



# FAST PAYMENT SYSTEMS

Preliminary Analysis of Global Developments

HIGH-LEVEL DRAFT FOR PUBLIC CONSULTATION

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## FINANCE, COMPETITIVENESS & INNOVATION GLOBAL PRACTICE

*Payment Systems Development Group*

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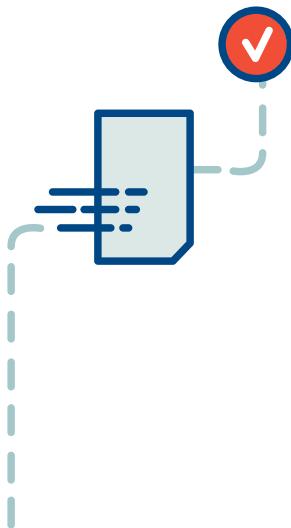
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1818 H Street NW  
Washington DC 20433  
Telephone: 202-473-1000  
Internet: [www.worldbank.org](http://www.worldbank.org)

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# 1 INTRODUCTION

## 1.1. STUDY OVERVIEW

The development and implementation of a safe, reliable, and efficient national payment system is a crucial component of the World Bank Group's work in the financial sector given its link to financial inclusion, stability, and economic development. The World Bank Group has been monitoring closely the development of fast payment systems by central banks and private actors across the world. In its unique role of guiding and supporting countries' development of payments and market infrastructure, the World Bank Group has undertaken a study of implementations of fast payment systems across the world and which will result in a policy toolkit on the implementation of fast payment systems. The toolkit is being designed to guide countries and regions on the likely alternatives and models that could inform their policy and implementation choices as they embark on their own fast payment journeys.

## 1.2. OVERVIEW OF FAST PAYMENT SYSTEMS (FPS)

The global payments industry is experiencing a paradigm shift driven by changes in economics, demographics, and customer needs for faster, cheaper, and more accurate means of making payments. Traditionally, most countries have deployed the following four main types of national payment systems:

1. Real-time gross settlement for high value and time critical payments;
2. An automated clearinghouse or bulk payment system for retail and repetitive payments;
3. Card payment systems;
4. Interoperable e-money systems (some countries are merging this with the card payment systems infrastructure).

For the purposes of this study, the definition of fast payments, as defined by Committee on Payments and Market Infrastructures, is used:

*"Fast Payments are defined as payments in which the transmission of the payment message and the availability of final funds to the payee occur in real time or near-real time and on as near to a 24-hour and 7-day (24/7) basis as possible."*



Looking to move away from cash-based economies by providing payment/receipt akin to cash transactions, central banks and monetary authorities have been promoting a fifth type of system—that is, the fast payment system (FPS).

Currently, over 60 countries have an FPS in place, and several others have announced their plans to go live.<sup>1</sup> The basic principle among all the countries remains the same—that is, to provide a real-time, 24/7 fund-transfer facility. In addition, a few countries have payment systems that resemble FPSs but are not classified as fast payments as per the Committee on Payments and Market Infrastructure's definition.

### 1.3. FPS AS A PAYMENTS INNOVATION

The financial services industry has been at the cusp of innovation and rapid transformation as technology has advanced. Payment systems have undergone substantial innovation over the years as new payment methods, platforms, and interfaces have been introduced. This can be attributed to rapid improvements in the fields of information technology and communications, coupled with growing customer expectations and demand.

The improvements started in wholesale payments, with the introduction of real-time gross settlement (RTGS) in almost every country since the 1990s. While there were fewer than 10 RTGS systems in 1990, 176 countries had RTGS or RTGS-equivalent systems in 2017.<sup>2</sup> The operating hours of these RTGS systems have also been extended in the last decade; a few jurisdictions even have RTGS active for a few hours on bank holidays. For retail payments, the innovations were initially limited to making the customer experience and interface more convenient, but more recently innovations have started to address the entire value chain, to plug gaps, and to increase the speed of payments.

With the introduction of these systems, non-cash modes of payment have been replaced largely by electronic payments, including online payments, at enterprise as well as individual levels (retail segment). Despite these advancements, the following shortcomings remain in the payment ecosystem:

- Cash continues to dominate as the default mode of payment in the low-value retail segment. This is due primarily to a lack of financial inclusion or the absence of alternative, secure, low-cost modes of payments. Globally, 1.7 billion adults are tied to cash as their only means of payment, as they do not have a transaction account.<sup>3</sup>

- Even among people who have access to electronic payments, the adoption of payments via these methods continues to be quite low.
- Cross-border payments continue to largely remain slow, expensive, and opaque in terms of delivery time and cost.

FPS as a mode of payment attempts to address the above shortcomings. FPS has supported innovation in the wider payment landscape. It has enabled completion of time-sensitive payments quickly and with finality, thereby increasing end-user confidence in digital payment methods. The following characteristics differentiate FPS from erstwhile payment systems:

- Instant settlement finality for both the payee and the payer, and the availability of final funds to the payee or beneficiary occurs in real time. In other payment modes, while the payer's account is debited in real time, the funds may or may not be made available to the beneficiary immediately. (This depends on the agreement between the acquirer and merchant.)
- Transactions can be made through new modes of interfaces, such as mobile applications from third-party providers.
- New access channels and transaction-initiation methods such as QR codes have been introduced.
- Membership to FPS is broader, and non-banks can also participate as both direct and indirect participants.
- Channels innovation and newer payment-transaction flows are introduced through use cases such as request to pay, welfare payments, and salary payments.
- Payments made with the help of such aliases as phone numbers, email address, and so on are increasing user convenience.

Immediate transfer of payment also tends to give FPS a near-cash-type characteristic, thereby increasing consumer confidence in it as a mode of payment for small retail payments. To facilitate a near-cash, seamless experience for all types of users, focus has been increased on the interoperability of payment systems and types. Technical innovations have helped support interoperability. In many countries, third-party service providers have used the FPS infrastructure to design and provide innovative payment solutions to the end customers. It has provided the basis for service enhancements and value-added services. Emerging economies have used the FPS infrastructure to transfer subsidy and welfare payments in real time, resulting in reduced transmission costs and losses and improved social indicators. Online payments have equipped operators and

participants with data and analytical tools that allow them to understand payment patterns and offer innovative, customized solutions.

The rapid adoption of FPSs, however, must be balanced with appropriate safeguards and risk-management frameworks. It is important to ensure that innovations in the payment space do not come at the cost of overall security and safety. It is crucial, for example, to put in place a robust fraud-mitigation system to ensure the health of the system. Clear dispute-resolution mechanisms are needed to address concerns, such as when a payment is accidentally made to the wrong recipient. In addition, the risk of social-engineering attacks, such as phishing, can be higher with fast payments than with other modes. This concern needs to be mitigated with an appropriate monitoring system, fraud-prevention tools, and end-user training.

The COVID-19 pandemic has also highlighted the growing relevance of FPS. Countries that have implemented FPS have seen a surge in adoption and usage. For example, Thailand's PromptPay system has become quite popular among the masses for safe, secure, and convenient transactions. It has also been used by the government to provide relief measures to the citizens. In India, the National Payments Corporation of India launched UPI in August 2016. UPI processed transactions worth Rs 14.260 billion between March and August 2020, amounting to almost one-third of the total amount transacted on UPI since its launch.<sup>4</sup> In Kenya, the central bank mandated that all participants waive transactions charges for PesaLink for three months during the pandemic.<sup>5</sup> Additionally, the use of access channels such as QR codes has allowed customers to make payments remotely in real time while practicing social distancing.

