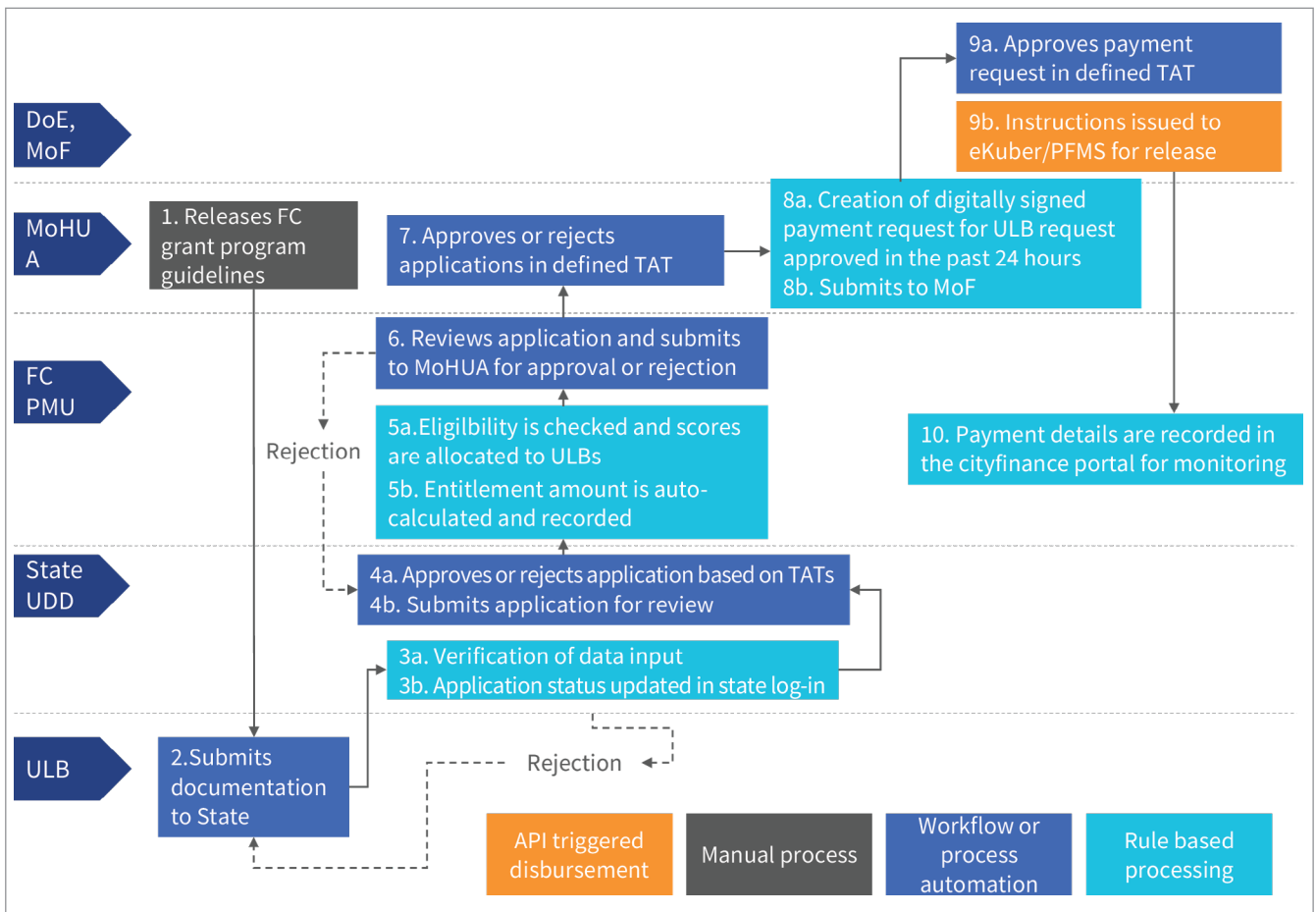


Figure 11: Proposed workflow after the implementation of smart payments in the 15th FC grant automation

The deployment of smart payments can be built further on the existing systems as the 15th FC grants have already been disbursed through a system that includes the cityfinance portal. While the cityfinance portal is a digital platform which allows documents to be uploaded, it is done manually. Specific features of the smart payments system can be mapped for each scenario of the implementation of smart payments—basic, intermediate, and ideal. This helps understand the level of digitalization that the grant disbursal process can potentially achieve.

A basic deployment scenario would only entail integration with the cityfinance portal. An intermediate scenario would include the basic parameters alongside API integration with MoHUA's program, MIS. Finally, the ideal deployment scenario will comprise parameters in both prior categories and API integration across all relevant internal and external systems, which include the PFMS.

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[23] eKuber is the electronic core banking solution of the central bank and regulatory body in India—RBI (Reserve Bank of India).

# Section 5:

# A G2B payments use case: PMGSY, a centrally sponsored program for states from the Ministry of Rural Development (MoRD) in India

This section explores the implementation of the smart payments framework designed and laid out in section 3 to the flow of funds disbursed by the Ministry of Rural Development (MoRD) to the states under the *Pradhan Mantri Gram Sadak Yojana* (PMGSY). The funds released under the program provide the states with the necessary support to construct all-weather roads to ensure connectivity to eligible unconnected habitations.

## 5.1. Overview of the program and funds disbursed by the MoRD to the states

### Institutional overview

The MoRD set up an autonomous body, the National Rural Infrastructure Development Agency (NRIDA), to implement and oversee the PMGSY program efficiently. As showcased in figure 12, the NRIDA executes and monitors the program in its current form via a three-tier structure as follows:

a) **Tier 1 (national level)**: The NRIDA at the center is responsible for overseeing the program's implementation across the country.
b) **Tier 2 (state level)**: The State Rural Road Development Agency (SRRDA) is responsible for overseeing the program's implementation in their respective state.
c) **Tier 3 (district level)**: The District Project Implementation Unit (DPIU) is responsible for the program's implementation at the last mile in each district.

**Note:** Several other agencies (as highlighted in the infographic) operate at various levels of the tiers mentioned above to ensure the program's efficient and timely implementation.
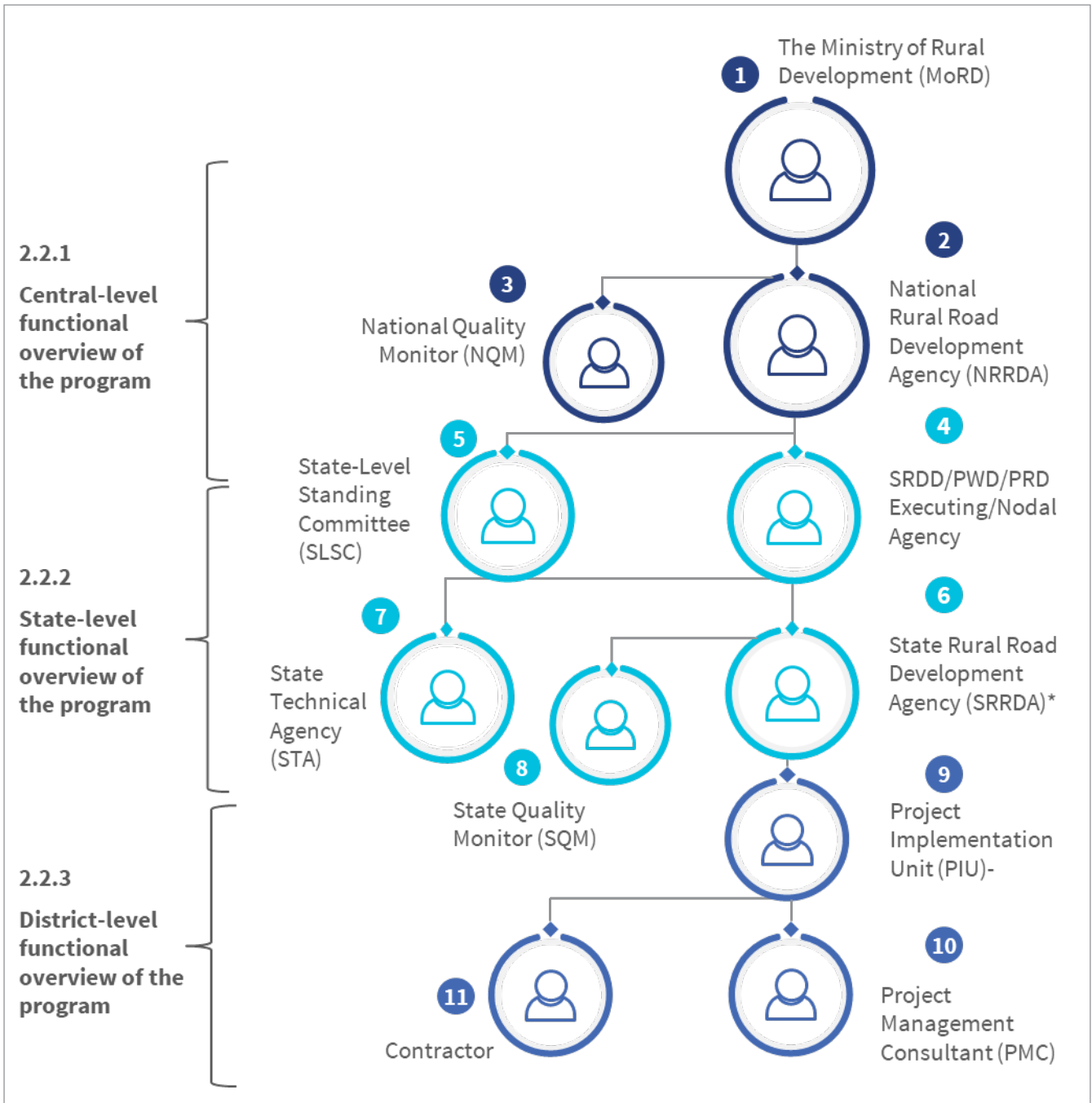
Figure 12: Institutional overview of the PMGSY program

