

Agpaytech's Research
19th April, 2024

PAPSS and UPI integration

Economic benefits and a Catalyst for
South Payment dynamics



PAPSS
Pan-African Payment
& Settlement System

UPI

Summary

The integration of payment systems has become increasingly important in an interconnected global economy. The Pan-African Payment and Settlement System (PAPSS) and the Unified Payments Interface (UPI) are two prominent systems that have the potential to transform the financial landscape in their respective regions. PAPSS, launched by the African Union in 2019, aims to facilitate cross-border payments and foster economic integration within Africa. On the other hand, UPI, introduced by the National Payments Corporation of India (NPCI) in 2016, has revolutionized digital payments in India by enabling seamless peer-to-peer and merchant transactions.



UPI has gone beyond borders, connecting other international payment systems such as UPI-UPI-PayNow, UPI-PhonePe, UPI-TerraPay. Recently, India and Mauritius announced a collaboration that will see UPI and RuPay connectivity with Mauritius MuCAS system. With this connectivity, an

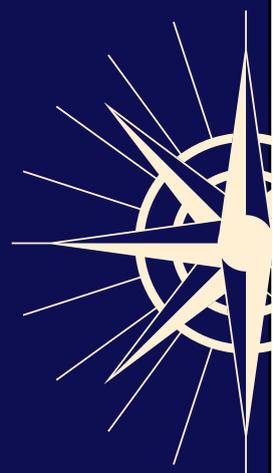


PAPSS, launched by the African Union in 2019, facilitates cross-border payments and promotes economic integration, while UPI, introduced by NPCI in 2016, revolutionizes digital payments in India.

Indian traveller to Mauritius will be able to do the same in India using the Instant Payment System (IPS) app of Mauritius. This collaboration suggests the possibility of UPI interlinking with other payment systems in Africa such as PAPSS to boost regional trade without any limitations and restrictions

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Evolution of Public Digital Payment Infrastructure

Evolution of Public Digital Payment Infrastructure

The evolution of digital payment infrastructure for payment connectivity has undergone significant advancements over the years, driven by technological innovation, changing consumer behaviors, and regulatory developments. Initially, digital payments were primarily facilitated through traditional banking systems, such as Automated Clearing House (ACH) transfers, wire transfers, and card-based transactions (debit and credit cards). These systems relied on established banking networks and were often characterized by longer processing times and higher transaction costs. The global development of digital public payment systems has seen significant advancements aimed at making financial transactions more efficient, convenient, and secure. In recent times, many countries have implemented or are in the process of implementing real-time payment systems, faster payment networks, instant payment schemes, digital wallets and mobile payment apps, and cross-border fast payment solutions enabling instantaneous fund transfers 24/7, 365 days a year. There are national payment infrastructures (PSIs) such as the UPI, PayNow, DuitNow, PromptPay, PAPSS, US FedNow, and many others. This section provides an overview of some instant retail payment systems shaping digital payments beyond local boundaries.

■ India - UPI, Launch 2016

Developed by the NPCI, UPI is a real-time payment system in India that enables instant money transfer between bank accounts via mobile devices with friendly interface

It also facilitates payments by scanning QR codes at merchants. UPI can be used for various purposes such as bill payments, booking tickets, paying for goods and services, and more.

■ Thailand - PromptPay Launch 2017

PromptPay is a fast payment service with real-time clearing and settlement combined with a proxy look-up service that securely maps a national ID number, corporate tax ID, or phone number to a

■ Brazil - PIX, Launch 2020

Brazil's PIX fast payment system allows fund transfers between all types of transaction accounts, creating a payment service ecosystem with low acceptance costs and high levels of usability. Through Pix one can transfer money using the e-mail address or the mobile phone number of the transferee. Like the UPI, Pix also actively uses QR codes as the access channel.

bank account. PromptPay has enrolled 70% of the population, banks charge no fees for using the service, and they have deployed an interoperable QR code system.



- **Indonesia –BI Fast, Launch 2021**

BI Fast is a fast payment infrastructure that refers to a method of transferring funds or making payments that are characterized by its speed and efficiency for bank and nonbank customers by direct and indirect membership model. It was built by Bank Indonesia to facilitate near-instantaneous transactions, allowing individuals or businesses to send and receive money quickly.