#### 1.4. DRIVERS FOR FPS

Adoption and uptake of FPS services vary significantly between countries based on the following characteristics.

- **Coverage and Openness of the System**

Countries that introduced FPSs with wider coverage helped maximize adoption and usage by both businesses and consumers. The following factors may drive wider coverage and openness of FPS:

- Capability to facilitate both individual and corporate use cases: Restriction of fast payments to a narrow set of transactions—for example, person to person but not person to business or business to business—may limit potential use case.



- Support for both push and pull payments: Accommodation of both types of payments helps in offering a wider range of use cases and services to the end customers.
- Participation of non-banks and technology companies: The presence of more participants makes the system more valuable to each participant. The more traditional participants of the FPS ecosystem are banks; however, inclusion of non-banks and technology companies such as mobile network operators and mobile money operators will provide FPS with a wider user base and help boost adoption.
- Financial inclusion as a motivation to introduce FPS: Countries may witness widespread adoption owing to affordable pricing and efforts from the regulator or government to boost adoption.

- **Technology, Access Channels, and Ease of Use**

Since FPS is a new technology, limited access to the system or a complex user experience make it inconvenient or hard for users, thus posing a significant challenge to adoption and usage. The following factors may ensure easy accessibility and a more user-friendly experience:

- Accessibility via everyday devices: Many FPSs have demonstrated the importance of accessibility to services through everyday devices, such as mobile phones and computers, as a driver for adoption.
- Use of an alias (mobile number, national ID, email ID, or other user-chosen ID) makes it convenient for users to access the services offered through FPS, thus promoting uptake.
- FPS accessibility via an API and the usage of international standards, such as ISO20022, facilitate payment service providers to connect to the system and structure their offering.

- **Market Context**

Uptake is likely to be higher in economies where the preexisting market context enables use of real-time payments. The following preexisting market and technological factors may affect the adoption of FPS in a country:

- Level of penetration or adoption of mobile phones (both smart phones and feature phones) and usage of Internet services;
- Quality and payment speed of other payment options;
- Level of market competitiveness in the payments space.

## 1.5. EVOLUTION OF FPS AROUND THE WORLD

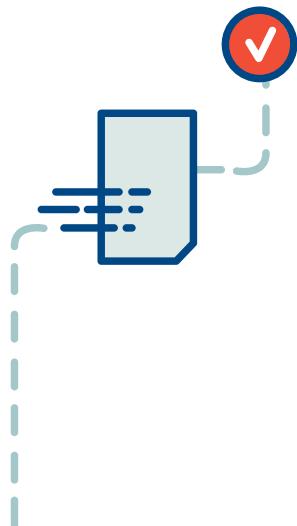
While FPS may appear to be a recent phenomenon, quite a few near-real-time retail payment schemes were introduced in the second half of the 20th century. For example, the Zengin System in Japan, a near-real-time payment system during banking hours, was launched in 1973.<sup>6</sup> However, it wasn't until the first decade of the 21st century that many countries started adopting FPS. While Japan, Mexico, and a few other countries upgraded their existing payment systems to meet the FPS requirements, other countries including Hong Kong, Australia, and Poland developed a new system. While all existing FPSs are domestic in nature, defined by the jurisdiction of their operation, SCT Inst. (Europe) and P27<sup>7</sup> (Nordic countries) offer multicurrency cross-border instant payments. FPS progressed at a truly rapid pace in the last five years.

While the United Kingdom, Poland, and a few other countries were pioneers in implementing FPS at a time when there were no other global analogies and little market demand, most countries started implementing FPS after seeing the success of early FPSs and the benefits they bring. Although FPS was introduced because of regulatory pushes in most countries, the United States, Poland, and other countries saw private operators introducing FPS on their own due to increased market need for the same. The emergence of FPS was undoubtedly accompanied by advances in information technology, especially as access, adoption, and usage of smartphones increased.

FPSs, like other aspects of payments, have changed with time. Many of them entered the market with simple person-to-person or limited payment types, but as user confidence grew, other payment types were introduced, including business and government. Similarly, in the earlier versions, most FPSs enabled payments only via a bank account number. This made small payments tedious, as people and merchants had to share account details to initiate payments. To improve user experience and make payments easier, over the years most FPSs introduced aliases, such as mobile numbers, that act as proxies for bank account numbers and complete transactions. With the help of aliases, users are required to register only once and then can transact with ease using the alias in the future. Aliases can also be easily used in social commerce (where social media is used to conduct commerce between individuals). FPSs have also taken different journeys based on the market environment they operate in. Due to the popularity of QR code, FPSs in the Asian region have enabled invoking payments through this channel. Payments via QR code

have helped increase adoption of FPS as a means of payment, especially for merchant and bill payments. FPSs have to keep adapting as market conditions and people's preferences change over time. With the advent of alternatives such as payments via m-POS, biometric authentication, and so on, it is imperative for FPS operators to continue to be agile and to offer innovative solutions according to the regulatory environment.

FPS implementation is a complex venture, as it involves multiple stakeholders. Therefore, regulators and operators need to be meticulous while making sensitive decisions. Evidence indicates that FPS is here to stay—and needs emerging from events like the COVID-19 pandemic are reinforcing the advantages that FPS offers, such as instant transfer, contactless payment.



## 2 APPROACH

The FPS toolkit will provide guidance to countries looking to embark on their FPS journeys or for FPS enhancements or legal and governance arrangements. The study methodology was divided into two phases.

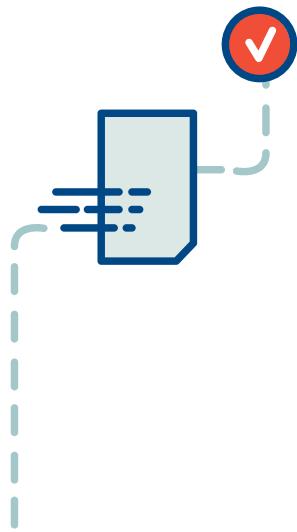
Phase 1 was subdivided in two parts. Phase 1a involved secondary research to understand the current state of FPS and recent developments in FPS across 10 broad parameters in more than 85 countries (across live systems, systems under development, and live but not full-fledged systems) around the world. In Phase 1b, desk research was conducted for 25 countries or systems identified for more detailed study, using publicly available information. The parameters studied ranged across regulatory and governance aspects, customer features, and technical capabilities. The 25 countries were selected based on geographical region, income levels, and FPS development stage. These 25 countries were further streamlined to include only countries with live FPS, producing a list of 16 countries identified for a deep dive; they were studied in Phase 2. The intent was to get a diverse mix of countries across various geographic regions and also adequate coverage across matured or developed and emerging economies. In Phase 2, detailed country-specific reports were developed covering FPS objectives, the system-development processes, business and operating models, technical specifications, and governance frameworks. These deep-dive reports were built through in-depth secondary and primary research that included more than 65 interviews with regulators, operators, and participants (banks and non-banks) in the 16 selected countries. Exhibit 1 provides a summary of the approach followed for country shortlisting and research.