## 5.2. Program implementation overview (as-is scenario)

Like any other infrastructure project, the PMGSY program is divided into two phases: The construction phase and the maintenance phase. The construction phase is usually completed within a year, after which the road enters the maintenance phase for the next 10 years. Both phases are executed on a separate set of operating principles. Different IT systems plan and monitor each phase to ensure smooth and efficient operations. The Online Management, Monitoring and Accounting System (OMMAS) monitors the construction phase, whereas the electronic Maintenance of Rural Roads under PMGSY (e-MARG) manages the maintenance phase. The graphic below provides an overview of the activities in both phases.
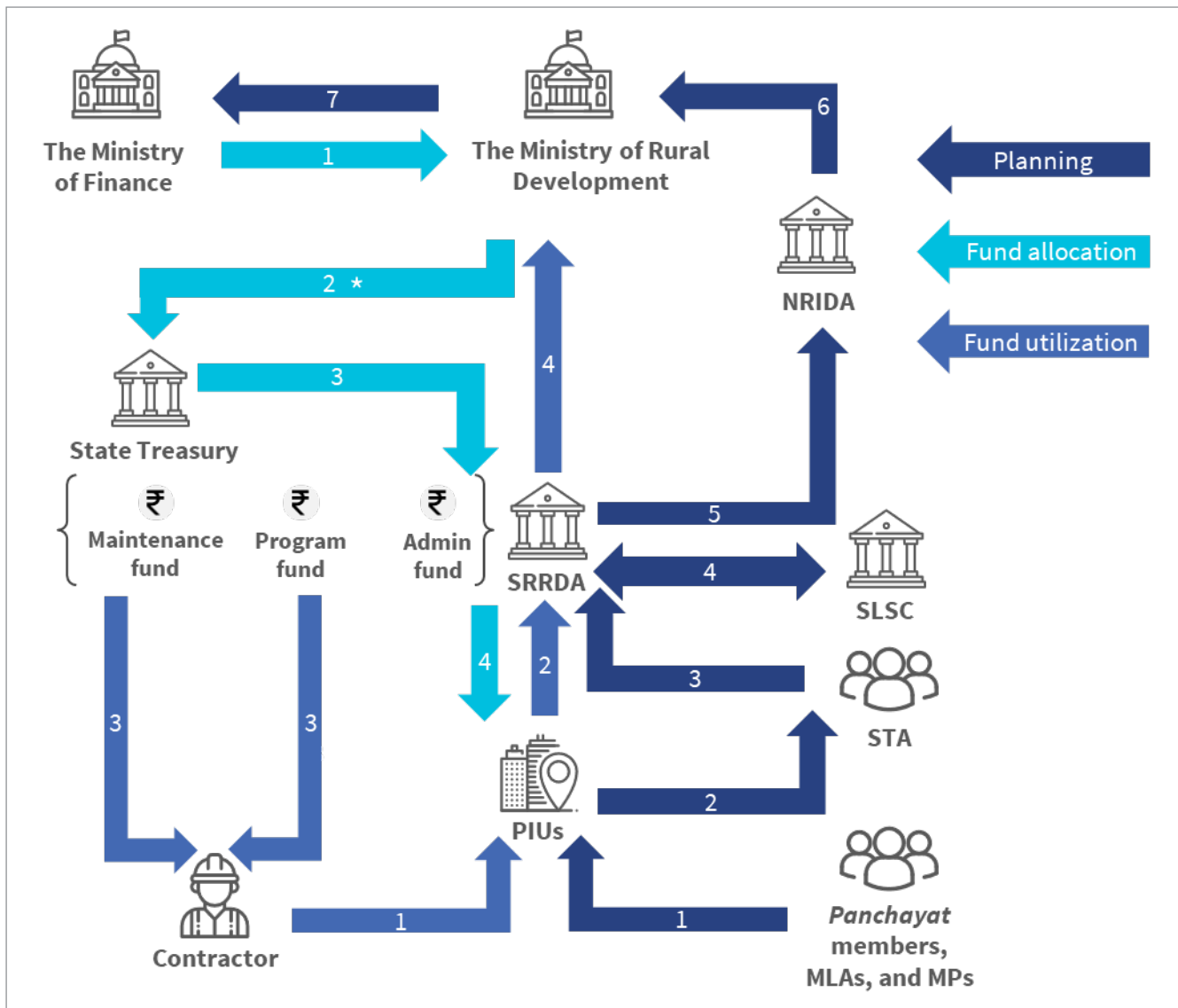
Figure 13: Process (as-is) overview of the PMGSY program

## Construction phase overview

## Planning stage

Planning activities in PMGSY require inputs from multiple stakeholders and follow a **bottom-up** approach (as showcased in figure 13). The District Project Implementation Unit (DPIU) acts as the nodal agency to initiate and conduct the planning, reporting, and stakeholder consultation activities. The DPIU initiates the planning process through the identification of an unconnected habitation using the **digitized core network**[24] mapped on an IT tool called **GRIMMS (GIS-enabled Road Information Management & Monitoring System)[25].**

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[24] A core network is the minimal network of roads (routes) that is essential to provide basic access to essential social and economic services to all eligible unconnected habitations in the selected areas through at least a single all-weather road connectivity.

[25] Web GIS-enabled Road information Management & Monitoring System (GRIMMS)

The DPIU drafts a detailed project report (DPR) that covers technical and financial details of the road to be constructed. The abstract of the final DPR is uploaded to the **Online Management, Monitoring, and Accounting System (OMMAS).**

After it uploads the abstract, the DPIU submits a hard copy of the DPR document to the state technical agency (STA) for approval. The STA vets the DPR for technical and financial feasibility, approves the abstract on OMMAS, and sends it to SRRDA and the state-level standing committee (SLSC) for the next approval.

Based on the state's economic priorities and budget estimates for the subsequent fiscal year, the SLSC approves DPRs received from various DPIUs and submits them to the NRIDA for approval. The NRIDA once again validates the submitted DPRs for their technical and financial viability and submits them to the MoRD for further action.

## Fund disbursal

The fund flow in the PMGSY program follows a **top-down approach**, as after budget approval from the Ministry of Finance, the MoRD releases funds to the state treasury. The state treasury further remits it to the respective SRDDA's bank accounts within three days after it receives the funds. The funds are transferred to the state treasuries in two tranches each fiscal year, and the SRDDA maintains the funds in three different bank accounts as per the program guidelines. The different bank accounts maintained by the SRDDA are as follows:

- **Program account:** The SRRDA and the DPIU book all construction-related payments to contractors under this account, which constitute about 75-80% of the total budget.

- **Maintenance account**: The SRRDA and the DPIU book all maintenance-related payments (defect liability period for 10 years) to contractors under this account, which constitute about 15-20% of the total budget.

- **Admin account**: The SRRDA and the DPIU book all admin-related expenses of the program under this account, which constitute 2.25% of the program component.

## Fund utilization stage

At the start of every financial year, the SRRDA authorizes the DPIUs to utilize funds and execute projects as per the DPR submitted. The respective DPIU executes, supervises, and utilizes the funds allocated at the district level as per the approved DPRs. The contractor submits a paper invoice to the DPIU for each work completed. The DPIU staff verifies the quantity and quality of the work executed and records it in the measurement book.

The DPIU calculates the amount to be paid as per the terms of the contract and the approved schedule of rates. The DPIU staff record the final amount after calculation in the measurement bill book. The hard copy of the bill is uploaded on OMMAS after approval by the DPIU head. The DPIU team creates the payment voucher for the final amount in the Public Finance Management System (PFMS). The DPIU head authorizes the payment voucher in the PFMS and directs the bank to release the funds to the contractor.

## Maintenance phase

Once the road under construction is completed, it is moved to the maintenance phase for the next 10 years. During this phase, the respective DPIUs monitor all the work executed and monitor the payments via the electronic Maintenance of Rural Roads (eMARG) system. During this phase, funds are utilized from the maintenance account and are only released after inspection by the DPIU staff.

