JULY 2024

INNOVATION FOR INCLUSION: AN OVERVIEW OF RETAIL PAYMENTS IN SELECTED SEACEN MEMBERS

REPORT OF A STUDY GROUP ESTABLISHED BY THE SEACEN CENTRE

THIS STUDY GROUP WAS CHAIRED BY DARANEE SAEJU OF THE BANK OF THAILAND

The SEACEN Centre

THE SOUTH EAST ASIAN CENTRAL BANKS (SEACEN) RESEARCH AND TRAINING CENTRE

This publication is available on The SEACEN Centre website (www.seacen.org)

Level 5 Sasana Kijang, Bank Negara Malaysia
2 Jalan Dato' Onn, 50480 Kuala Lumpur, Malaysia
Tel. No.: +603 9195 1888
Fax. No: +603 9195 1801
Email: enquiries@seacen.org

Innovations for Inclusion: An Overview of Retail Payments in Selected SEACEN Members

Report of a Study Group

Chaired by Daranee Saeju of the Bank of Thailand

July 2024

Contents

Executive Summary

Over the last two decades, the progress made in information and communication technology supported by cheaper digital storage devices and faster computers have fundamentally altered the way people interact with each other and how companies do business. One of the areas in which this is most evident is how consumers today make payments for their daily purchases of goods and services. Payment service providers supported by fintech companies have led this change by offering consumers the option of using multiple instruments and devices to make retail payments and money transfers while ensuring seamless connectivity and interoperability across different payment channels. A broadening of the devices and channels that can be used in effecting payments for goods and services can bring economic benefits as it has the potential to increase consumption and raise growth.

Considering that payment systems are critical financial market infrastructures whose disruptions can undermine financial stability and the effective transmission of monetary policy, central banks regulate and exercise oversight of these systems. By recognising the benefits innovations in retail payments can bring, including meeting social goals like financial inclusion, central banks have been supportive of the changes taking place in the retail payments sector by providing the enabling regulation. Over the last decade, the SEACEN member central banks and monetary authorities have been the global leaders in driving innovation in retail payments. They have done this by experimenting and adopting newer technologies to bring a large and diverse population, including those in the rural areas, into the financial net, and to reduce transaction costs for users and businesses as well as to promote financial inclusion. Many central banks in other regions, including those in advanced economies, are beginning to embrace the innovative technologies in the retail payments sector being developed in the Asia-Pacific region.

Against this backdrop, The SEACEN Centre formed a Study Group to take stock of the retail payments landscape in the Asia-Pacific region. The mandate of the Study Group was to contribute to a better understanding of the innovations taking place in retail payments and to assess both the benefits they bring as well as the key challenges they may pose to the resilience of the payments and financial system as they continue to evolve. This report summarises the main findings of the Study Group. The key takeaways are given below.

The broadening of the access to and the affordability of internet services and smartphones have helped quicken the pace of the shift to digital payments. Merchant quick response (QR) code is gaining popularity in the region and is now becoming the preferred mode to initiate peer-to-merchant (P2M) payments. But as innovations in digital payments gathers pace, phishing scams and identity thefts pose constant risks to consumers and financial institutions. Integrating the ISO 20022 messaging standards into legacy systems can be a challenge particularly for smaller financial institutions given that this requires significant investment in infrastructure, software changes as well as employee training to make them understand the new standards. Looking ahead, a number of newer technologies will enter the retail payments sector. The promising ones include payments enabled by biometric authentication methods like fingerprint scanning or facial recognition, and P2M transactions enabled over the “sound medium” by establishing a secure channel for data transfer over Interactive Voice Response between devices. The progress made in the retail payments sector, including building the supporting infrastructure for fast payment systems, has opened up the opportunity for better cross-border payments connectivity. This will help promote regional trade to be settled in domestic currencies and reduce the foreign exchange fees associated with the correspondent banking model.