## EXHIBIT 1: STUDY APPROACH

APPROACH							
PHASE	BRIEF	COUNTRIES	PARAMETERS	BRIEF APPROACH	SOURCE	DELIVERABLE	
1a	FPS global landscape	85+	10	Broad characteristics/indicators of FPS were studied to provide a global overview of FPS	Desk research		
1b	25-country profiles	25	16	25-country profiles were developed including high level information on technical specs, system participants, governance arrangement and use cases/services provided	Desk research		
2a	Deep dive assessments	16	30+	In-depth study on FPS developments across 16 countries was carried out	Desk research and primary interviews	FPS toolkit includes consolidated insights from all phases	
2b	Specific topics		1. QR codes 2. APIs 3. Customer Authentication 4. Messaging formats	5. Consumer protection 6. Dispute handling, reversal, chargeback and refunds 7. Fraud risks and AML/CFT	8. Pricing Structure 9. Proxy Database 10. Access to retail payment systems	Desk research and primary interviews	

PARAMETERS	PHASE 1a	PHASE 1b	PHASE 2a
<b>Country selection framework</b>	FPS developments across the globe consisting of <ul style="list-style-type: none"> <li>• live FPS</li> <li>• under development</li> <li>• live-not full fledged systems</li> </ul>	25 countries were selected with representatives across: <ul style="list-style-type: none"> <li>• Geographical regions</li> <li>• Developed / developing nations and mix of country economy size</li> <li>• Income levels</li> <li>• Countries who were early adopters of FPS and countries with new systems developed over the last 2-3 years</li> </ul>	For the deep dive study, framework used for shortlisting the 16 countries consists of three filters: <ul style="list-style-type: none"> <li>• FPS Implementation Stage</li> <li>• Country Economics and Regional Distributions</li> <li>• Key FPS Features</li> </ul> In this phase only 'Live FPS' were considered as greater information likely to be available on the technical features of the payment systems, use cases, adoption statistics, FPS structure, rollout/post-rollout actions).



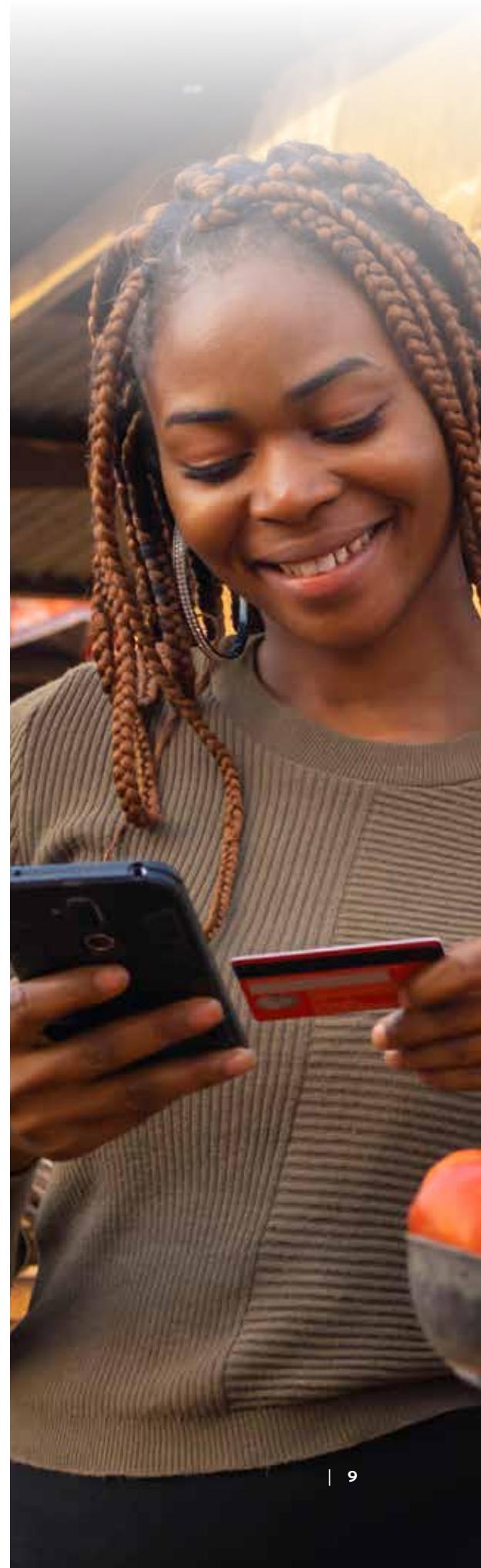
## 3 INSIGHTS

The FPS development life cycle can be broken into three distinct phases: conceptualize, design and implement, and go live and post-implementation. Considering the dynamic nature of FPS, continuous improvements and enhancements are needed to keep up with technological advancements and evolving consumer needs. Additionally, most systems are following a phased deployment of features, rather than a “big bang” deployment, providing opportunities to validate assumptions and designs and include participant and consumer feedback along the journey.

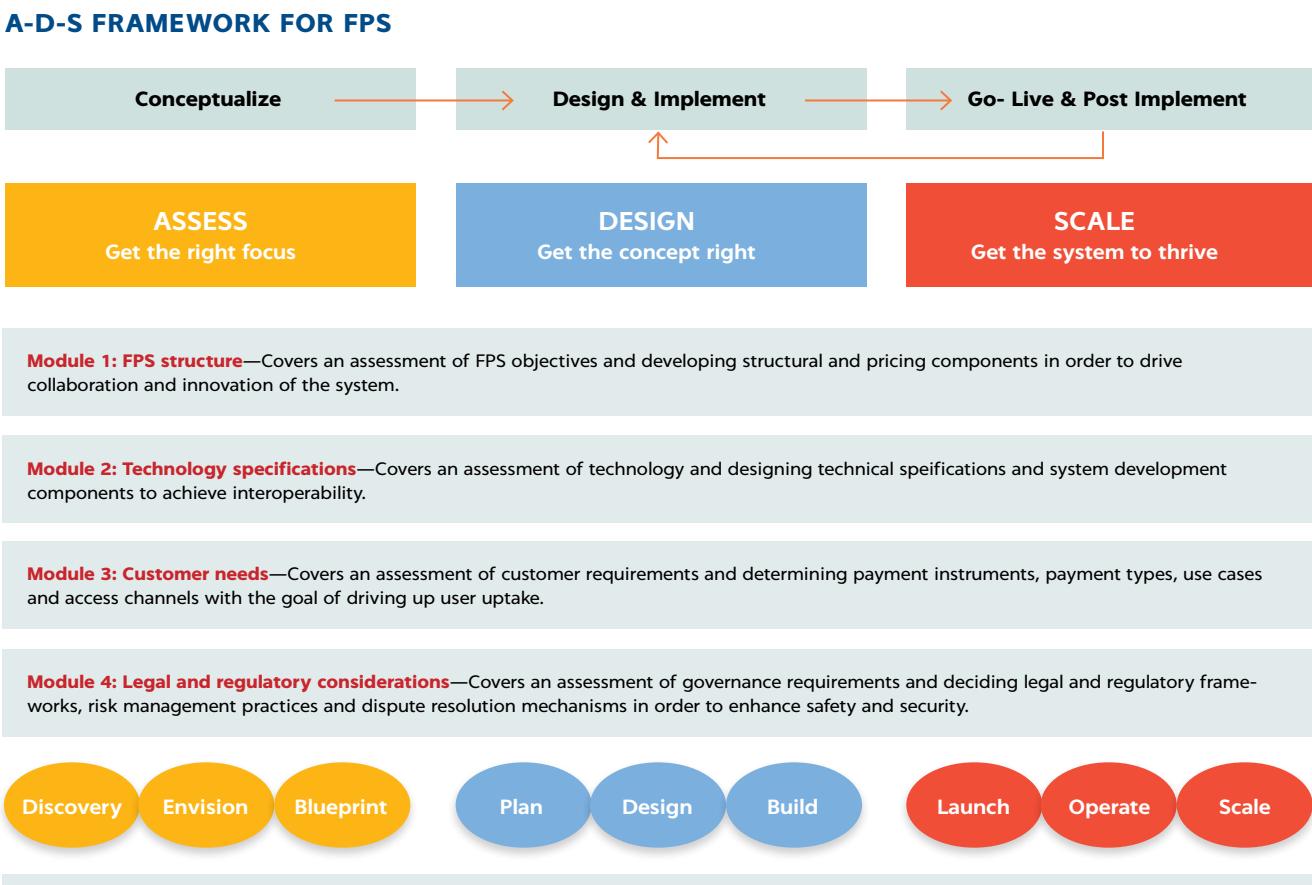
While over 60 countries have live FPSs, each FPS is unique in its own right, driven by the needs and requirements of its individual customers, regulatory bodies, and participants. Objectives and systems vary. Based on our analysis, the common theme is the need to endorse collaboration and innovation, ensure interoperability, promote user adoption, and guarantee safety and security.