# Conditions for fund utilization or payment processing (construction phase)

The DPIU onboards contractors to construct the road project via an online bidding process. The contractor selected through the bidding process signs an agreement with the DPIU, which serves as the governing document to regulate all project activities. The agreement consists of the following documents:

- **Concession agreement:** It is a master agreement that defines the conditions that govern project regulation activities and legal aspects of the project.
- **Request for proposal:** The RFP is a document that governs bid conditions, pre-qualification criteria, and legal compliances.
- **Financial and technical bids:** The bids submitted by the contractor include the project delivery plan, quoted price, and company documents.
- **Detailed project report (DPR):** A DPR is a report that comprises all technical details, such as road design, dimensions and extent of road to be constructed, technical specifications, quality specifications, and project costing.

All the above documents collectively govern the payments made to the contractor as they influence the payment processing conditions. Payment processing conditions can be classified into the following categories:

| Category | Payment processing criteria |
|---|---|
| **Quantity** | 1. Quantum of work executed and recorded<br>2. Verification of the work executedAny adjustments for quantity variation<br>3. Conditions for the supply of material or labor |
| **Quality** | 1. Technical specifications for different quality tests<br>2. Testing schedule<br>3. Laboratory specifications<br>4. Quality-related penalties |
| **Compliance** | 1. Labor compliances<br>2. ITR and ROC compliances<br>3. Technical staff requirements<br>4. Force majeure<br>5. Sub-contracting terms |

| Monitoring | 1. Monitoring schedule |
| | 2. Milestones—work and financial |
| | 3. On-schedule work delivery |
| | 4. Delayed work delivery |
| | 5. Deferred Liability Period (DLP) conditions |
| Settlements | 1. Eligible advance |
| | 2. Billing frequency |
| | 3. Bill format or supporting documents |
| | 4. Deviation penalties or incentives |
| | 5. Fluctuations in the price of materials |

**The as-is process for fund disbursal to DPIUs**

Since its inception, the PMGSY program was established with clear operational and financial guidelines to prevent conflicts. Over time, the government introduced new policies and technologies to increase efficiency, but the program still faces many challenges, especially related to fund utilization. The current process at DPIUs requires significant manual intervention from all stakeholders, which results in tedious verification checks, high individual discretion, and substantial administrative burden due to the nature of the work to be verified and the value of funds to be disbursed.

Funds are currently released in two installments—once in April and then in September. The first installment in the year is released after the Ministry or the NRIDA clears the projects, whereas the release of the second remaining installment is subject to utilization of the total available funds and completion of the road works. See Figure 14 or an overview of the as-is fund flow process.

Table 13: PMGSY stakeholders and their functions

| Fund disbursal to the DPIU in the PMGSY program | | |
|---|---|---|
| **Role** | **Actor** | **Functions** |
| **Central level** | | |
| **Fund holder** | Ministry of Finance (MoF) | • The owner of PFM systems<br>• Debits the central government account and transfers money to the state government's account based on the recommendation received by the nodal ministry |
| **Granting authority** | Ministry of Rural Development | • The nodal ministry or national sponsor of the program<br>• Allocates funds based on the approved detailed project reports (DPRs) received from the states<br>• Releases funds in tranches based on utilization certificates (UCs) |

| Nodal agency | National Rural Infrastructure Development Agency (NRIDA) | • The national entity responsible for monitoring the program implementation<br>• Responsible for the quality monitoring mechanism<br>• Implements the monitoring, accounting, and management systems (OMMAS and eMARG)<br>• Final approver of the funds allocated to states<br>• Final approver of DPRs for project execution<br>• Implements the standards of construction based on guidelines of the Indian Road Congress (IRC), including the use of new technologies |
|---|---|---|
| Monitoring and evaluation | National Quality Monitor (NQM) | • The national-level quality monitoring agency<br>• Conducts periodic quality reviews after the construction of the road |
| **State-level** | | |
| Granting authority | State-level standing committee (SLSC) | • The state-level committee that approves projects and funds<br>• Reviews and monitors the progress and provides advice on any concerns.<br>• Reviews operational and financial capacity at SRRDA and PIU levels |
| Nodal agency or fund receiver | Stage government or line department (PWD/RD) | • The nodal department and sponsor for the program at the state level<br>• Releases its share of funds to the respective executing agency or the SRRDA based on the implementation phase of PMGSY |
| Nodal Technical Agency | State Technical Agency (STA) | • The technical agency hired to scrutinize and review DPRs<br>• First approver of the DPR submitted by the PIU |
| Nodal executing agency | State Rural Road Development Agency (SRRDA) | • An autonomous implementation body<br>• Second-level approver of project DPRs<br>• Identifies and onboards banks for the program<br>• Authorizes and allocates funds to the DPIU<br>• Hires SQM for quality monitoring<br>• Implements the standards of construction based on guidelines of the IRC, including the use of new technologies |
| Monitoring and evaluation | State Quality Monitor (SQM) | • The program's second-tier monitoring agency and the state-level quality monitoring agency hired by SRRDA<br>• Conducts monthly quality reviews after construction |

| District-level | | |
|---|---|---|
| **Executing agency** | Project Implementation Unit (PIU) | • The implementation unit at the district level<br><br>• Prepares the project DPR in consultation with the *panchayat* members, Members of Parliament (MPs), and Members of Legislative Assemblies (MLAs)<br><br>• Conducts procurement to hire contractors to build the road network as per the DPR<br><br>• Final approver for the physical work and release of payments to the contractor |
| **Utilizer or payee** | Contractor | • Vendor engaged to develop the rural road package<br><br>• Engaged on a rate contract as per the standard RFP-based procurement for construction and the five-year defect liability period (DLP) |

| Steps | | Activity |
|---|---|---|
| **1** | **Work execution and record of quantity** | 1a  The contractor executes the work as per the bill of quantity (BOQ), DPR, and schedule.<br>1b  The JE carries out measurement of quantities, which is recorded in the measurement book (MB). |
| **2** | **Quality testing** | •  Quality tests as prescribed are carried out under   the JE's supervision and are recorded in the quality register (QR). |
| **3** | **Bill submission** | •  The contractor submits the bill along with compliance documents as per the prescribed format to the JE, which are passed to the AO for processing. |
| **4** | **Finalization of MB and QR** | 4a  The AE verifies the MB, which the EE then finalizes.<br>4b  The QR is verified with field inspection by Sub-Engineer (SE),  Sub-Divisional Officer (SDO), and the EE or GM. |
| **5** | **Entitlement calculation** | 5a  The AO checks compliances and calculates entitlements and records in the MBB, which the Sr. AO then approves.<br>5b  The MBB abstract and contractor bill is uploaded to OMMAS. |
| **6** | **Payment approval and release** | 6a  The AO creates the payment voucher in OMMAS, which the GM approves.<br>6b  The payment voucher is transferred to the PFMS for payment release from SRRDA account. |
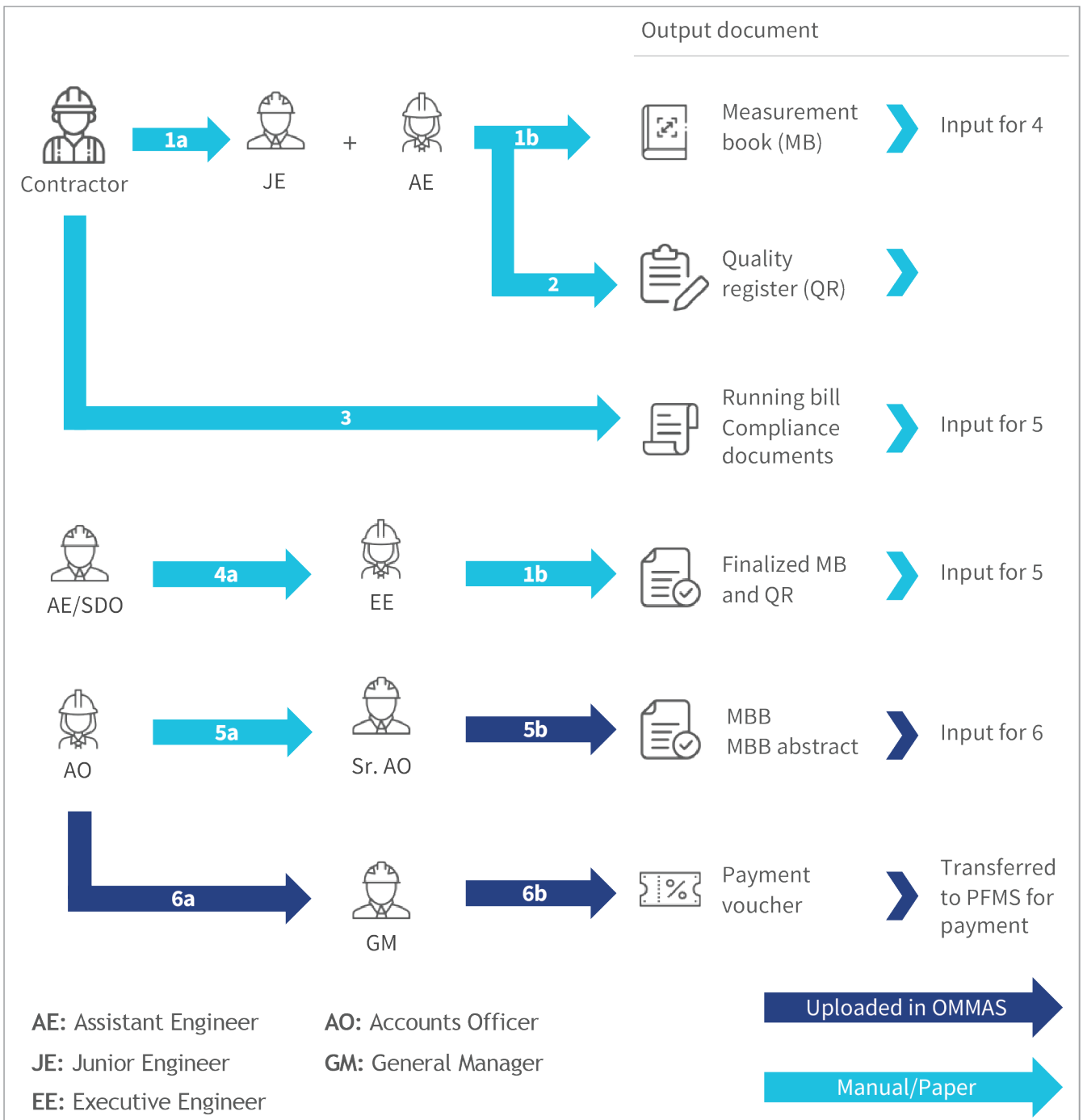
Figure 14: As-is process of fund flow in the PMGSY program