1. Introduction

The retail payments landscape has undergone transformative changes over the last two decades. Not only are there multiple options to make retail payments, but they have become faster and easier to execute. As consumer preferences have changed, businesses are forced to offer payment solutions that include the use of mobile apps, quick response (QR) codes and e-wallets beyond the traditional payment instruments like debit/credit cards and cash. At the same time, ensuring interoperability across different payment solution providers is demanding the adoption of the ISO 20022 new messaging standard. These innovative payment solutions also demand a shift to faster payment systems (FPS) that are available on a 24x7 basis. But as FPS build upon bank account-based credit transfers, this may warrant real time gross settlement systems (RTGS) to extend operating hours to help manage the liquidity and settlement risks.

Central banks are supportive of the innovations taking place in the retail payments sector recognising that it can foster financial inclusion. But payment innovations also bring in new players, including non-banks, requiring enhanced monitoring and understanding of the risks they can bring to the system if their governance and risk management arrangements are inadequate. Furthermore, innovations in money are bringing newer forms of instruments like stablecoins and other cryptocurrencies into the payments landscape. Central banks themselves are experimenting with digital currencies to provide an alternative to cash for retail payments. Many central banks in the Asia-Pacific region are interested in learning from the experiences of other member central banks in the region to come to a common position on these innovative payment solutions and understand the unique risks they may bring.

Against this backdrop, The SEACEN Centre formed a Study Group to understand the developments taking place in the retail payments sector and to assess the trends and lessons to be shared among its member central banks. The main issues to be addressed under the Study Group's mandate include broadly the following (the mandate is included in Annexe 2): (a) documenting the relative share of various instruments being used for making retail payments; (b) taking stock of existing payment solutions for retail payments and how central banks are supporting the innovations in payments; (c) challenges for central banks arising from innovations in retail payments and in the implementation of the ISO 20022 standards and fast payments; and (d) understanding how the landscape of retail payments might evolve in the next 3 to 5 years. This report documents the feedback received from the members of the Study Group on these issues.

2. Payment instruments and their share

Retail payments are typically payments between consumers, businesses and public authorities. They can be everyday consumer transactions, but also include, for example, salary and tax payments made by businesses. Some frequent small-value business-to-business payments might also be categorised as retail payments. Retail payments have higher volumes – that is, numbers – and lower average values than wholesale payments. Retail payments markets are characterised by extensive use of private sector systems for the transaction processing and clearing. Given the diverse nature of instruments and actors involved in retail payments, getting consistent and comparable data on retail payments across different jurisdictions can be challenging. While the Study Group members note these challenges, the values and volumes of retail payments data collected across different instrument categories under the classification criteria used by each jurisdiction has been used in this report to assess trends and to draw some conclusions. To get a regional perspective on how the relative shares of the values and volumes of transactions in different payment instruments are evolving, the aggregated payment instruments data across jurisdictions is included in Annexe 1.

All members of the Study Group report that the adoption of digital payments is gathering pace in their respective jurisdictions, and that it is transforming the way people conduct their daily financial transactions – be it doing their banking business, paying for their goods and services or how they settle their utility bills. The trend overall has been to use less cash and cheque payments – the backbone of the traditional retail payment instruments – which is being replaced by greater use of debit or credit cards and other digital payment options. That said both cash and cheque pose some challenges in measuring their relative shares in retail payments. For cash, this arises from the fact that cash payments are not always recorded, and this is particularly so in the more rural areas. For cheques, authorities do not make a distinction between a cheque payment made by a retail customer versus those made by a corporate customer which can often involve a very large payment. This tends to bias the share of cheques in retail payments as measured by their transaction values in some jurisdictions where cheques are still being used by corporates to settle large value claims. In these cases, the volume of cheque payments is a better statistic to assess changes in trends on their usage.

Based on the information provided by the members of the Study Group, a summary of how the different payment instruments and their use has been evolving in various jurisdictions, both in terms of transaction values and transaction volumes, are given below. These are broadly categorised under five headings: (a) cash; (b) cheques; (c) card-based payments (credit, debit and charge card); (d) prepaid payment instruments; and (e) mobile and internet-based payment instruments.