The above themes have been incorporated into a customized framework for FPS implementation called Assess-Design-Scale that can be used by jurisdictions looking to start their FPS journey. Exhibit 2 presents a high-level summary. A more detailed version will be included in the final report.

Adoption of FPS has improved the consumer experience and added the option of transferring government benefits digitally. Additionally, the migration of customers to digital channels has reduced the cost of servicing for FPS participants. In order to scale FPS’s benefits, countries were motivated by different factors and have taken different approaches in terms of setting up the FPS ecosystem, technological elements, and governance. Various insights were gained by the comprehensive analysis of the 16 countries. A high-level overview of these insights is provided below. The insights have been mapped to the different modules based on the Assess-Design-Scale framework.



## EXHIBIT 2: STUDY FRAMEWORK

**MODULE 1: FPS STRUCTURE**

Focuses on the key drivers and objectives for considering FPS. Collaboration and innovation were called out as critical success factors by all countries during our analysis. The key drivers include whether the system development was market driven or regulatory driven, the role of governmental or regulatory push, and so on.

**1A. MOTIVATION TO INTRODUCE FPS**

When clearly articulated and agreed upon by all stakeholders, key drivers and objectives can spur the successful conceptualization and implementation of FPS. Over 60 countries have live FPS, and the motivation varies among the following factors:

- Countries were motivated to introduce FPS primarily to introduce real-time payments. The introduction and the adoption of FPS has been either market driven, regulator driven, or a combination of the two.
- The desire to enhance customer experience and to drive innovation have been key drivers for regulators, operators, and participants. Pursuing financial-inclusion objectives has also served as a driver in select economies. Convenience and safety are two key factors taken into consideration while introducing FPS.
- Regulators' initiatives and government push are believed to be the drivers for FPS adoption as well. In some countries, the government was also involved during FPS conceptualization.
- While some countries initially witnessed resistance from participants owing to comfort with existing systems, collaborative efforts from the central bank helped drive adoption by participants.

## EXHIBIT 3



- Initiatives such as external consultations and stakeholder forums during FPS conceptualization have also been viewed as a common theme across countries. Additionally, FPS was introduced as part of larger national programs in some countries.
- Some countries have external contributors to their FPS through collaborations with industry bodies such as banking associations.

## 1B. STAKEHOLDER ECOSYSTEM AND APPROACH TO SETTING UP FPS

The FPS ecosystem typically consists of the regulator, operator, owner, participants, third party providers, and end users. Participants can be both direct and indirect.

- Typically, the regulator plays the role of supervisor and oversees compliance with operating guidelines. The scheme owner and operator are typically independent entities that run the FPS under the supervision of the regulator.
- Direct participants are financial institutions that use the payment system infrastructure and have a direct account linked with the central bank's settlement system (where settlement generally takes place). Indirect participants are financial institutions that use the payment system infrastructure via a sponsoring primary participant and leverage the primary participant's account with the central bank for settlement. Non-banks are allowed to participate in the FPS of certain countries, while other countries do not currently allow them or are in the process of opening up their FPS to non-bank players.
- Early systems that were introduced around 2010 typically allowed only banks to be participants. The reasoning is that banks are comprehensively regulated and subject to stringent capital requirements and therefore are safe options. The liquidity risks associated with banks is usually low, as they maintain accounts with the central bank, which is used for settlement.

## 1C. FUNDING AND PRICING

An FPS requires sophisticated infrastructure that can handle large volumes and values of payments and execute multiple processes within seconds. This requires significant investments in technology and operations during the system-development phase. Therefore, it is important for FPS operators to recover costs accrued. The following two types of funding mechanisms have been observed:

- The FPS regulator funds the system development.
- Through operator ownership or banking associations, participants fund the entire FPS through monetary contributions.

To recover the investments incurred while developing the FPS, operators charge the system participants a joining fee or a fixed annual fee. This fee is generally proportional to the size of the financial institutions. Participants are also required to pay a variable fee that depends on the transaction volumes processed through the system. During the course of our study, a majority of the FPSs were seen to follow a partly fixed-fee, partly variable-fee model, although there are some exceptions. For example, one country follows the same pricing structure for all participants with no volume discounts, no volume commitments, and no monthly minimums, to ensure that financial institutions of all sizes participate on the same terms. In another country, participants are charged fees on a per-transaction basis, and the fee depends on transaction amounts.

System participants usually recover these costs in the form of charges to their customers (end users of the FPS). To promote adoption of FPS, the regulator or operator in

many countries has capped transaction fees to end users, limiting sources of revenue for the participants. To promote adoption of FPS for low-value retail transactions, a few countries waive transaction fees until a certain limit is reached.

## MODULE 2: TECHNOLOGY SPECIFICATIONS

Focuses on assessing the current state of technology of the existing payment system to evaluate whether to build FPS over the existing infrastructure or as a new system.

### 2A. OPTIONS FOR SYSTEM DEVELOPMENT

System development is a complex process that must be evaluated holistically before a country embarks on its FPS journey. Different countries have chosen different approaches based on their existing ecosystem, customer needs, and supporting infrastructure.