As already highlighted, operational issues, such as irregular planning, unapproved expenditures, and delayed contractor payments, have persisted since the program's inception. The CAG has highlighted this multiple times in its program review. The issues that continue to hamper the fund flow in the program are as follows:

- **Low visibility of fund availability for stakeholders:** The PFMS only captures the amount released from the center to the state. However, once the fund leaves the Single Nodal Account (SNA) at the state level, the MoRD has limited visibility on the funds allocated to DPIUs and used by them. The fund status is only accessible once district units voluntarily upload spending summaries, subject to their discretion. This lack of fund visibility and bill traceability in the OMMAS often results in the underutilization of funds or impedes their timely release.

- **Manual feeding of work data in the OMMAS:** All payment conditions are recorded manually with a paper trail by the DPIU staff. For example, the measurement book is the logbook maintained by DPIUs to monitor and record construction activities, while the measurement bill book is the logbook maintained by DPIUs to calculate and record payments for construction completed. All entries in the measurement book and the measurement bill book are uploaded to the OMMAS, and only values are entered. Compliance-related or other supporting documents, such as quality test reports, labor compliance certificates, and contractor bills, among others, are not uploaded on the OMMAS. Hence, the team that processes payments has to wait for and rely on the physical file that contains paper documents. This increases the administrative burden, leads to duplication of effort, and delays payment processing.

- **Entitlements are calculated manually and uploaded on the OMMAS:** The DPIU staff calculates all entitlements and makes adjustments manually based on contract service-level agreements (SLAs), as well as other adjustments, such as penalties and advances. The basis for the final payment calculations is not traceable in the OMMAS. This leaves scope for staff discretion when they finalize the payment amount and prepare the payment voucher in the OMMAS.

- **Low transparency or traceability in compliances linked to a contract:** After contracts are awarded, the OMMAS only receives the tender information and details around the award of contracts through the digital procurement system called the Government eProcurement System of NIC (GePNIC). These details include bid type, date, number of bids, and bidder's name and contract value. However, contract clauses are not exported to the OMMAS, and staff have to maintain physical records of the contract, which leads to limited <u>transparency and traceability</u>.

The implementation of smart payments to the PMGSY fund flow process would help eliminate most of the challenges through real-time updates, digital verification, or validation of several payment conditions and through near-autonomous calculation and execution of payments.

## 5.3 The proposed smart payments solution to automate the PMGSY fund disbursal and utilization process

Smart payments involve digital tracking of conditions, validated system workflow, and autonomous payment release when all the conditions are met digitally. These three functions help meet the challenges highlighted in the current fund disbursal process through automated claim processing. They provide real-time visibility of the claim or payment workflow, validate claims through system-defined if-then-else scenarios, and generate a system-generated compliance score for entitlement calculation, time-bound processing, and initiate the approval matrix. Finally, the autonomous payment release is triggered.

## Proposed workflow to facilitate smart payments

The deployment of smart payments solutions in PMGSY will require changes to the current process workflow and the implementation of new digital tools and workflow systems. The major components that will be designed to enable smart payments implementation are as follows:

- **Single project registry (SPR):** The SPR will be a reference data repository for all PMGSY projects based on the principle of a single source of truth. The SPR will hold all project-related data and information at one point and enable access to real-time information to and from other applications. This information includes vendor data, contract milestones, and payment conditions.

- **E-measurement book (eMB):** The proposed eMB will be a part of the modular architecture and work in sync with the OMMAS as a workflow management system. The eMB will enable digital data entry of a contractor's work at the source and allow rules-based processing to fulfill compliances. The data processed in the eMB will trigger the smart payments engine (SPE) to automatically generate the measurement book and measurement bill book, which would eliminate the need to record work data and undertake any manual payment calculation. Additionally, the eMB will integrate with the existing OMMAS system to permit seamless data exchange.

- **Smart payments engine (SPE):** The proposed SPE refers to a module that runs if-then-else algorithms at the backend. It uses available inputs in electronic form and other payment conditions. The SPE will automate invoice processing and voucher creation and provide the necessary trigger to release funds to vendors.

Figure 15 below highlights how the smart payments framework can apply to the existing process for the user adopting an ideal scenario to implement smart payments.

| Steps | | Activity |
|---|---|---|
| 1 | **Work execution and record of quantity** | 1a  The contractor executes of work as per the bill of quantity (BOQ), DPR, and schedule. <br><br> 1b  The JE carries out the measurement for all the work done in the eMB mobile app with image and geotagged location. |
| 2 | **Quality testing** | •  The JE and AE carry out quality tests for all the work done, which is recorded in the eMB mobile app's quality module. |
| 3 | **Bill submission** | •  The contractor submits the bill and compliance documents through their log-in via the eMB mobile app. The bill submitted is received by the AO on the AO's interface for verification. |
| 4 | **Finalization of MB and QR** | 4a  The AE verifies the MB and the EE finalizes it  through eMB workflow automation. <br><br> 4b  The QR is verified with field inspection by Sub-Engineer (SE), Sub-Divisional Officer (SDO), and the EE or GM through the eMB workflow system. |
| 5 | **Entitlement calculation** | 5a  For all invoices submitted, the SPE checks compliances and calculates entitlements payable and records them in measurement bill book (MBB). <br><br> 5b  The Sr.AO validates the MBB entries via DSC and creates a final MBB abstract. |
| 6 | **Payment approval and release** | 6a  The SPE creates the payment voucher in OMMAS, which the AO validates and the GM approves via DSC. <br><br> 6b  The payment voucher is transferred to OMMAS for payment release via PFMS. |
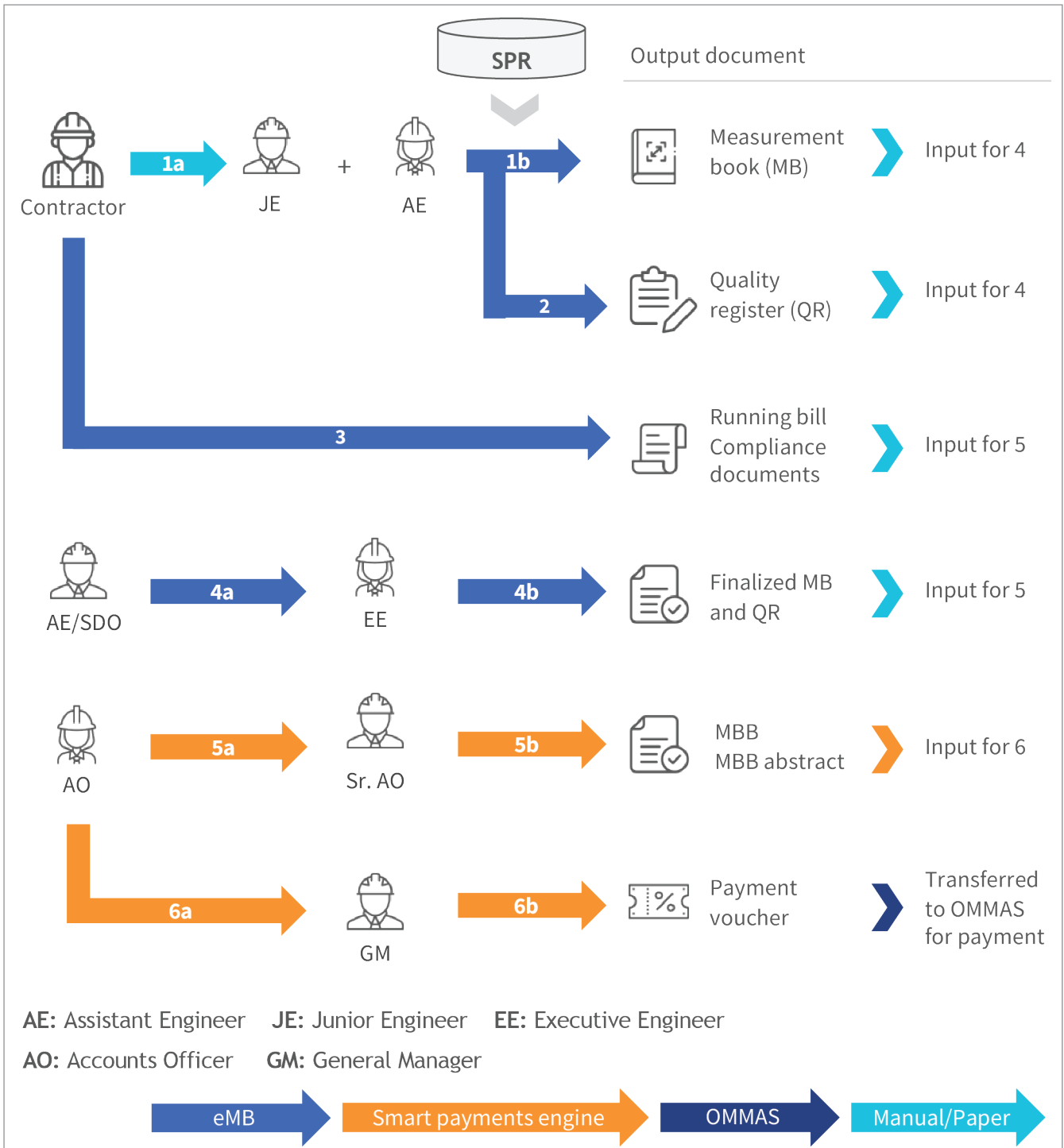
Figure 15 : Proposed workflow after implementation of smart payments in PMGSY