- **Malaysia - DuitNow**

DuitNow is a Payments Network Malaysia Sdn Bhd (PayNet) is the national payments network and shared central infrastructure for Malaysia's financial markets.

- **Singapore - PayNow, Launch 2017**

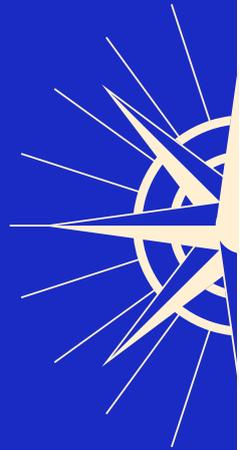
PayNow offers an enhanced funds transfer experience that enables retail customers of the participating banks and NFIs to send and receive Singapore Dollar funds from one bank or e-wallet account to another in Singapore through FAST by using just their mobile number, Singapore NRIC/FIN, or VPA, instantly.

- **USA -FedNow, Launch 2023**

The FedNow Service is a new instant payment infrastructure developed by the Federal Reserve that allows eligible depository institutions of different sizes across the U.S. to provide instant payment services. Businesses and individuals can send and receive money instantly, and support account-to-account transfer and bill pay.

- **Mexico - CoDi**

CoDi is a payment method created by the Central Bank of Mexico (Banco de México) that combined with STP's technology will enable your company to make real-time collections with QRs and push notification messages to your end user's banking applications.



A Focus on UPI-PAPSS Integration

A Focus on UPI-PAPSS Integration

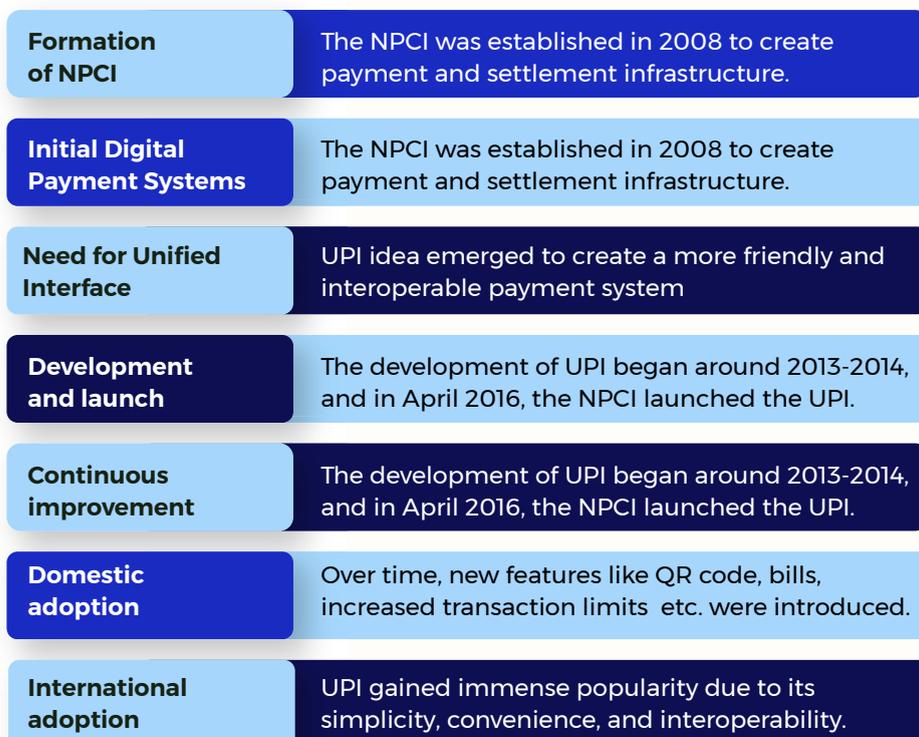
The integration of the Pan-African Payment and Settlement System (PAPSS) with the Unified Payments Interface (UPI) could lead to several economic benefits and serve as a catalyst for payment dynamics, particularly in the African continent and India.