2.1 Cash

The use of cash in retail payments, unlike other means of payments, is difficult to measure. This is because transactions made using cash are not always recorded as noted above, and cash held by the public can also be used multiple times to make payments. For example, a street vendor accepting payment in cash will use the same cash to pay his merchant, and the merchant in turn will use the cash received from multiple vendors to pay his wholesale dealer. For this reason, currency in circulation relative to GDP, despite its shortcomings, is often used as a proxy as this statistic is readily available. But alternative measures such as cash withdrawals from ATMs and over bank counters can provide a better estimate of cash used in retail payments. To ensure consistency and comparison across jurisdictions, the Study Group members were asked to report cash in circulation as a share of nominal GDP, which is shown in Table 1.

Table 1
Currency in circulation as a share of nominal GDP (in percent)

	2017	2018	2019	2020	2021	2022	2023
Hong Kong SAR	15.8	16.3	17.1	19.6	19.6	21.1	19.5
India	10.0	10.7	11.4	14.3	13.0	12.2	11.6
Lao PDR	6.3	6.0	6.9	7.3	7.4	5.0	4.9
Malaysia	6.7	6.5	6.6	8.3	8.8	8.2	8.2
Myanmar					27.2	27.1	28.6
Nepal	11.8	12.0	11.0	12.6	13.1	10.3	9.6
Sri Lanka	4.2	4.2	4.3	5.3	5.7	4.3	4.3
Thailand	11.6	11.3	11.5	13.9	14.8	13.8	14.0

Source: Data submitted by Study Group members.

The figures in Table 1 suggest that the currency in circulation as a share of GDP has declined in some countries modestly. But there is no clear trend to suggest that cash as a store of value or medium of exchange is losing its appeal in the SEACEN member jurisdictions.

2.2 Cheques

Cheque, like cash, is one of the oldest instruments for making retail payments. In most jurisdictions, interbank cheques are cleared through the Electronic Cheque Clearing (ECC) system. ECC is an image-based electronic cheque clearing and settlement system. The original paper cheques are scanned to create images and presented electronically through the secure communication channels from the member bank where they are deposited to another member bank from which they are drawn. This results in faster access to funds and lower transportation expenses. Most members of the Study Group report that the use of cheque as a payment instrument continues to decline. The relative share of cheques used in retail payments (excluding cash) are shown in Tables 2 and 3.[1]

Table 2
Transaction value of cheques used in retail payments as a share of the total value of retail payments (in percent)

	2017	2018	2019	2020	2021	2022	2023
Hong Kong SAR	88.8	87.1	80.9	75.7	70.0	63.6	56.0
India	28.1	22.2	20.1	14.6	13.4	11.4	9.6
Lao PDR			63.7	52.7	30.1	23.5	11.0
Malaysia			12.8	9.3	7.3	6.6	5.9
Myanmar					7.4	11.0	7.6
Nepal					61.2	53.3	38.1
Sri Lanka	81.2	75.9	69.4	60.6	54.0	45.9	43.0
Thailand[a]	93.7	87.5	77.4	65.7	52.5	46.1	43.2

[a] For Hong Kong and Thailand, the cheque usage data include commercial non-retail users, which are typically higher value transactions and the main contributors in terms of value.

Source: Data submitted by Study Group members.

Table 3
Transaction volume of cheques used in retail payments as a share of the total volume of retail payments (in percent)

	2017	2018	2019	2020	2021	2022	2023
Hong Kong SAR	1.4	1.3	1.1	1.1	0.9	0.7	0.6
India	11.6	8.2	5.5	1.8	1.1	0.7	0.5
Lao PDR							
Malaysia			1.8	1.1	0.7	0.5	0.4
Myanmar					0.0	0.0	0.0
Nepal					3.3	2.5	1.6
Sri Lanka	32.7	28.4	22.8	15.9	10.1	7.7	6.2
Thailand	3.2	2.1	1.2	0.7	0.4	0.2	0.2

Source: Data submitted by Study Group members.

[1] Considering that cash in circulation may not be a good measure to capture its share in retail payments, cash in circulation is not included when computing the relative share of different retail payment instruments.

There is now a concerted effort by central banks to reduce the use of cheques in daily transactions. For example, Myanmar is migrating government payments from cheques to digital transfers to reduce the use of cheques. In Nepal, the National Payment System Development Strategy (NPSDS) adopted in 2014 to modernise the payment system and to prioritise the digital economy has contributed to a decline in the use of cheques. The digital innovations adopted by the non-bank entities, and the enabling regulatory environment after the NPSDS (issuance of Licensing Policy, Payments and Settlement Act, Retail Payment Strategy, and other policies), also contributed to an increase in digital modes of payment. The Covid-19 pandemic was a further supporting factor.