The three components will function in tandem once deployed in the ideal scenario. The SPR will act as a central hub for all project data to ensure a single source of truth. The eMB and SPE will facilitate compliance through rule-based processing and ensure frictionless payments to beneficiaries. This will pave the way for a more streamlined and automated system that promises increased efficiency and transparency.

In the short term, the new solution will enable real-time updates, a fixed locus of accountability, and increased observability. In the long term, these interventions, combined with the treasury single account (TSA), will ensure frictionless expenditure, reduce float at different government levels, and strengthen the government's fiscal position.

G2P programs generally target poor and marginalized people. These groups are often financially excluded (Olga Morawczynski, 27 October 2022). This playbook highlights the potential of implementing the smart payments solution in the MUKTA program—the Government of Odisha's urban wage employment initiative—to address critical challenges related to payments and program management.

# Section 6:

# A G2P payments use case: Direct benefit transfer (DBT) from urban local bodies (ULBs) to MUKTA program's beneficiaries and stakeholders in Odisha

G2P programs generally target poor and marginalized people. These groups are often financially excluded (Olga Morawczynski, 27 October 2022). This playbook highlights the potential of implementing the smart payments solution in the MUKTA program—the Government of Odisha's urban wage employment initiative—to address critical challenges related to payments and program management.

## 6.1. Overview of the MUKTA program

During COVID-19, the Government of Odisha introduced the Urban Wage Employment Initiative (UWEI) across the 114 ULBs in the state. It sought to address the urgent need for job creation and simultaneously fulfill the need to develop sustainable community assets. The initiative intended to generate employment opportunities for urban poor people, informal workers, and migrant laborers. The Odisha government implemented the *Mukhyamantri Karma Tatpar Abhiyan* (MUKTA) program in 2021 after it saw a positive response from UWEI.

The MUKTA program sought to strengthen migrant laborers and urban workers against economic vulnerabilities. The main objective was to generate localized employment opportunities for urban residents. This program focuses on the construction of infrastructure and assets with the community's active involvement. The program adopted a bottom-up approach where each area's needs are analyzed and development projects are undertaken accordingly. Payments to the stakeholders are done instantly through DBT.

## 6.2. Conditions for payments to the stakeholders

The main stakeholders under MUKTA include the daily wage seekers or laborers, community-based organizations (CBOs), and vendors.

- **Daily wage seekers or laborers:** CBOs employ laborers to complete the work for which the ULBs issue work orders. The laborers receive payments every week.

i. **Detailed conditions for payments to wage seekers**

| S. No. | Payment condition |
|---|---|
| 1 | Identification of the wage seekers by CBOs |
| 2 | Registration of the wage seekers by CBOs |
| 3 | Collection of the wage seekers' bank account and *Aadhaar* details |
| 4 | Verification and validation of the wage seekers by the ULB officials |
| 5 | Preparation of wage seekers' muster rolls by CBOs |
| 6 | Approval of the muster rolls by the Implementation Expert (IE), Junior Engineer (JE), or Assistant Engineer (AE) after a preliminary assessment of the work executed |
| 7 | Payment approval from the counter-signing officer to release payments to the wage seekers |
| 8 | Release of wages directly into the wage seekers' bank accounts post approval |

- **Community-based organizations (CBOs):** The CBOs comprise self-help groups (SHGs), slum dwellers associations (SDAs), and transgender self-help groups (T-SHGs). They are responsible for the execution of the entire work with the technical support of the IE, JE, or AE concerned. The CBOs are paid 7.5% of the total estimated cost of work every 15 days.

ii. **Detailed conditions for payments to CBOs**

| S. No. | Payment condition |
|---|---|
| 1 | Identification of CBOs |
| 2 | Collection of the CBOs' bank accounts and *Aadhaar* details |
| 3 | Verification and validation of the CBO details by the ULB officials |
| 4 | Issue of work orders in the name of CBOs by the ULBs |
| 5 | On-ground execution of the work by the CBOs |
| 6 | Preliminary assessment of the work executed by the CBOs and estimation of the supervision charge by the IE, JE, or AE |
| 7 | Payment approval from the counter-signing officer to release supervision charge to wage seekers |
| 8 | Release of supervision charges directly into the CBOs' bank accounts after approval |

- **Vendors:** They are the material suppliers for various works the CBOs undertake. Payments to the vendors are processed based on the material statement approved by the IE, JE, or AE.

**iii. Detailed conditions for payments to the vendors**

| S. No. | Payment condition |
|---|---|
| 1 | Identification of vendors by the ULBs |
| 2 | Issue of work orders in the name of CBOs by the ULBs |
| 3 | Receipt of materials from the vendors by the CBOs based on the work orders issued |
| 4 | Issue of the GST invoices for the materials supplied in favor of ULBs |
| 5 | On-ground execution of the work by CBOs |
| 6 | Preliminary assessment of work executed by the CBOs and estimation of the volume of materials used by the IE, JE, or AE |
| 7 | Preparation of the material statement and generation of the payment vouchers by the IE, JE, or AE based on the volume of materials used |
| 8 | Approval of payment from the counter-signing officer for the release of payment to vendors |
| 9 | Disbursal of payments for the materials used directly into the vendors' bank accounts after approval |

# 6.3. Challenges in the existing as-is process

The current process relies on file-based approvals for weekly wage settlements and uses manual project management procedures. This reliance often delays claims processing and creates obstacles to transparent program implementation. Major challenges identified in the existing as-is process are as follows:

| Serial number | Challenges |
|---|---|
| **1-** | **Delay in payment to beneficiaries** |
| 1.1 | Manual preparation of project estimate by the IE, JE, or AE |
| 1.2 | Manual identification and registration of CBOs (SHGs, T-SHGs, SDAs) |
| 1.3 | Manual creation and handover of work orders to CBOs by Urban Local Body (ULB) officials |
| 1.4 | Manual preparation of muster rolls for wage seekers by CBOs |
| 1.5 | Manual recording of the measurements in the Measurement Book (MB) by the IE, JE, or AE |
| **2-** | **Administrative burden** |
| 2.1 | Manual file-based approval with undefined turnaround times (TATs) |
| 2.2 | Manual compliance check and entitlement calculation by the IE, JE, or AE |
| 2.3 | Manual filing and compilation of bills |
| **3-** | **Suboptimal fund management** |
| 3.1 | Idle parking of funds in PD accounts of ULBs |
| 3.2 | The discretion to pay lies with the Treasury Officer (TO), as the TO must approve every payment instruction from the ULB |
| 3.3 | Low observability of expenditure due to the unavailability of a single source of truth |

The baseline study identified more than 10 steps in the manual file-based approval process. These administrative approvals took around 60 days on average. The study highlighted a delay of 144 days in processing payments to beneficiaries. (Refer to Annexure for results from the mid-line evaluation after smart payments solution implementation.)

These challenges must be addressed to streamline claims settlement, improve transparency, and enhance the overall efficiency of program implementation. Digital payment solutions must be deployed to increase efficiency, enhance transparency, and reduce delays in contract management and fund disbursement processes. These solutions include smart payments and just-in-time funding systems (JIT-FS).