UPI Development

The RBI and Indian Banks' Association (IBA) under the provisions of the Payment and Settlement Systems Act, 2007, initiated the NPCI. The NPCI is an umbrella organization for operating retail payments and settlement systems in India. The UPI in India has its roots in the efforts to modernize and streamline the country's payment systems. Since its launch, UPI has transformed the digital payments landscape in India, witnessing

exponential growth in transaction volumes and playing a pivotal role in driving the country towards a less-cash economy. Its success has been attributed to its user-friendly interface, seamless transactions, and support from banks, fintech firms, and the government. The development of UPI began around 2013-2014, and in April 2016, the NPCI officially launched the UPI platform.

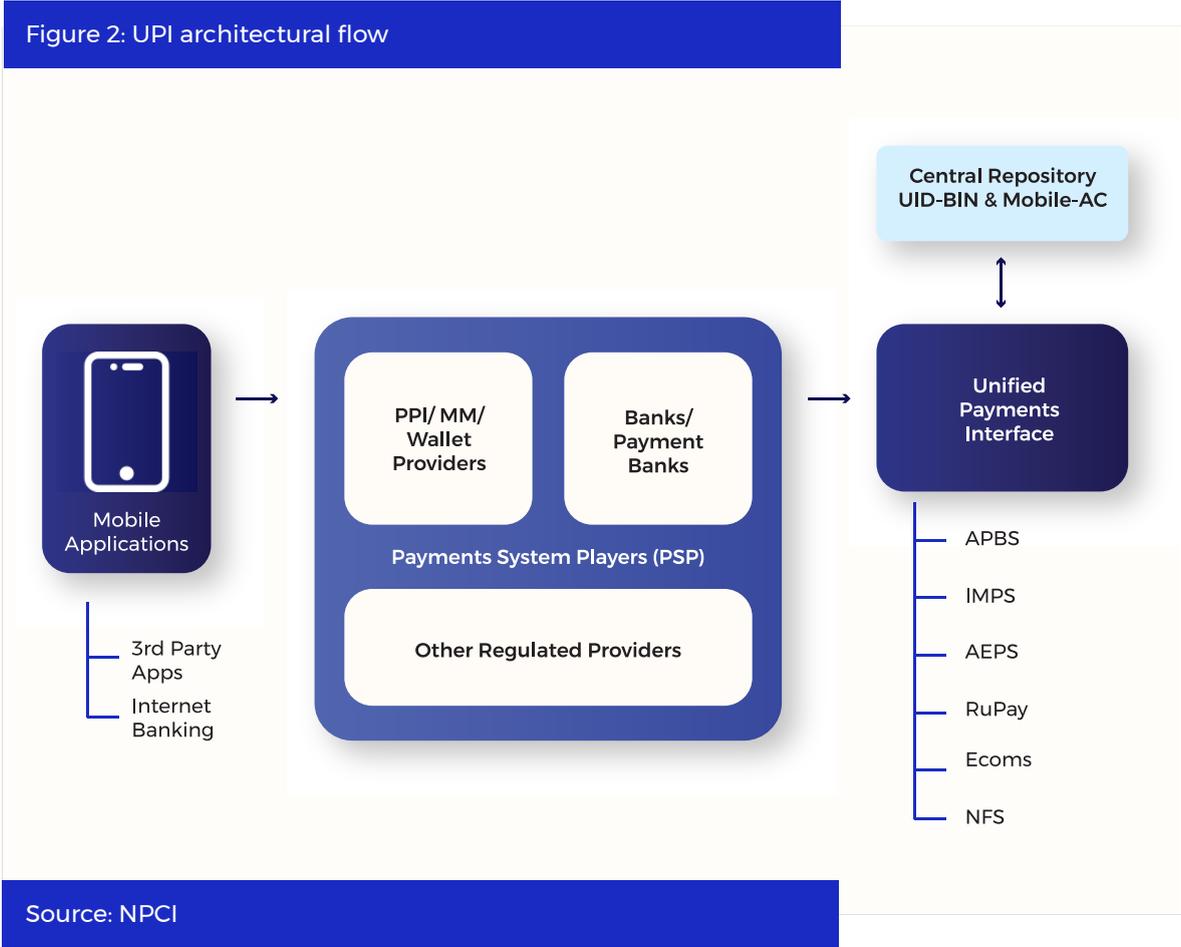
Figure 1: Development of UPI



Source: Agpaytech

UPI Architecture Framework

The UPI architecture is built with the motivation to become a less-cash society and improve the participation of people in a financial society that has a majority in electronic payments. The UPI is a system developed primarily for mobile phone users, migrating the bank onto the screens of your mobile. Thus it can be said that on average, every person has a mobile phone and every household has one smartphone (NPCI, 2023). If transactions can be made quick and effortless, with the 1-click 2-factor authentication, then more and more people will use such a simple interface. The UPI uses existing payment systems like the Immediate Payment Services (IMPS), Aadhar Enabled Payments Service (AEPS), etc, to ensure the integrity of the transactions. These payment systems are integrated by using a common Interface, which is the UPI. This interface offers instant payment using the mobile phone, which is a value added service.