In Sri Lanka, cheques have been the most popular non-cash payment instrument for individuals and corporations. But the share of cheques in payments is now declining in view of the growing popularity of the instant payment system implemented through the Common Electronic Fund Transfer Switch. In Hong Kong, a significant portion of cheques are for corporate usage with high value payments. Similar to some other ASEAN economies, it is hard to differentiate between corporate and retail usage of cheques and the figures provided here include both. Nonetheless, for both value and volume, the cheque usage has been on a declining trend from 2017 to 2023. The decline can be attributed to the increasing popularity of using digital payments, such as the FPS.

In Malaysia, the use of cheques has also been declining with greater e-payment adoption. This decline can be attributed to measures introduced by Bank Negara Malaysia (BNM) via the e-Payment Incentive Fund (ePIF) in 2015. These measures have led cheques issued by banks to fall below 100 million in 2020, a target that was set out in the ePIF. In 2023, the number of cheques issued declined further to about 41 million as compared to 46 million in 2022. The primary users of cheques in Malaysia continue to be large corporations, many of whom are also migrating to e-payment alternatives for some if not all their payments.

2.3 Digital wallets and prepaid cards

Digital wallets store a customer's payment card information securely on a mobile device, and use the mobile devices' wireless capability like Bluetooth, Wi-Fi and magnetic signal to transmit payment data to a point-of-sale (POS) terminal designed to communicate with the smart phone. For example, the mobile devices' camera can be used to scan a QR code and then use the digital wallet scanning system to initiate a payment using the selected payment card. Alternatively, the near field communication (NFC) technology can be used to initiate the payment by connecting the smart phone to the POS terminal. Because a mobile device is used to initiate the payment, the transaction could be categorised under mobile and internet-based payments.[2]

The share of digital wallets and prepaid cards in payments is quite heterogeneous across the SEACEN jurisdiction (see Tables 4 and 5). One reason for this heterogeneity could be that the definition used across jurisdictions to assign a retail payment instrument to different categories might differ. This is because a digital wallet can store multiple types of information – payment cards, loyalty cards, identification cards, etc. In Malaysia, for example, digital wallets and prepaid cards require e-money to be used as the source of fund. When debit and credit cards are used as the source of fund, which is the case for Apple Pay and Samsung Pay, they are excluded from this category.

The shares of digital wallets and card-based e-money in retail payments are quite high in Malaysia. Prior to the pandemic, card-based e-money – which is used mainly for toll payments – accounted for a substantial volume of e-money transactions. After the pandemic, digital

[2] In Malaysia, mobile banking and internet banking fall under online banking.

wallets have become more popular, and this has been further supported by the industry-led adoption of QR code payments. Further, efforts to modernise the retail payment ecosystem by PayNet in 2018,[3] through the launch of the real-time Retail Payments Platform (RPP) built with ISO 20022 messaging standards, also laid the foundation for online payment including e-wallets to be widely used.

Table 4

Transaction value of digital wallets[a] and prepaid card payments as a share of the total value of retail payments (in percent)

	2017	2018	2019	2020	2021	2022	2023
Hong Kong SAR	1.4	1.7	2.0	2.2	2.5	3.0	3.0
India	0.3	0.5	0.5	0.5	0.5	0.5	0.4
Lao PDR			0.0	0.0	0.1	0.3	0.3
Malaysia			0.2	0.3	0.4	0.5	0.7
Myanmar					36.6	35.2	37.5
Nepal					0.9	1.1	1.4
Sri Lanka			0.0	0.0	0.0	0.2	0.5
Thailand	0.2	0.3	0.4	0.5	0.7	0.8	0.8

[a] Digital wallet includes Apple Pay, Google Pay, Samsung Pay, PayPal, Alipay and WeChat Pay in most jurisdictions. In Malaysia and Hong Kong SAR, digital wallets only include wallet providers that use e-money as the source of fund.

Source: Data submitted by Study Group members.