## 6.4. The proposed smart payments or to-be process

Smart payments track conditions digitally, validate system workflow based on predefined rules, and release payment autonomously when the claims satisfy all the conditions digitally. These three functions help address the challenges highlighted above in the MUKTA program. The proposed solution provides real-time visibility of the claim or payment workflow, validates claims through system-defined if-then-else scenarios, and calculates entitlements. The JIT-FS helps in the timely processing and release of payments from the central treasury into the beneficiary's bank account.

## The proposed workflow to facilitate smart payments

The following diagram illustrates how the proposed solutions will interact with each other and the legacy systems to monitor fund utilization and regulate payments.
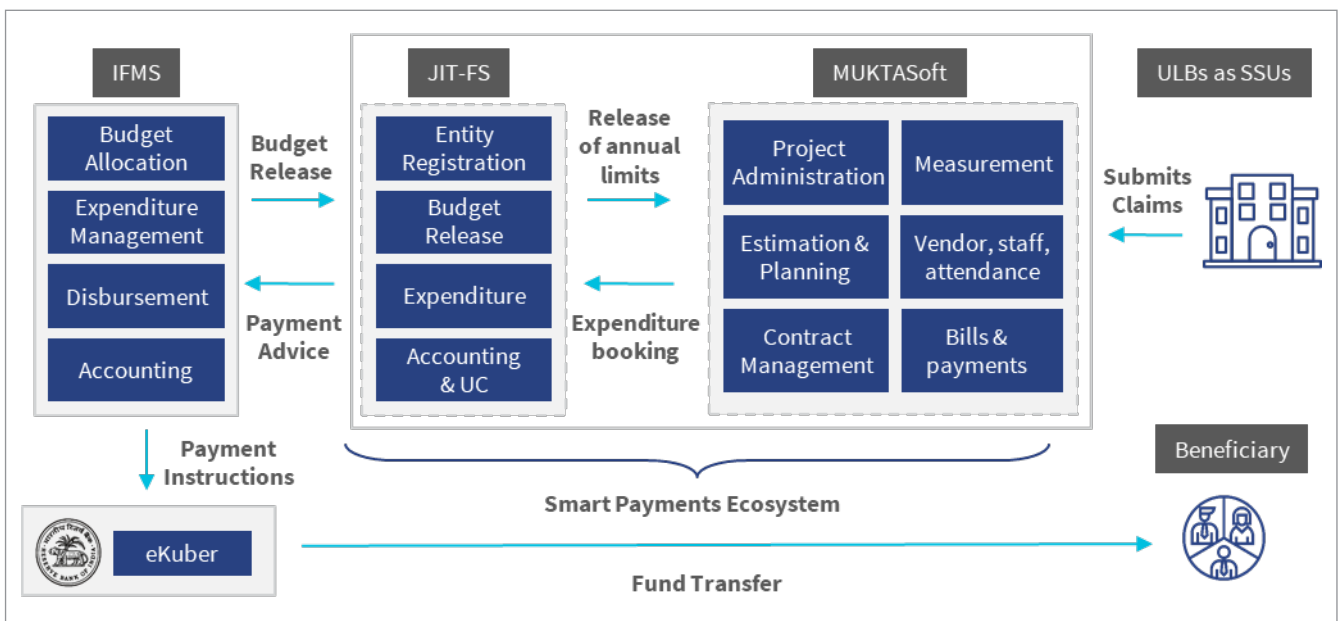


** via PFMS/State banking systems   |   *Proposed via cityfinance portal

Figure 16: Smart payments solution implementation in MUKTA scheme

The proposed solution has two components:

a. **Smart payment system (MUKTA-Soft):** This solution employs "rule-as-code" to guarantee seamless and swift payment of wages to wage seekers, project supervision charges to CBOs, and supplier payments to workers. The system enhances payment processing efficiency through payments in near real-time, which means it pays precisely for the work at the scheduled time of payment.

b. **JIT funding system:** This system empowers the finance department to allocate the budget to ULBs as "authorization-to-pay" and permits the Housing and Urban Development Department (H&UDD) to submit beneficiary payment requests from the Consolidated Fund of the State (CFS). These payment requests are managed within the set "authorization-to-pay" limits. The system guarantees efficient fund disbursals through fund withdrawal from the CFS and direct transfers to the beneficiaries' bank accounts.

The proposed solution seeks to enhance ULBs' capability to execute projects under the MUKTA program. This enhancement will facilitate swifter fund deployment and, with time, increase program allocation. As a result, this will increase the benefits of MUKTA for its beneficiaries.

# Conclusion

The smart payments solution framework can unlock the impact of billions in funds that are already committed by the government. It has tremendous potential to streamline government payments. It can also significantly reduce the burden on officials to enhance public service delivery and reduce state capacity challenges. Governments worldwide are committed to achieving sustainable development goals but many lag behind in their commitments severely. In these scenarios, digital tools and aids would provide a much-needed impetus to help governments realize their commitments and achieve development goals for their countries. They would help close some gaps faster, especially among social sectors, such as health, education, agriculture, and water and sanitation.

A combination of digital aids, upgraded backend infrastructure, and database integration and management can reduce the extant problems of high administrative burden, low accountability in decision-making, and frictions in government expenditures. The resultant outcomes of high observability and traceability will enhance accountability in the payments process while reducing systemic uncertainty.

The problems associated with the complexity of government payments are everyday experiences across the developing world. With many countries embarking on the journey of digitization of public finance, the environment is ripe for reform champions to introduce the required changes in the technology infrastructure, processes, and personnel to implement smart payment. The desired solution will save significant time, cost, and manual effort.

The strength of a smart payments solution lies in its versatility and simplicity. Governments have a large bouquet of digital tools across deployment scenarios. They can, therefore, determine which set of tools suits their national contexts and explore their feasibility in a targeted manner.

The enhancement of overall institutional transparency and accountability through the adoption of smart payments will facilitate rigorous monitoring. In the process, governments will be empowered to introduce stronger reporting standards. This would help reduce taxpayer and public scrutiny over the medium term, given improved access to utilization information.

However, the hallmark of a smart payments solution for governments worldwide lies in its ability to strengthen state capacity, which will be achieved through the effective and efficient allocation of resources for public expenditure.

# Glossary

| Term | Definition |
|------|-----------|
| API-based integration | Open APIs can be used to integrate two or more identified systems and other possible systems in the future. Various APIs can be exposed in the program MIS, ERPs, or other parts of the PFM ecosystem. They can also consumed by other systems to produce the desired output. |
| Business process management (BPM) | BPM is a way to improve the payment process through methods, such as discover, model, analyze, measure, improve, optimize, and automate. It can help eliminate redundant processes and automate manual and time-consuming processes through the deployment of the latest technologies. These include AI, RPA, and IoT, among others. |
| Business rule engine or rule-based engine | The rules about payment conditions can be configured in the business rules engine. When a payment event is triggered, these rules and conditions are executed to check whether all conditions are satisfied. Payment rules are executed to calculate the final entitlements. |
| Centralized data store (CDS) | A CDS helps reduce duplication in the entry and maintenance of data. Various repositories are centralized and made accessible to different departments through a CDS. These include beneficiaries, employees, and assets, among others. It helps reduce time and effort in data management and simultaneously allows convenient access to all relevant data for stakeholders. |
| Dashboards | A dashboard is a graphical user interface that often provides at-a-glance views of key performance indicators (KPIs) relevant to a program's particular objective. These may be used to produce fixed or dynamic data reports. |
| Dedicated ERP solution | A department can implement dedicated ERP solutions to digitize its activities. Such solutions act as the data points for the smart payments system, such as the human resource management system (HRMS) for employees' salaries, among other aspects. |
| Digital monitoring and auditing | A smart payments system facilitates digital monitoring and auditing of various steps involved in the payment cycle and a program's physical progress on which payment is to be made. |
| Digital signatures | Digital signatures act as an identifier for an officer. These can authenticate payments, approve various bills, and provide administrative approvals on a digital file system. They eliminate the need for manual signatures on paper. |
| Digital workflow | A digital workflow enables the completion of defined tasks or processes and the transmission of information or data without any manual interventions through a software. |
| Document management system (DMS) | A DMS is used to receive, track, manage, and store documents in electronic forms, such as PDFs, word processing files, and digital images on paper-based content. Such systems can record the various versions created and modified by different users. A DMS can manage the various files electronically with digital approvals on it. Vendors' proofs or bills can be stored on this system and retrieved whenever required. |
| Expenditure management | This is the management and accounting of public funds to achieve desired objectives. It may also include the evaluation of individual line items in expenditure and expenditure processes, among others, to achieve the government's desired outcomes. |
| Identity and access management | Identity and access management is a framework of policies and technologies to ensure that the right users have appropriate access to technology resources. This may be implemented through biometric devices, network protocols, digital certificates, and passwords, among others. |