UPI Usage in Foreign Countries

Today, UPI has transcended its initial purpose within India, gaining acknowledgment and interest on the global stage. Its recognition by international institutions, collaborations with foreign entities, and potential applications in various countries highlight its significance and success beyond Indian borders. Already, India has shared its UPI technology with many countries including France,

Australia, Singapore, UAE, Saudi Arabia, Oman, Nepal, Bhutan, Sri Lanka, and others. Some countries have initiated pilot programs to test UPI-inspired payment systems (e.g. Brazil's Pix). These programs aim to assess the feasibility of implementing similar real-time payment systems in their respective regions.

Table 1: Where UPI International access to UPI technology

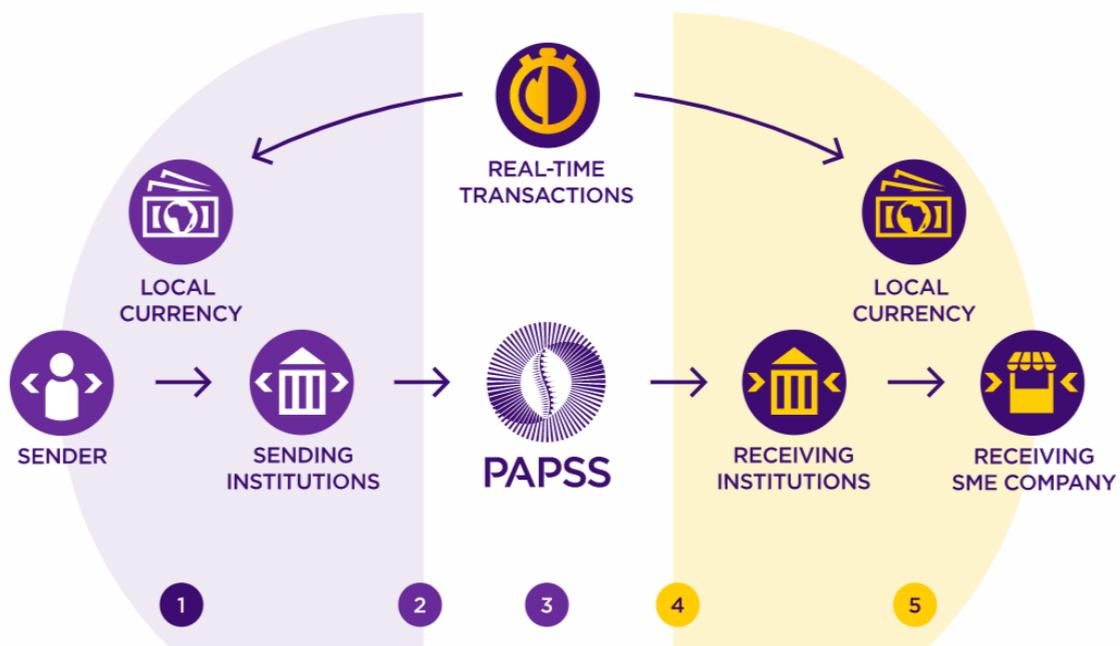
Country	Entity	Announced
Bhutan	Royal Monetary Authority of Bhutan	July 2021
Singapore	Monetary Authority of Singapore, PayNow	September 2021
Malaysia	Merchantrade Asia	August 2021
Singapore, Malaysia, Thailand, Philippines, Vietnam, Cambodia, Hong Kong, Taiwan, South Korea, Japan	Liquid Group	September 2021
UAE	Network International (NI)	November 2021
Nepal	Gateway Payment Services, Manam Infotech	February 2022
UAE	LuLu Financial, NEOPAY (Mashreq Bank)	April-August 2022
France	<ul style="list-style-type: none"> ▪ Lyra ▪ India and France agreed to implement this following PM Modi's visit to France 	June 2022 July 2023
United Kingdom	Terrapay, PayXpert	August-September 2022
Netherlands, Belgium, Luxemburg, Switzerland	Worldline	October 2022
Oman	Central Bank of Oman	October 2022
UAE	UAE Central Bank's Instant Payment Platform (IPP)	July 2023
Sri Lanka	Network-to-network agreement for UPI [announced during President Ranil Wickremesinghe's two-day visit to India]	July 2023