Table 5

Transaction volume of digital wallets[a] and prepaid card payments as a share of the total volume of retail payments (in percent)

	2017	2018	2019	2020	2021	2022	2023
Hong Kong SAR	86.9	86.3	85.0	81.4	82.4	82.1	81.3
India	31.6	31.5	26.4	12.4	9.7	7.1	5.2
Lao PDR							
Malaysia			44.3	34.2	30.3	35.8	37.6
Myanmar					90.5	94.2	96.4
Nepal					33.7	30.0	27.1
Sri Lanka	0.0	0.0	0.1	0.2	0.4	1.0	2.1
Thailand	36.3	27.7	23.4	16.9	12.9	12.3	12.1

[a] Digital wallet includes Apple Pay, Google Pay, Samsung Pay, PayPal, Ali Pay and WeChat Pay in most jurisdictions. In Malaysia and Hong Kong SAR, digital wallets only include wallet providers that use e-money as the source of fund.

Source: Data submitted by Study Group members.

Digital wallets in Hong Kong are regulated by the Hong Kong Monetary Authority (HKMA) under the Payment Systems and Stored Value Facilities (SVFs) Ordinance. It covers SVFs in physical form (i.e., stored value cards and prepaid cards) and in electronic form (i.e., digital wallets). Stored value card is a common payment instrument typically used for small-value transactions (e.g., public transportation). The transaction value of stored value facilities has been increasing steadily while the transaction volume has remained largely stable.

[3] Payments Network Malaysia (PayNet) is the operator of the country's shared payment systems and financial market infrastructures, which is jointly owned by Bank Negara Malaysia and 11 domestic banks.

According to Nepal Rastra Bank (NRB), the use of prepaid cards, which are primarily used for travel purposes, has increased in recent years. The use of e-wallets has also increased significantly after the Covid-19 pandemic, but the transaction size remains small. Still, the debit card remains the most widely used instrument for domestic payments. In India, prepaid payment instruments (PPI) – instruments that facilitate purchase of goods and services against the value stored in them – are being regulated since 2009, and both banks and non-banks can issue them. The Reserve Bank of India (RBI) has made it mandatory since 2022 to provide interoperability across PPI issuers that are compliant with the know-your-customer (KYC) requirements. But the share of payments using the e-money instruments remain quite low in India.

2.4 Debit and credit cards

Just like cash, the use of payment cards, such as debit and credit cards, have a long history. Most POS terminals now are enabled for contactless payments using payment cards by employing the NFC technology. Based on the payments data furnished by Study Group members, the relative share of debit and credit card payments in various jurisdictions are shown in Tables 6 and 7.

Table 6
Transaction value of debit and credit card payments as a share of the total value of retail payments (in percent)

	2017	2018	2019	2020	2021	2022	2023
Hong Kong SAR	9.8	10.2	10.6	8.9	9.1	10.2	10.8
India	12.2	11.8	10.6	3.2	3.3	3.3	3.1
Lao PDR			1.6	6.0	4.3	3.9	3.3
Malaysia			2.0	1.8	1.8	2.1	2.3
Myanmar					0.7	0.5	0.4
Nepal					5.2	5.4	6.3
Sri Lanka	2.6	2.9	3.3	3.5	3.9	4.3	5.2
Thailand	2.8	2.9	3.2	2.7	2.5	2.7	2.9

Source: Data submitted by Study Group members.

Table 7
Transaction volume of debit and credit card payments as a share of the total volume of retail payments (in percent)

	2017	2018	2019	2020	2021	2022	2023
Hong Kong SAR	11.7	12.3	13.4	15.4	13.7	13.1	13.3
India	12.7	12.2	15.1	14.7	9.7	6.2	3.9
Lao PDR							
Malaysia			18.7	18.4	18.6	21.5	22.6
Myanmar					1.6	1.5	0.7
Nepal					22.5	20.2	17.0
Sri Lanka	52.8	56.5	59.4	56.6	48.3	47.9	47.8
Thailand	17.1	12.8	9.7	6.5	4.6	3.9	3.4

Source: Data submitted by Study Group members.