| Term | Definition |
|---|---|
| Intelligent workflow and routing | A workflow is a series of necessary activities to complete a task. Intelligent workflows increase these tasks' visibility, flexibility, agility, value, and efficacy through the addition of technologies, such as AI and automation. Such workflows can be implemented to automate payment processes, such as compliance checks, entitlement calculations, and approvals, among others. The process contains well-defined tasks and respective actors. |
| Interoperability | This principle refers to the integration of various systems in the payment ecosystem to exchange and use information without restrictions to enable faster processing of payments and ensure fund availability. Interoperability also allows for greater visibility of a program's physical and financial progress. |
| IoT-fed data capture | IoT devices can capture data directly from the field, such as temperature, quality data, measurement data, and other data directly into the system which leads to faster and real-time data entry and avoids manual errors. The data captured through IoT devices can be used directly to process payments. |
| Just-in-Time (JiT) funding | JiT funding enables real-time usage and receipt of funds through "pull-based" transactions when the request is triggered. It prevents the creation of idle float with commercial banks. |
| MIS reports | Data is collected and aggregated to produce various types of MIS reports. These are used to assess performance and facilitate quicker decision-making. These reports provide insights into the status and progress of different business activities. |
| Mobile applications | Mobile apps are convenient and provide an interface to interact with various stakeholders and officers for approval of electronic files from anywhere. Stakeholders may include field staff for surveys, among others. Mobile apps help field staff capture additional details, such as biometrics, images, and GPS coordinates, among others. They also allow beneficiaries to check a program's status and entitlements. |
| Notification engine | The notification engine sends notifications to enable the timely processing of tasks. It sends these through e-mail, SMS, and other preferred channels to stakeholders and owners of the process as per defined threshold limits and frequencies. |
| Optical character recognition (OCR) for data extraction | OCR refers to the electronic or mechanical conversion of images of typed, handwritten, or printed text into machine-encoded text, whether from a scanned document, a photo of a document, a scene photo, or subtitle text superimposed on an image. It can be used to make data digitization faster with reduced effort. |
| Real-time alerts and notifications | The system should generate "real-time alerts and notifications" and communicate them through email, SMS, and other channels preferred by stakeholders and process owners. This would help inform users to take action on time and improve the turnaround time (TAT) for each process. |
| Robotic process automation (RPA) | RPA is a tool to do repetitive, time-consuming, and rule-based office tasks more efficiently through automation. It can also be used to automate complex tasks performed during data capture and processing by a department. |
| Rule-based automated payment processing | The rules can be configured in the business rule engine, and processing for any payment can be performed based on them. Once they are executed and the compliance performed, the entitlement engine calculates the entitlements based on the results of the rules processed. |
| Service-level agreement (SLA) enablement to track turnaround time (TAT) | An IT system can define and monitor various SLAs and TATs for a process or job. It helps improve the entire system's efficiency through the measurement of time-consuming tasks and their optimization through process improvement or automation. |
| Web portals | Portals provide the capability of seamless access to information and data to all stakeholders on a real-time basis. Portals help capture transactional information, provide the status of applications and entitlements, and report on progress, among others, for any program. |
| Workflow automation | Workflow automation refers to the automation of the entire flow of tasks, data, and information associated with the program. This is in contrast to process automation, which refers to the automation of a standalone activity. |

# Annexure 1

## Enabling solutions for the implementation of the smart payments framework

The smart payments framework introduced in this playbook shows that its meaningful adoption requires reforms in the technology landscape to achieve its intended outcomes. These include automated validation, entitlement calculation, authorization of payments, and eventual payout.

Section 2 of the playbook explains the four technology pillars and their capabilities for the three scenarios. Figure 17 highlights the technology pillars, relevant capabilities, and enabling solutions in an ideal scenario. The list of enabling solutions in the figure below is significant. Each serves an essential purpose in the digitization process and the smart payments framework (see the glossary for the definitions of these enabling solutions)

| Technology pillars underlying smart payments framework | | | |
|---|---|---|---|
| **Digital & engaging experience** | **Simplified processing** | **Intelligent automation** | **Platform approach** |
| • Anytime, anywhere, seamless access via digital channels for all stakeholders<br><br>• MIS reports and dashboards for data insights to decision-makers and policymakers<br><br>• Actionable insights<br><br>• Secure information access based on rights and privileges | • Simplified and integrated business processes through configurable and extensible workflows<br><br>• SLA driven autonomous execution of transactions or events based on business rules for better productivity and informed decision-making<br><br>• Straight-through processing<br><br>• System-based approvals and sanction | • Paperless documents and online data entry<br><br>• Process automation to reduce human intervention as much as possible<br><br>• Automation of notifications and alerts<br><br>• Apps and IoT devices for inspections and data capture | • Platform-based approach to enable integration, reuse, and extensibility<br><br>• Standardized data, APIs and interfaces for flexible, extensible and future-proof integrations across systems and devices<br><br>• Telemetry, monitoring, tracing for better observability<br><br>• Data security<br><br>• Single source of truth |

| Enabling solutions | | | |
|---|---|---|---|
| **Digital & engaging experience** | **Simplified processing** | **Intelligent automation** | **Platform approach** |
| • Web portals<br><br>• Mobile apps<br><br>• MIS reports<br><br>• Dashboards<br><br>• Real-time alerts and notifications<br><br>• Identity and access management | • Intelligent workflow and routing<br><br>• Business process management<br><br>• Business rule engine<br><br>• Dedicated ERP solution<br><br>• Digital signatures | • Document management<br><br>• OCR for data extraction<br><br>• Rules-based automated payment processing<br><br>• SLA enablement to track turnaround time<br><br>• IoT-fed data capture<br><br>• Notification engine | • API integration<br><br>• Interoperability<br><br>• Centralized data store<br><br>• Compliance to security and data policies<br><br>• Digital monitoring and auditing<br><br>• Scalability and reliability |

Figure 17: Technology capabilities and their enabling solutions in an ideal smart payments scenario
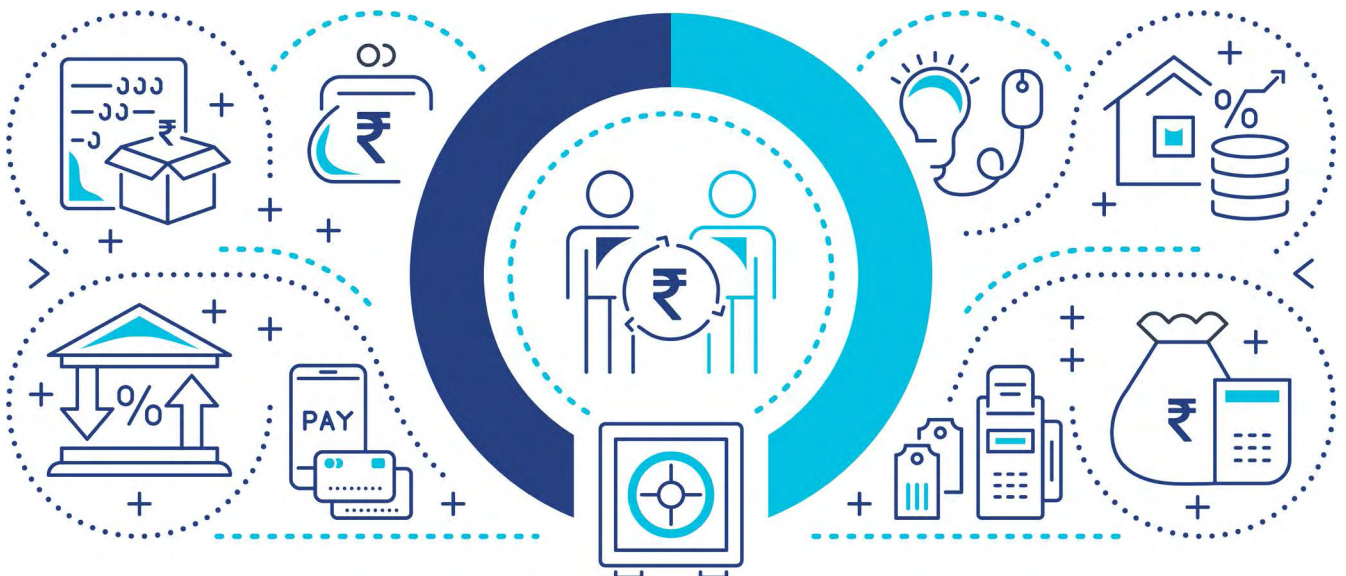
# Annexure 2

## Results from interim impact evaluation of smart payments implementation in MUKTA program of Odisha Government

The smart payment solution is being implemented in two phases. The first phase introduced MUKTA-Soft (version 1.0), which included JIT funding and automated wage payments to wage-seekers based on the approved muster roll. The second phase introduced MUKTA-Soft (version 2.0), which enabled the creation of a schedule of rates (SoR), detailed estimates, and an e-measurement book within the system.