Source: Web Compilation

Pan-African Payment and Settlement System (PAPSS)

PAPSS is a single payment infrastructure that cuts through the existing challenges of local currency exchange and ensures instant payment of funds across Africa. PAPSS is a centralized payment and settlement infrastructure for intra- African trade and commerce payments. PAPSS collaborates with Africa's central banks to provide a payment and settlement service to commercial banks, payment service providers, and Fintech. PAPSS technologies aimed to facilitate the expected increased volumes in cross-border payments, whose mission includes stimulating African trade expansion, diversification, and development. PAPSS, developed by African Export-Import Bank (Afreximbank), is expected to boost intra-African trade by transforming and facilitating payment, clearing, and settlement for cross-border trade across Africa.

Figure 3: PAPSS transaction flow



Source: Pan-Africa Payment and Settlement System

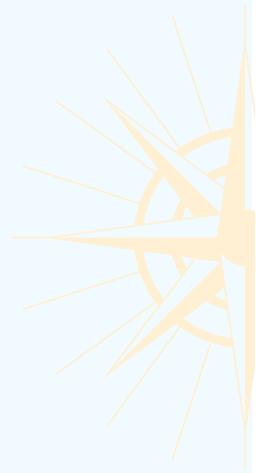
PAPSS, which had a slow start is making progress. It has now extended its presence to North Africa, making it present in four African regions (West Africa, East Africa, Southern Africa, and North Africa), with a total of 13 Central banks already on board. Building a resilient and reliable PAPSS is a challenge since only a few African countries have joined and achieved full interoperability, limiting the ability to maximize the opportunity presented by the PAPSS platform.

Achieving 90% full interoperability, intra-African country currencies pre-funded would eliminate the huge transactional charges, delays and the involvement of correspondent banking hassles. The central banks from the following countries are members of the PAPSS; Gambia, Sierra Leone, Zimbabwe, Ghana, Nigeria, Liberia, Guinea, Djibouti, Zambia, Kenya, Rwanda, Malawi and Tunisia.

Figure 4: PAPSS participants by country



Source Agpaytech



UPI and PAPSS Technology Connectivity

UPI and PAPSS Technology Connectivity

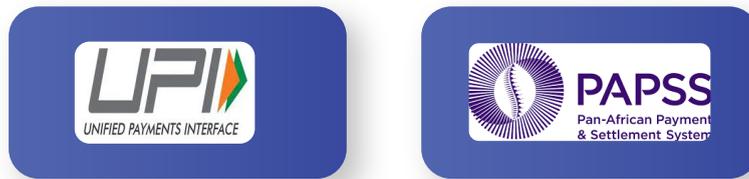


UPI system has gone international and many Asia and European countries (France, etc.) are piloting or implementing its cross-border usage. In February 2024, India and Mauritius announced a collaboration that will see UPI and RuPay connectivity with Mauritius MuCAS system. With this connectivity, an Indian traveller to Mauritius will be able to pay a merchant in Mauritius using UPI. Similarly, a Mauritian traveller will be able to do the same in India using the Instant Payment System (IPS) app of Mauritius.

Further, with the adoption of RuPay technology, the MauCAS card scheme of Mauritius will enable banks in Mauritius to issue RuPay cards domestically. Such cards can be used at ATMs and PoS terminals locally in Mauritius as well as in India. With this, Mauritius becomes the first country outside Asia to issue cards using RuPay technology. Indian RuPay cards would also be accepted at ATMs and PoS terminals in Mauritius.