In encouraging wider acceptance of card payments among businesses and small merchants, BNM has undertaken a series of policy reforms with the latest being issuance of the Payments Cards Framework Policy Document in 2022. Under this reform, there is a revised interchange

fee ceiling to better align with the actual processing costs for transactions, and to ensure that merchants are charged fairly for the costs incurred. Merchants are also allowed to choose the type of payment cards they would like to accept considering that different cards are subject to varying fee structures.

In Hong Kong, the use of debit and credit cards has experienced a stable trend in recent years. The adoption of contactless payment methods and its integration into various sectors, including retail, transportation, and online shopping, has contributed to the widespread use of debit and credit cards.

In Nepal, payment service operators are now offering virtual cards avoiding the need to carry a physical version of debit or credit card. The NRB is in the process of implementing the National Payment Switch (NPS) and a domestic card scheme with the overarching objective of reducing the cost of card transactions for merchants to foster their wider adoption and improve settlement efficiency. This is similar to the initiative undertaken in India to introduce the RuPay debit and credit cards to reduce the reliance on foreign service providers by providing the enabling public infrastructure.

2.5 Mobile and internet-based payments

A significant share of the retail payments has now migrated to mobile and internet-based transfers. In reporting the share of mobile and internet-based payments, some members have included any payment made using a smartphone under this category even if the source of the funds were from digital wallets (e-money) stored on the device. This could result in a small bias in the statistics reported. But overall, a large share of the payments that use this channel is linked to e-commerce payments, fund transfers and payment of utility bills. In India and Lao PDR, the share of this category in retail payments now exceeds 85 percent (Tables 8 and 9).

Table 8
Transaction value of mobile and internet-based payments as a share of the total value of retail payments (in percent)

	2017	2018	2019	2020	2021	2022	2023
Hong Kong SAR		1.0	6.5	13.2	18.4	23.2	30.2
India	59.5	65.4	68.8	81.8	82.8	85.0	86.9
Lao PDR			34.2	41.0	65.3	72.1	85.2
Malaysia			85.0	88.7	90.5	90.8	91.1
Myanmar					55.2	53.3	54.4
Nepal					32.7	40.1	54.2
Sri Lanka	16.3	21.2	27.3	35.9	42.1	49.6	51.3
Thailand	3.3	9.3	19.0	31.1	44.4	50.4	53.1

Source: Data submitted by Study Group members.

BNM reports that the use of mobile banking has now become very popular with the volume of transactions made via mobile banking applications being the same as that of internet banking in 2023 – a shift from previous years. While some of this shift might stem from the high smartphone penetration rate, the innovative mobile banking applications that financial institutions are now offering their clients have also played a significant role.

Bank of Thailand (BOT) states that PromptPay – Thailand's payment infrastructure introduced in 2016 – has been a game changer in driving the digital payment revolution in the country by laying the foundation to facilitate payment and financial innovations. NRB reports that mobile banking is one of the most widely used retail payment channels in Nepal with transaction count

and transaction value made through mobile banking increasing by 56 percent and 80 percent, respectively, from the 2022 to the 2023 financial year. This trend has resulted in a small decline in payments made through internet banking applications.

Table 9
Transaction volume of mobile and internet-based payments as a share of the total volume of retail payments (in percent)

	2017	2018	2019	2020	2021	2022	2023
Hong Kong SAR		0.1	0.5	2.0	3.1	4.1	4.8
India	44.0	48.1	53.0	71.2	79.5	86.0	90.5
Lao PDR							
Malaysia			35.2	46.3	50.4	42.2	39.4
Myanmar					7.9	4.3	2.9
Nepal					40.5	47.3	54.4
Sri Lanka	14.5	15.2	17.7	27.3	41.2	43.4	43.9
Thailand	43.4	57.5	65.6	76.0	82.1	83.5	84.3

Source: Data submitted by Study Group members.

In Hong Kong, the use of FPS has witnessed a remarkable surge in recent years. FPS is the fast payment system in Hong Kong operating on 24x7 basis supporting Hong Kong dollar (HKD) and Renminbi (RMB). Since its launch in 2018, it has gained significant popularity due to its convenience, speed, and ease of use. It enables individuals and businesses to make instant fund transfers and payments through their mobile devices or online platforms. Its wide usage for P2P payments, bill payments and top-up of e-wallets, along with the increasing integration of FPS into various sectors like retail, e-commerce, and peer-to-peer transactions, have contributed to the rapid increase in its widespread adoption and usage.