- FPS can be built either over an existing payment system or as a completely new system. Typically, it has been observed that most countries evaluate building over an existing systems but eventually opt for developing a new system that can accommodate the dynamic needs of FPS, something their existing systems can not do. It was observed that existing capabilities did not support the technology, security, or infrastructural requirements of FPS. Fifteen of the 16 deep-dive countries analyzed as part of this study built their FPS as a new system.
- Timelines for implementation varied across countries depending on the level of inherent functionality upon introduction of the system, use cases in FPS, whether the regulatory body or government mandated timelines, the time taken to get participants on board, and other factors.
- Countries carried out system development either in house or through a vendor partner. Typically, countries go through a request-for-proposal process for vendor shortlisting and onboarding. The benefit of onboard-ing a vendor partner is that they already have prebuilt solutions that are tried and tested. These solutions can be customized and leveraged, rather than investing re-sources in in-house capabilities and developing new components.

### 2B. TECHNICAL SPECIFICATIONS

Technical specifications, including the messaging format, customer-authentication standard, and usage of APIs, are typically determined with the goal of driving interoperability while ensuring secure data transmission and good customer experience.

- i. **Messaging format:** Over the years, many countries adopted various standards for domestic payments trans-fer, including ISO 8583, ISO 15022, American National Standards Institute (ANSI) X12, and so on. In the FPS context, ISO 20022 and ISO 8583 emerged as the major messaging standards. A few FPSs have also adopted the XML-based messaging format and proprietary messag-ing tools. Uniform messaging standards are highly criti-cal in standardizing payment flows. FPSs have adopted varying messaging standards depending upon their suitability with the domestic infrastructure.
- ii. **Customer authentication:** Authentication specifica-tions across schemes are generally based on regula-tions issued by central banks. Globally, there is a push toward using Strong Customer Authentication to reduce fraud and make online payments more secure. However, strong multifactor customer authentication may hamper seamless customer experience. It is critical for orga-nizations to strengthen authentication mechanisms while paying adequate attention to maintaining customer experience. It is essential to strike a balance between the two in today's age of remote digital payments, when miscreants are on the lookout for opportunities for identity theft and misuse.
- iii. **APIs:** APIs boost access and therefore interoperability by providing easy access to FPSs and other aspects of banking—that is, account details, lending, and other use cases. APIs also open the opportunity to create several interactions between participants of the payment eco-system and permit consumers to initiate payments at any time and from any location. Regulators around the world have started to understand that APIs are capable of revolu-tionizing the fast payments space. While regulation is important to help certain ecosystems move toward maturity, it is also important to allow market forces to encourage innovation, flexibility, and change. In some countries, APIs for payments were part of a broader evo-lution of financial services, while in other countries, APIs for payments were specifically developed or mandated. Countries are approaching APIs in stages across other aspects of banking—that is, account details, lending, and other use cases.

## 2C. CONNECTIVITY

During the FPS onboarding process, participants are required to establish a secure connection with the core infrastructure of the FPS. This technical connection allows system participants to exchange payment and non-payment messages with the system operator and other FPS participants.

In most jurisdictions, direct participants are required to establish this connection and undergo testing and certification when they connect with the system. Additionally, the direct participants are also required to fulfill settlement obligations (including obligations of indirect participants who are connected through them).

As FPSs have matured, some countries have made a distinct separation between the technical connection and settlement to allow financial institutions to connect with the system through several approaches. In this model, participants can designate a third-party service provider to send and receive transmissions of payment and non-payment messages. The access framework enables smaller financial institutions (generally lacking the technical capability) to connect to the system easily. Participants can also appoint an agent financial institution to fulfill their settlement obligations in this model.

## 2D. SETTLEMENT

The settlement model has an important role and forms a core intermediating function in FPS, ensuring a swift, safe, and seamless flow of funds from one payment participant to another. A sound settlement model ensures mitigation of risks and the management of liquidity. An efficient settlement model is therefore critical to the success of attaining security and stability in the payment system. There are two major payment-settlement models:

**i. Deferred net settlement:** Interparticipant settlement takes place through bilateral or multilateral netting of positions at designated times of the day. This model might create credit risks when participants do not have enough funds to fulfill their net settlement obligations. Due to this, participants are required to maintain float in the current accounts they hold with the central bank, locking their liquidity. Some operators have established other mechanism for ensuring timely settlement—by way of line of credit, Settlement Guarantee Mechanism / FundF.

**ii. Real-time settlement:** Credit risk is mitigated because of continuous interparticipant settlement. In this model, participants have to ensure sufficient liquidity contin-

uously. However, these requirements are relatively low, as FPSs usually process retail payments. In this model, participants need to maintain liquidity pools to handle instant settlement outside normal business hours and on holidays.

In our analysis, one country has adopted a line-by-line settlement model—that is, individual payments are settled with finality by simultaneously crediting and debiting accounts of participants held at the central bank.

In all the countries studied during the course of assessment, settlement systems are a central bank function in the case of the deferred net settlement model. The final settlement occurs in RTGS or RTGS-equivalent accounts maintained with the central bank of the country.

Settlement arrangements require direct participants to fulfill settlement obligations through their account in RTGS or RTGS equivalent, including obligations of indirect participants who are connected through them.

## 2E. INTEROPERABILITY

Interoperable systems are those that can work together to exchange information, either at present or in the future, without restrictions. Interoperability in the context of FPS can be enabled through compatible systems and can be facilitated by technologies, standards, or channels such as the following:

- QR codes;
- Open APIs;
- Standardized messaging formats such as ISO 20022;
- Standardized specifications such as EMVCo's specifications.

Interoperability in FPS can exist

- Between systems and platforms of different players—for example, for transfers between banks and non-banks, or for services that integrate multiple technological layers;
- Between payment instruments, for transfers between direct debits, credit transfers, and e-wallets; and
- In cross-border payments.

For example, one country has two instant payment systems that are not interoperable, while in another country there is complete interoperability between banks and stored value facilities<sup>8</sup> and customers can transfer money from banks to stored value facilities and vice versa. Some countries' FPSs allow transfers between banks and non-banks, while others do not.

Countries are working on enabling cross-border payments. In July 2019, the financial messaging service SWIFT successfully tested its near-instant cross-border payments proof of concept. The tests involved banks in Singapore, China, Thailand, and Australia, and the concept allows domestic real-time systems to process SWIFT's global payment innovation payments. Further, interoperability can be facilitated by standardized QR codes. Interoperability and standardization are necessary both at the country level as well as globally. In recent years, many countries have also realized the need to establish a standard QR specification for use across payment systems to address the need for interoperability. Some countries have based their QR specification on EMVCo's merchant-presented QR specifications in order to enable interoperability in the future, as these specifications are being adopted by a growing number of operators and participants.

### MODULE 3: CUSTOMER NEEDS

Focuses on carefully assessing customer needs, such as speed, payment certainty, a simple and convenient user experience, optimal pricing, clarity on the timing of delivery, and integration with bank account, mobile wallet, or e-money, among others. If the design of this module is done with a focus on the consumer's requirements, high user adoption can typically be achieved.

#### 3A. OVERLAY SERVICES AND ALIASES

- Overlay services** Businesses can use overlay services to deliver a better customer experience. In our study, a majority of countries introduced the overlay service as a follow-on after the FPS went live. This was done to enhance customer experience and increase user uptake. Certain countries' offerings are explicitly called out as overlay services. Overlay services include QR code generation, future-payment scheduling, reconciliation, and aliases.
- Aliases** entail the use of mobile numbers, email IDs, and so on as proxy addresses for bank account numbers, allowing customers to make transactions without needing to know the bank account number, which is typically hard to remember. (Numbers are 10 digits long or longer.) Systems generally offer proxy lookup as a key offer-

ing for customer convenience. The simplicity associated with aliases has been a major driver for their widespread adoption. Alias mapping can be done centrally or at a bank level.