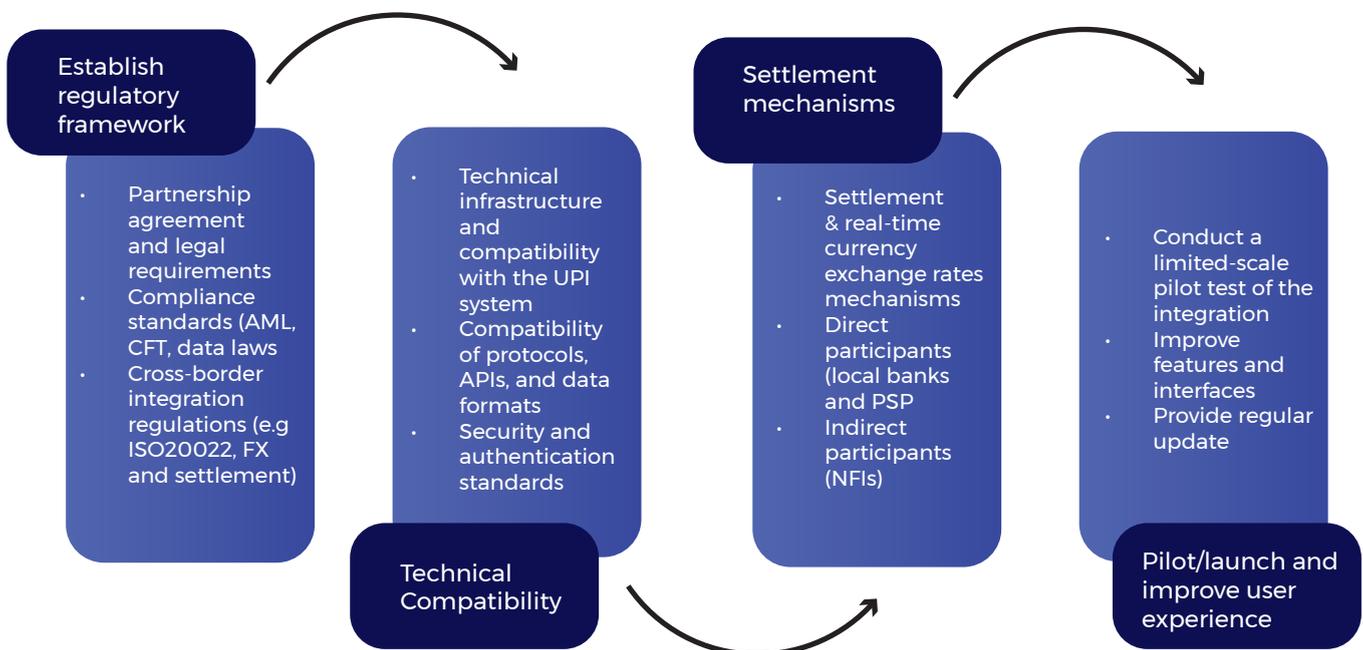
UPI expansion to Africa is feasible and would be in the best interest of addressing cross-border e-commerce and trade payment challenges among partnering countries. Also, such an initiative is poised to drive financial inclusion, support rural economies, foster FinTech innovation, and promote transparency among other things. Many central banks in Africa have set up subsidiaries of innovative centers like India's NPCI to develop a robust instant retail payment system like the Central Bank of Ghana's GhIPSS and the Central Bank of Nigeria's NIBSS. Overseeing robust technological and efficient payment systems, these institutions are encouraged to lead cross-border payment integrations (UPI, Pix, PromptPay, Alipay+, etc.) capable of universal interoperability by all participating banks, Fintechs, MNOs, and NFIs.

A Case of PAPSS and UPI Interlinking



The integration of the Pan-African Payment and Settlement System (PAPSS) and the Unified Payments Interface (UPI) could yield several economic benefits and serve as a catalyst for payment dynamics, particularly in the context of enhancing financial inclusion, promoting cross-border trade, and driving economic growth. Connecting a PAPSS in Africa to India's UPI system involves multiple technical, regulatory, and operational considerations. This framework provides a structured approach towards connecting an African payment system with India's UPI system, emphasizing the need for collaboration, compliance, technical integration, and user-centric design for a successful cross-border payment solution.