3. Central banks as change drivers

The retail payments sector has seen many innovations in the recent past which are significantly reshaping the payments landscape. Ensuring interoperability across different payment platforms and instruments as well as speeding up the payment and settlement processing are being given particular importance. Towards this goal, many jurisdictions have either adopted or are moving towards ISO 20022 as the messaging format for their FPS. The role of non-banks in retail payments has also increased owing in part to the growing use of innovative technology in retail payments. In general, the user demand is perhaps the most important driver of innovation, but the regulatory framework is also equally important as a facilitator of the innovation in retail payments. This section documents how some central banks or monetary authorities represented in the Study Group have taken on the role of enablers of financial innovation that is driving the adoption of newer technologies to support faster and more efficient retail payments infrastructure as well as to foster financial inclusion.

3.1 Hong Kong SAR

The launch of Hong Kong's FPS in 2018 revolutionised the payment landscape by providing instant and secure transactions across banks and e-wallets. FPS has been widely adopted in Hong Kong, with over 14.2 million registrations of using proxy IDs at end-March 2024, which is much higher than the population in Hong Kong of around 7.5 million. In terms of usage, the average number of HKD real-time transactions per day reached 1.5 million (31 percent increase year-on-year), worth HKD11.4 billion (37 percent increase year-on-year) in March 2024. The increased use of the FPS has been spurred by steady growth of adoption and a

gradual extension in the scope of usage, from primarily P2P payments at the initial stage to bill, retail and business payments, including payments to the Government. The HKMA has been working closely with various government departments to expand the usage of the FPS from bills, counters and self-help kiosks to online payments using the App-to-App and Web-to-App FPS payment functions. Currently, more than 90 percent of Government departments accept the FPS as a means of payment.

The FPS has played a crucial role in promoting financial inclusion by supporting small and medium-sized enterprises (SMEs) in adopting affordable payment solutions. Many banks and SVF operators have launched simple and low-cost payment solutions, such as FPS QR codes, to make payment collection more convenient and eliminate the need for cash exchange. Merchants across a broad spectrum of business sectors are therefore gradually adopting the FPS to collect payments. The FPS can be used for making payments for in-store or online shopping, dining out, driving lessons, school fees, video game top-ups, donations and even consultations at some Chinese medicine clinics, reflecting the popularity of the FPS in the everyday lives of people in Hong Kong.

With the development of the FPS in Hong Kong becoming increasingly mature, the HKMA has been actively exploring opportunities to establish linkages with different jurisdictions. In December 2023, the FPS successfully established its first overseas linkage and jointly launched the “FPS x PromptPay” with the Bank of Thailand, marking its first step for cross-border payments. This collaboration enables Hong Kong tourists to make fast, secure, and cost-effective retail payments in Thailand through the scanning of QR codes displayed by merchants. The FPS x PromptPay link has been well-received, providing travellers with convenience and supporting tourism and economic activities between Hong Kong and Thailand.

The success of FPS x PromptPay serves as a blueprint for further collaboration and innovation in the region, paving the way for more cross-border payment initiatives. The HKMA has actively explored opportunities to establish linkages with different jurisdictions, aiming to promote financial integration within the Asia-Pacific market.

Overall, the FPS has transformed payment practices in Hong Kong, fostering efficiency, accessibility, and innovation in the digital payment ecosystem. Its widespread adoption, expansion into various sectors, and cross-border collaborations demonstrate its relevance and potential for further development. As the FPS continues to evolve and embrace new possibilities, it is poised to shape the future of payments in Hong Kong and beyond.

3.2 India

The retail payments landscape has changed significantly over the past 10 years in India with the RBI driving this process. Major changes that embrace newer technologies have occurred in every type of retail instrument in use. For example, in 2019, the RBI mandated the use of tokens in place of actual credit or debit card transactions, and it provides the foundation for future innovation in card payments, such as payments using wearables or internet-of-things (IoT)-based payments. To provide customers choice of card network, the RBI in March 2024 mandated card issuers with more than one million active card issuances to provide network alternatives for customers.