- The introduction of aliases is mainly facilitated by an overlay service; introduction of aliases typically boosted user adoption of the FPS.

#### 3B. PAYMENT INSTRUMENTS, PAYMENT TYPES SUPPORTED, AND USE CASES AND SERVICES

Payment instruments are modes of payment that facilitate transactions between two parties. Payment instruments that facilitate real-time payments are credit transfers, direct debits, and e-wallets. All FPSs support credit transfers as an inherent payment instrument for facilitating real-time payments. Apart from credit transfers, some countries also support direct debits and e-money.

The adoption of FPS depends largely on the payment types and use cases and additional services provided by it. Adoption occurred faster for an FPS supporting more payment types and use cases than a system having limited offerings. Digitizing government and corporate payments (government to person, government to business, business to business, and business to person) is a potentially powerful way to advance the adoption of FPS. A common theme that emerged through the study is that when governments adopt FPS to enable payments, user uptake is strong. Particularly in emerging economies, adoption increased after the government started using FPS for payments.

Countries have taken different approaches to introducing use cases in the market. Select system operators have defined the associated use cases to be introduced in the market. On the other hand, in other countries, operators have developed a robust underlying infrastructure flexible enough to support multiple use cases. These countries have left it to system participants to decide on the use cases best suited for the market. It has also been observed that in some countries, use cases were introduced in a phased manner as per the needs of the customers. After launch of FPS, in some countries, additional use cases and services, including cross-bank bill payments, requests to pay, e-donations, bulk credit transfer payments, and direct debit, were extended in a phased manner.

### 3C. ACCESS CHANNELS

The channels through which a payment can be made are mobile banking, Internet banking, branches, kiosks, QR codes, and so on. Self-service channels have remained dominant in the FPS ecosystem, while the majority of systems do have a provision to support transactions through branches. Internet and mobile banking are the most common channels supported to initiate payments by FPS participants.

- i. QR codes:** QR codes are becoming increasingly common both among merchants and customers, and they are flexible enough to support the needs of both. Merchants are attracted to the QR code primarily due to its low cost of acquisition and maintenance. Moreover, QR codes provide flexibility to invoke other peripheral services, such as redirecting to a merchant's website or running promotional campaigns, apart from facilitating payments. Such services also attract customer adoption of QR codes owing to enhanced customer experience. Regulators and central banks observed success in select Asian countries and are working toward advancing QR payments to digitize cash and also promote financial inclusion.
- ii. Near Field Communication (NFC):** NFC<sup>9</sup> is widely used for facilitating merchant payments at NFC-enabled terminals. Adoption of this channel depends on the maturity of the infrastructure setup.

### iii. Unstructured Supplementary Service Data (USSD):

USSD<sup>10</sup> has been observed in countries where financial inclusion has been a key driver for the launch of FPS, especially lower middle-income countries. Most of the lower middle-income countries in our study offer this channel. This has helped overcome the barrier of smartphone and data requirements for FPS penetration and adoption in these countries.

- iv. Agent networks:** Agent networks<sup>11</sup> are utilized to transact via FPS in certain countries. The use of agents helps drive adoption of FPS even in segments that have limited access to smartphones and among customers who may not be technologically savvy enough to conduct financial transactions on their own (self-service).

### 3D. USER UPTAKE

Countries have seen a range of growth drivers for FPS adoption, including user experience, use case coverage, low transaction costs, and a push from the government and regulators. Typically, the person-to-person use case has seen maximum adoption. Exhibit 4 summarizes the drivers of user adoption and select corresponding country examples.

EXHIBIT 4: USER ADOPTION DRIVER—SELECT EXAMPLES

AWARENESS MEASURES	CUSTOMER EXPERIENCE	GOVERNMENT/REGULATORY PATH
The regulator developed a series of education and publicity materials, such as announcements in the public interest for broadcast on television and radio, as well as videos and electronic banners for digital platforms. The regulator also participated in trade fairs.	The overlay service completely revamped and focused on improving customer experience two years post the launch of mobile P2P payments. It saw the results of the same in terms of increased number of transactions.	The government departments are processing social welfare transfers and tax refunds through FPS, which has resulted in an increase in user registration of FPS from all sections, given that consumers need to be registered onto the FPS to receive the benefits.  Alignment of the government, regulator and operator played a vital role in ensuring that the overall policy decisions are in line to encourage users for adopting the system.
MARKETING ACTIVITIES OF PSPs	INCENTIVES/LOW TRANSACTION FEE	INTRODUCTION OF OVERLAY SERVICE
In all countries, PSPs play a role in marketing and advertising their solution to their customers.	Nil to minimal charges for transactions as incentives.	In some countries, the introduction of the overlay service acted as a driver for FPS uptake.

## MODULE 4: LEGAL AND REGULATORY CONSIDERATIONS

These focus on an assessment of governance requirements. Effective governance can promote the safety and security of the system.

### 4A. LEGAL, REGULATORY, AND GOVERNANCE CONSIDERATIONS

As the adoption of FPS picks up and the conventional payment systems are replaced, the role of sound regulation and legal backing, along with high governance standards, becomes important. This promotes innovation in payments while ensuring the full security and safety of the system. FPS in countries are governed not only by domestic regulations and laws but also by multiple regulations around open banking, such as the Payment Services Directive II in Europe, the General Data Protection Regulation in the European Union, digital know-your-customer guidelines, and the G20 High-Level Principles on Financial Consumer Protection.<sup>12</sup> These have added impetus for existing and new market participants to accept instant payments and become part of the transformation journey by providing substitutes to legacy payment systems.

### 4B. RISK MANAGEMENT (INCLUDING CYBER RESILIENCE)

According to the Committee on Payments and Market Infrastructure's Principles for Financial Market Infrastructures, an infrastructure should have a comprehensive risk-management framework for managing legal, credit, liquidity, operational, and other risks that the FPS is exposed to during day-to-day operations. FPS operators adopt enterprise-wide risk-management frameworks to manage these risks. Some jurisdictions also opt in for considering payment system-specific risk-management frameworks depending upon systemic risks associated with the system. These risk-management policies and procedures enable the stakeholders to identify, measure, monitor, and manage the range of risks that arise in or are borne by the FPS. System participants are also required to establish control mechanisms to deal with risks associated with their operation. Key risks associated with system operation are the following:

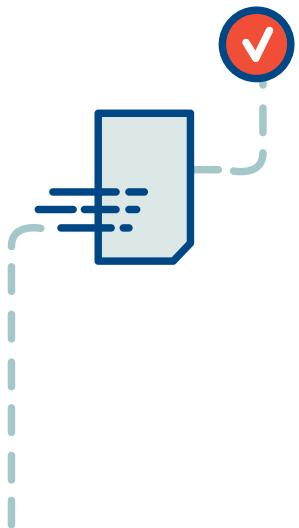
i. **Liquidity and settlement risk:** Liquidity and settlement risks are predominant in FPS because of the instant nature of fund transfers. The receiving institutions credit the customer's account before the payment is final, and they might be exposed to credit risk in cases where the sending institutions fail to settle their obligations during the settlement cycle. Some countries use a prefunding model to mitigate liquidity and settlement risks; in other countries, participants are required to deposit collateral with the central banks.

ii. **Operational and fraud risk:** Operational risks arise from the potential of loss due to significant deficiencies in system reliability or integrity. Payment systems can be exposed to these risks because of vulnerabilities of system participants. To mitigate the operational and fraud risks, system operators formulate operational and fraud risk-management frameworks that contain risk-tolerance policies and risk guidelines for participants and define the roles and responsibilities of the stakeholders.