Figure 5: Roadmap for UPI-PAPSS connectivity

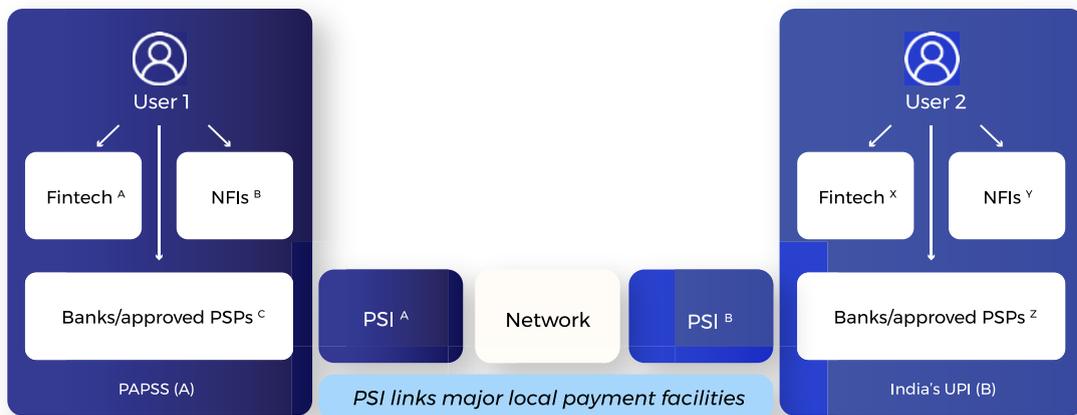


Source: Agpaytech

Architectural Framework for UPI Interlinking

Cross-border transactions can be made possible by establishing bilateral links between national payment system infrastructure (PSI) capable of linking India's UPI and PAPSS. The interlinking mechanism is usually a standardized messaging and connectivity technology, which links account management and the various national operating systems together, while participants access the hub entity through the national settlement infrastructure of their jurisdiction (ITU, 2016). This likely requires linking the UPI and PAPSS by developing technical interfaces between them. The direct linking of UPI and PAPSS without correspondent or settlement banks improve speed and reduce the cost of transaction as well as promote bilateral trade activities.

Figure 6: Interlinking national payment system infrastructure



Source: Agpaytech

- User 1 & 2** Can initiate transactions using PSP (A, B, C) mobile application or internet platform
- A, B, C** A, B, C PSP system authenticates the transaction using registered IDs (mobile number, PIN) and sends a payment request to PSIA
- PAPSS^A** PAPSSA receives the payee's address via participant, determines the FX rate, approves fees and sends a request back to Banks/approved PSPC to debit the money
- PAPSS^A & UPI^B** After PAPSSA receives confirmation of debit, ItA sends a request to UPIB in India to credit the debited amount to the User2 account with UPI xyz in rupee
- UPI^B & PAPSS^A** Payer PSP notifies the Payer through

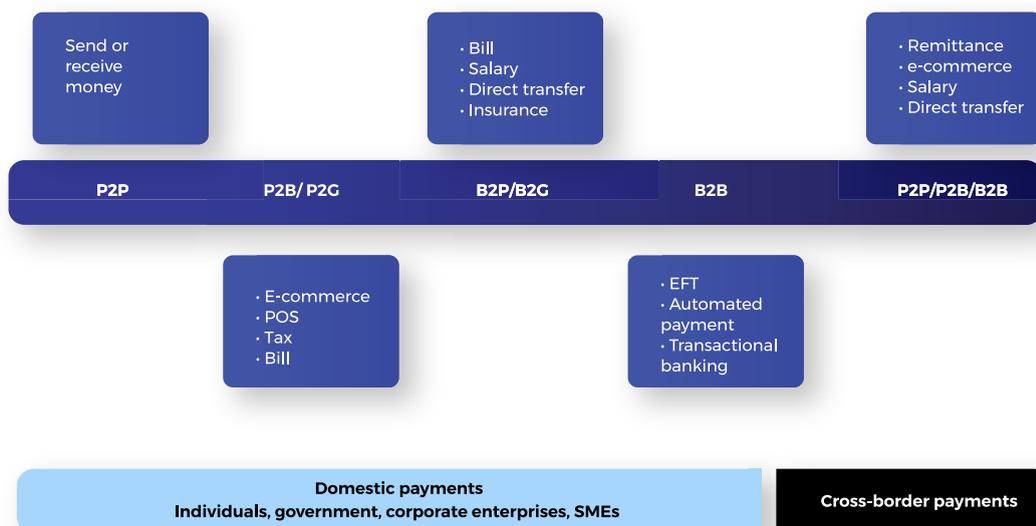
Benefits of Linking India’s UPI to African Country Payment System