The first phase of MUKTA-Soft (version 1.0) and JIT-FS pilot were undertaken in two ULBs to assess the impact of the proposed solution. These two ULBs were Dhenkanal and Jatani. At the time of publication of this playbook, the mid-line study for the first phase of MUKTA-Soft's pilot was underway. Preliminary findings indicated a **57%** reduction in the time spent to distribute payments to wage seekers. The MUKTA-Soft (version 2.0) is being developed and rolled out in 25 other ULBs.
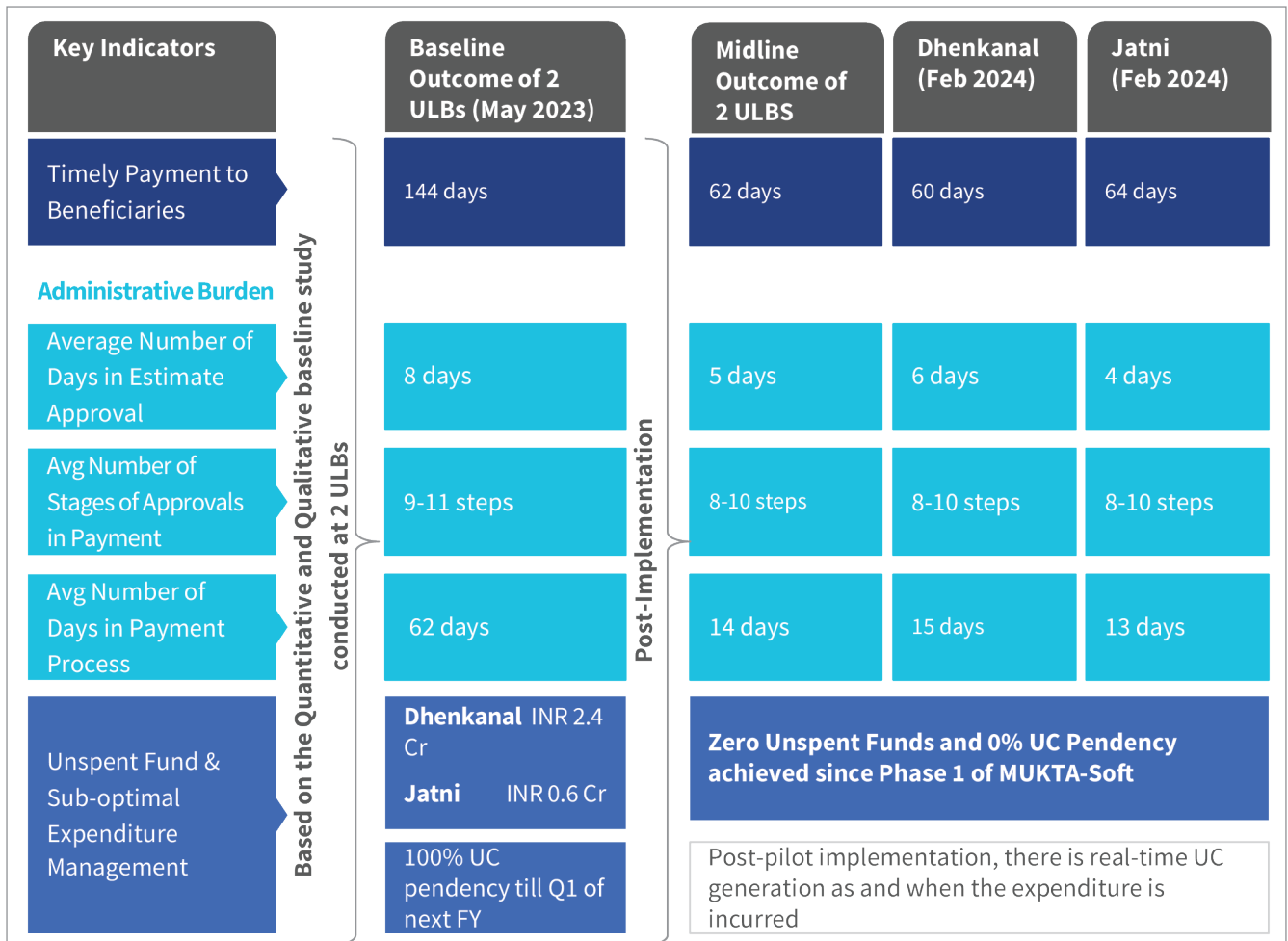
| Key Indicators | Baseline Outcome of 2 ULBs (May 2023) | Midline Outcome of 2 ULBS | Dhenkanal (Feb 2024) | Jatni (Feb 2024) |
|---|---|---|---|---|
| Timely Payment to Beneficiaries | 144 days | 62 days | 60 days | 64 days |
| **Administrative Burden** | | | | |
| Average Number of Days in Estimate Approval | 8 days | 5 days | 6 days | 4 days |
| Avg Number of Stages of Approvals in Payment | 9-11 steps | 8-10 steps | 8-10 steps | 8-10 steps |
| Avg Number of Days in Payment Process | 62 days | 14 days | 15 days | 13 days |
| Unspent Fund & Sub-optimal Expenditure Management | **Dhenkanal** INR 2.4 Cr  **Jatni** INR 0.6 Cr  <br> 100% UC pendency till Q1 of next FY | **Zero Unspent Funds and 0% UC Pendency achieved since Phase 1 of MUKTA-Soft** <br> Post-pilot implementation, there is real-time UC generation as and when the expenditure is incurred | | |

*Based on the Quantitative and Qualitative baseline study conducted at 2 ULBs*
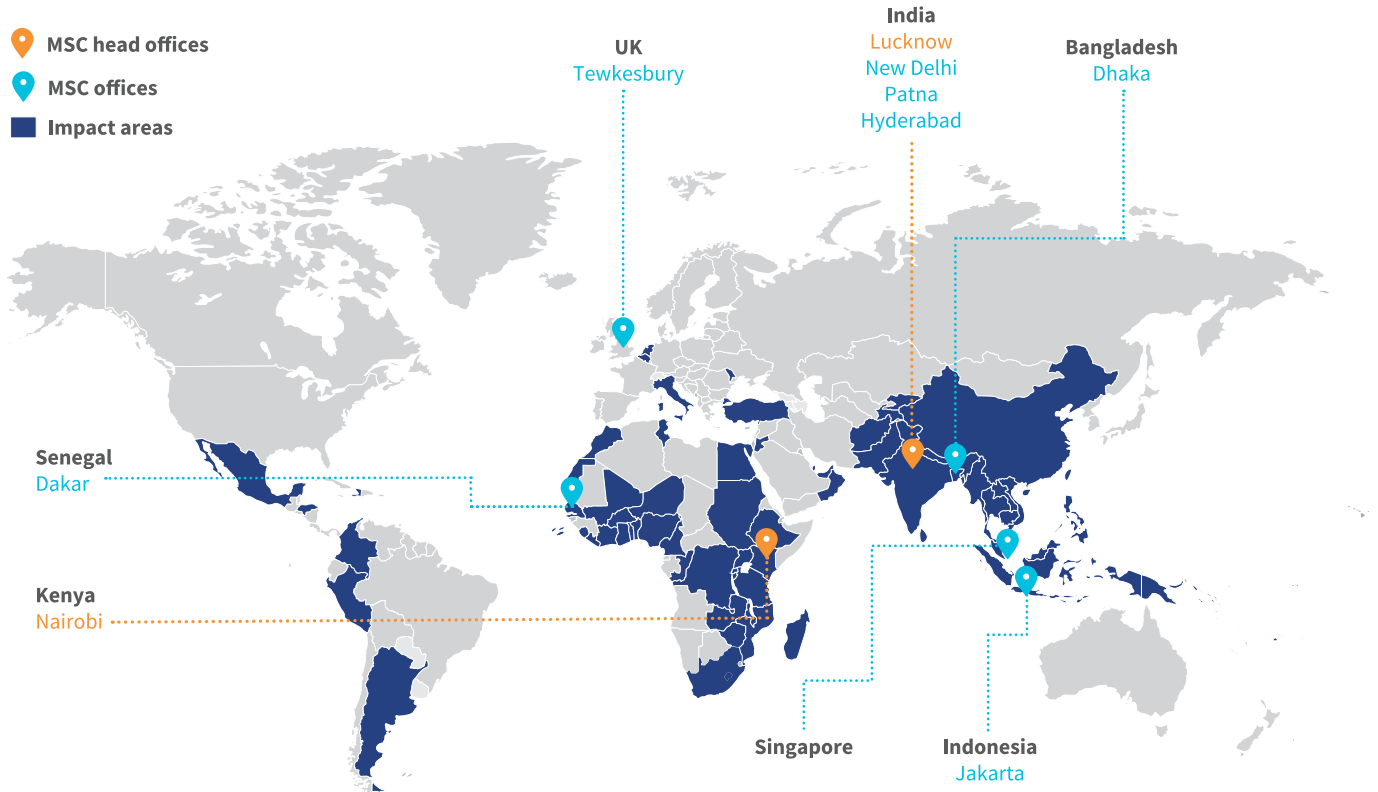
*Post-Implementation*

Figure 18: Impact evaluation results from smart payments implementation in the MUKTA scheme

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