**Cyber resilience:** According to guidelines from the Committee on Payments and Market Infrastructures and International Organization of Securities Commissions, five primary risk-management categories (governance, identification, protection, detection, and response and recovery) and three overarching components (testing, situational awareness, and learning and evolving) should be addressed across a financial market infrastructure's cyber-resilience framework. Several jurisdictions have adopted measures that are compliant with these guidelines. Some FPS operators are also leveraging the services of external consultants to ensure the cyber resilience of their systems.

### 4C. DISPUTE RESOLUTION AND CUSTOMER COMPLAINTS

During the day-to-day operations of payment systems, inter-participant differences and customer grievances are bound to occur. Therefore, it is important for regulatory authorities and system operators to put in place and publicize a dedicated dispute-resolution mechanism to ensure the effective and time-bound resolution of these differences. FPSs achieve settlement finality by providing final settlement intraday or in real time. In some jurisdictions, the legal basis has been provided to settlement finality. Due to this, transactions submitted through FPS become irrevocable and irreversible in nature. Hence, effective control mechanisms need to be put in place to resolve claims of erroneous transactions submitted by end consumers.



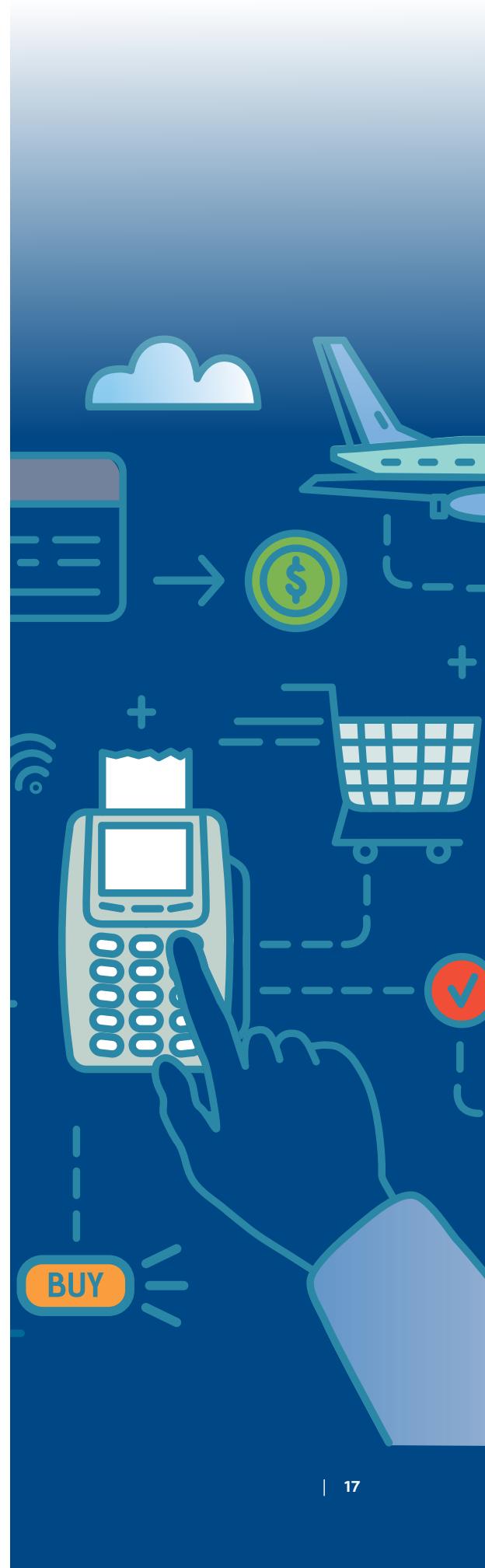
## 4 WHAT'S NEXT?

The World Bank Group is currently developing a toolkit that will present an overview of the global FPS landscape covering select parameters, 25 country profiles of systems with diverse geographical coverage, detailed deep-dive reports of 16 countries, a comprehensive report synthesizing findings from the study, and specific topics that are relevant to FPS. The deep-dive reports of the 16 countries are built on consultations with more than 65 stakeholders, including regulators, operators, participants, and industry bodies.

As we try to provide a comprehensive view of global FPS developments, we ask you to provide views and suggestions that could enhance our study by January 15, 2021 ([paymentsystems@worldbank.org](mailto:paymentsystems@worldbank.org)).

### **For countries that have already implemented FPS.**

1. FPS has enabled various innovations in the payment landscape, such as the use of aliases, newer transaction-initiation methods and increased interoperability (see section 1.3.). In your opinion:
  - a. What is the role of FPS in driving innovation in the wider payments landscape?
  - b. How do you envision the payments space will evolve in the coming years?
  - c. How has adoption of FPS changed during the COVID-19 pandemic in your country?
  - d. How has the introduction of FPS changed the usage of other payment systems in your country?
2. In your opinion, what are the key critical success factors for a successful FPS implementation?
3. We have proposed a detailed review of a set of 10 topics (as shown in Exhibit 1). Are there any other topics you think is missing from the list?



4. We have proposed a Assess-Design-Scale framework that we have developed for FPS implementations (see section 3). Do you think this captures all the key decisions and considerations that need to be taken into account?
5. What future enhancements are you considering for your fast payment system?

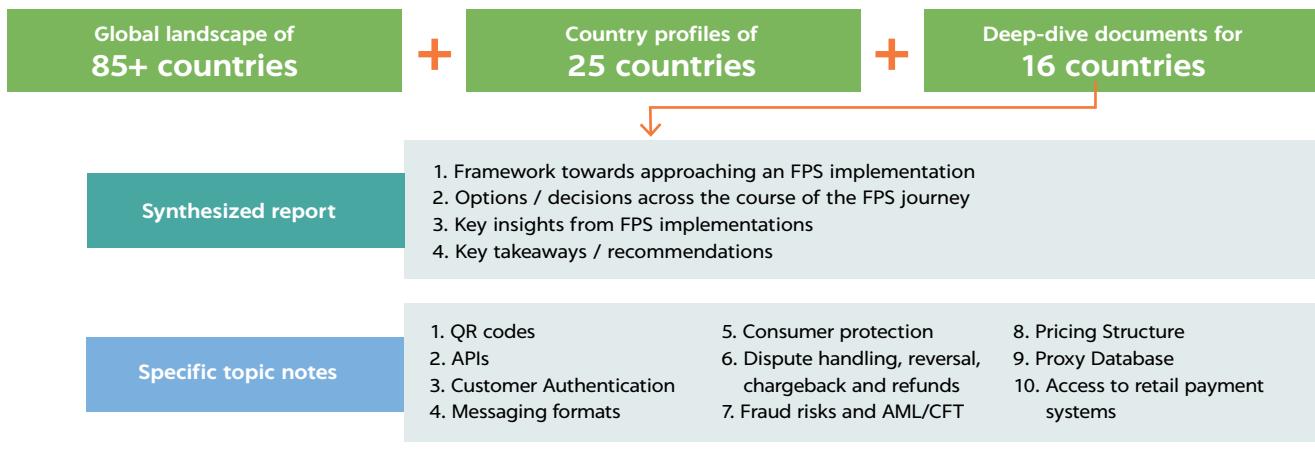
**For countries that have not implemented FPS yet, but plan to start soon or are in the process of implementing.**

1. FPS has enabled various innovations in the payment landscape, such as the use of aliases, newer transaction-initiation methods and increased interoperability (See section 1.3.). In your opinion:
  - a. What payment needs are being planned to be addressed through FPS?
  - b. What would be the role of FPS in driving innovation in the wider payments landscape?
  - c. How do you envision the payments space will evolve in the coming years?