With growing national payment initiatives across African countries such as South Africa’s PayShap, Ghana’s GhIPSS GhanaPay and NIBSS Instant Payment (NIP) and high adoption rates of banks, PSPs, NFIs, etc, interlinking payment systems between India’s UPI and an African country’s payment system can facilitate smoother and faster cross-border transactions. This can significantly boost bilateral trade by simplifying payment processes and reducing transactional barriers.

Also, the Indian diaspora in the African region is growing (South Africa 1560000, Mauritius 894500, Kenya 80000, Bostwana 12000, Uganda, 30000, etc.). Linking payment systems will help the Indian diasporas, as well as the African diaspora to accept business reunions across the region.

Collaboration between India and an African nation in the payments sector can lead to knowledge-sharing and technology exchange. This can foster innovation and the development of better payment solutions for both regions. Integrating with India’s UPI can aid in the development and modernization of the financial sector in the African country. It can lead to the adoption of more sophisticated financial technologies and practices. It is important to consider regulatory and security aspects when linking payment systems between countries. Collaborations should prioritize security measures, data protection, and regulatory compliance to ensure the safety and privacy of transactions for users in both regions.

Figure 7: Payment products from PAPSS and UPI integration



Source: Agpaytech

Conclusion

Enabling interoperability between payment systems requires more than just technical compatibility. As with the development of any new payment system, the first step in enabling interoperability is understanding the use cases and goals that interoperability seeks to achieve. These determine whether interoperability is the appropriate option. Also, successful interoperability will likely involve educational efforts for system participants and end users to boost the usage of these interoperable links. Overall, the integration of PAPSS and UPI holds the potential to unlock significant economic benefits by promoting financial inclusion, facilitating cross-border trade, improving payment efficiency, and stimulating digital innovation. However, achieving successful integration would require collaboration between governments, regulatory bodies, financial institutions, and technology providers to address technical, regulatory, and operational challenges effectively. It is also time for countries in Africa to seek to unify all payment systems to reduce the many delinked payment infrastructures. Providing a one-all unified payment infrastructure interface would help eliminate the payment complexities, improve efficiencies and transaction monitoring as well and help interoperability with other countries such as PayNow, PromptPay, Pix, UPI, and others.

References

- ITU-T Focus Group (2016). Digital Financial Services: Payment System Interoperability and Oversight: The International Dimension
- <https://lucaskitzmueller.medium.com/achieving-financial-inclusion-m-pesa-vs-upi-c6aaedf7ee97>
- <https://www.npci.org.in/PDF/npci/press-releases/2022/NIPL-Press-Release-Worldline-and-NPCIInternational-to-empower-mobile-payments-for-Indian-tourists-in-Europe.pdf>
- <https://www.tcmb.gov.tr/wps/wcm/connect/EN/TCMB+EN/Main+Menu/Announcements/Press+Releases/2022/ANO2022-13>
- <https://www.statista.com/search/?q=digital+revolution+in+india&Search=&p=1>
- <https://www.npci.org.in/what-we-do/upi/product-overview>
- World Bank (2021). Interoperability in fast payment systems
- BIS (2018). Committee on Payments and Market Infrastructures, Cross-Border Retail Payments 20.
- <https://www.cgap.org/research/publication/interoperability-why-and-how-providers-should-pursue-it>
- <https://www.rbi.org.in/>

About Agpaytech Ltd.

Agpaytech Ltd. is a company pioneering in the Fintech space with a focused approach to building robust technologies for e-commerce Card Processing Solutions for Payment Service Providers (PSPs). Additionally, we provide Compliance and Regulatory Umbrella, Remittance-as-a-Service (RaaS), Banking-as-a-Service (BaaS), Foreign Exchange, Cross Border Payments, and digital currency technology.

We also provide practical white paper research support to central banks, government and private institutions, economic organizations, and NGOs in Africa. Our services expand from research projects, state-of-industry reports, project assessment, data collection, and consulting services in the fintech space.

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