- d. What role do you think FPS would have played in your country in the context of COVID-19 pandemic?
- e. What changes do you envisage in the usage of other payment systems in your country, after FPS is implemented?

2. In your opinion, what are the key challenges in building support internally and amongst the market players for implementing FPS?
3. We have proposed a detailed review of a set of 10 topics (as shown in Exhibit 1). Are there any other topics you think is missing from this list and/ or issues that do not seem to have been addressed?
4. We have proposed a Assess-Design-Scale framework that we have developed for FPS implementations (see section 3), do you think this captures all the key decisions and considerations that need to be taken into account?
5. Would a toolkit like the one described in the document, be helpful for a country like yours that is envisaging or is in the process of implementing a FPS?

## FPS TOOLKIT



## INDICATIVE COUNTRY DEEP DIVE DOCUMENT CONTENT

### Background and Objectives, System Development and Key Timelines

### Business and Operating Model

FPS Structure  
Participants  
Payment Instruments, Types and Transaction Limits  
Aliases, Channels and Use Cases/Services

### User Adoption

### Technical Details and Payment Process

Messaging Format, QR Codes, APIs, Customer Authentication  
Customer Registration, Transaction Fulfillment, Liquidity Management and Settlement

### Governance Framework

Legal and Regulatory Aspects  
Risk Management, Dispute Resolution and Customer Complaints

## INDICATIVE CONTENT FOR SPECIFIC TOPIC NOTES

1. **QR codes** (e.g. security considerations, use cases, types of specifications, standardization, cross-border payment aspects)
2. **APIs** (e.g. financial services and payments use cases, open banking, country implementation examples, security considerations, pricing, standardization, W3C's APIs, GSMA mobile money APIs, EMVCo's secure remote commerce)
3. **Customer authentication** (e.g. strong customer authentication aspects, country specific examples, FIDO standards, EMV-3D secure, risk-based authentication, biometric authentication, GSMA's mobile connect)
4. **Messaging formats** (e.g. overview of different types of messaging standards, ISO8583, ISO15022, SWIFT and other proprietary standards, ISO20022, migration to ISO20022)
5. **Consumer protection** (e.g. legal, regulatory and supervisory framework, fair treatment and business conduct, data protection and privacy, disclosure and transparency, consumer education and awareness)
6. **Dispute handling** (e.g. dispute handling in card payments, dispute handling in FPS, ways to reduce disputes, settlement finality, reversals, refunds, chargebacks)
7. **Fraud risk and AML/CFT** (e.g. phishing and social engineering, malware, card-not-present fraud, chargeback fraud, risk management framework, AML/CFT compliance, role of AI)
8. **Pricing structure** (e.g. types of pricing structures adopted by retail payment systems and payment service providers, types of fees levied, pricing in card payments, pricing in FPS)
9. **Proxy database** (e.g. prominent proxy identifiers/aliases, mobile number, e-mail address, national ID number, scheme specific proxy identifies, proxy database)
10. **Access to retail payment systems** (e.g. access rules to retail payment systems, on-boarding procedures for participants, direct and indirect access to clearing and settlement services)

## NOTES

1. Desk research and analysis.
2. The quest for speed in payments. Bech et al. BIS Quarterly Review. 2017.
3. BIS Quarterly Review, March 2020.
4. <https://www.thehindubusinessline.com/money-and-banking/covid-effect-upi-transactions-up-significantly-post-lockdown/article32543739.ece>
5. <https://www.ipsl.co.ke/about-us/news/102-pesalink-waives-all-transaction-charges>
6. Zengin became a complete FPS in 2018 with implementation of the More Time System ([https://www.zengin-net.jp/en/zengin\\_net/pdf/pamphlet\\_e.pdf](https://www.zengin-net.jp/en/zengin_net/pdf/pamphlet_e.pdf)).
7. Expected to be launched in 2021.
8. Stored value facilities are similar to e-money providers or e-wallets.
9. NFC is a proximity-based access channel that allows the wireless transfer of payment messages and data through smartphones and other devices.
10. USSD is a common technology for communication between GSM handsets and the back-end computer systems of mobile network operators. USSD can be used on any phone, including feature phones, and it is among the easiest and most affordable technologies to deploy, especially for mobile network operators, because there are no additional hardware requirements for merchants or customers apart from the mobile phones.
11. Agent networks are an assisted form of banking channel (typically found in emerging and developing countries) in which a bank's agent facilitates customer transactions with the bank's application (usually through a mobile app or tablet).
12. Not legally enforceable.

## ANNEX

EXTERNAL ADVISORY EXPERTS GROUP		
Institution	Representative	Title
Banque Centrale des États de l'Afrique de l'Ouest (BCEAO)	Ms. Akuwa Dogbe Azoma	Payment Systems Director
Committee on Payments and Market Infrastructures (CPMI)	Mr. Umar Faruqui	Member of Secretariat
European Central Bank (ECB)	Ms. Mirjam Plooij	Senior Market Infrastructure Expert
Central Bank of Egypt	Mr. Ehab Nasr	Assistant Sub-Governor, Payment Systems and Business Technology Sector
Fast Identity Online (FIDO) Alliance	Ms. Christina Hulka	Executive Director and Chief Operating Officer
Global System for Mobile Communication (GSMA)	Mr. Bart-Jan Pors	Director of Inclusive FinTech
National Payment Corporation of India (NPCI)	Mr. Dilip Asbe	Director and Chief Executive Officer
NPCI International Payments Limited (NIPL)	Mr. Ritesh Shukla	Chief Executive Officer
Bank of Jamaica	Mrs. Novelette Panton	Division Chief, Financial Markets Infrastructure
Bank of Jamaica	Mr. Mario Griffiths (Alternate)	Director, Payment System Policy and Development
Bank Negara Malaysia	Mr. Yip Kah Kit	Deputy Director, Financial Development and Innovation
Banco de México	Mr. Miguel Diaz	General Director of Payment Systems and Market Infrastructures
South Africa Reserve Bank	Mr. Tim Masela	Head of Payment Systems Department
UK Payment Systems Regulator (PSR)	Mr. Nick Davey	Payment Specialist
UK Payment Systems Regulator (PSR)	Ms. Nicole Coates (Alternate)	Technical Specialist