For electronic fund transfers, the RBI has been operating the National Electronic Fund Transfer (NEFT) retail payment system since 2005, which is a deferred net settlement (DNS) system. Since 2020, NEFT has been made available on a 24x7 basis. NEFT is ISO 20022 compliant, but its implementation by member banks is still under progress. For large value payments, the fund transfers are made through the real-time gross settlement (RTGS) system.

In 2022, the access to NEFT and RTGS systems were extended to non-bank payment system operators. This is expected to minimise the overall risk in the payments ecosystem and benefit non-banks by lowering cost and time for effecting/receiving payments, reducing dependence on banks and eliminating uncertainty in finality of payments as the settlement will be carried out in central bank money.

A key milestone for creating a robust payment and settlement infrastructure in India was the establishment of the National Payments Corporation of India (NPCI) incorporated as a not-for-profit company in 2009. Under RBI guidance, NPCI became the primary body tasked with developing a new payment system that is simple, secure, and interoperable. This led to the development of the Unified Payments Interface (UPI) that became operational in 2016. The UPI operates as a digital public infrastructure and allows seamless processing of P2P and P2M transactions without any costs. Unlike traditional payment methods, the UPI simplifies fund transfers using the recipient's UPI ID, be it a mobile number, QR code, or Virtual Payment Address, which eliminates the need for account numbers. This payment method also serves as an open-source application programming interface (API) for various mobile payment apps (of banks or non-banks) that connects banks, merchants and users to facilitate instant transfers.

Other key initiatives promoted and managed by NPCI include the following.

- IMPS: The immediate payment service is the first fast payment system that was launched in 2010 and is operated by NPCI. The IMPS offers an instant 24x7 interbank electronic fund transfer service that can be accessed on multiple channels like mobile phones, internet, and through text messages.
- NETC: The national electronic toll collection system is a platform developed and operated by NPCI with the objective of having a central clearing location for toll transactions to ensure interoperability. The system uses the FASTag, which is a device using radio frequency identification technology for making toll payments directly while the vehicle is in motion.
- NACH: The national automated clearing house is operated by NPCI for banks, financial institutions, corporates and government. It is a web-based solution to facilitate interbank, high volume, electronic transactions which are repetitive and periodic in nature. The NACH System can also be used for making bulk transactions towards distribution of subsidies, dividends, interest, salary, pension etc.
- APBS: The Aadhar payment bridge system is a payment system that uses a unique identification (UID) number to electronically channel subsidies and benefits from the government to the UID-linked bank accounts of the beneficiaries.

3.3 Lao PDR

In Lao PDR, the Payment Systems Development strategy over the period 2021–25 is to develop payment infrastructure, systems and services to be interoperable domestically and internationally, and to help develop fast, modern and low-cost payment services. Specific targets under the strategy are the following: (a) increase the number of merchants accepting digital payments up to 50 percent in the urban and areas with internet coverage; (b) increase the number of mobile and internet banking users up to 60 percent of the total Lao Kip savings account balance; (c) expand the infrastructure of accepting digital payments to 100 percent for large enterprises and to 30 percent of small and medium enterprises; and (d) increase the portion of government revenue collection through digital payments up to 50 percent of the total revenue.

3.4 Malaysia

In Malaysia, regulatory reforms have been undertaken over the last decade to spur digital payments adoption. These reforms include the Pricing Reform Framework in 2013, ePIF Framework in 2015, and Interoperable Credit Transfer Framework (ICTF) in 2018. In 2022, BNM issued the Financial Sector Blueprint setting a target of achieving more than 15 percent compound annual growth rate of e-payment transactions per capita between 2022 and 2026. While the e-payments adoption continues to rise in line with this target, cash usage remains strong among the general public. According to the PayNet Digital Payments Insights Study 2022, 78 percent of Malaysians still prefer cash and about 48 percent still pay by cash on a daily basis.[4]

Efforts to modernise the retail payment ecosystem by PayNet in 2018 through the launch of the real-time RPP built with ISO 20022 messaging standards laid the foundation for online payment including e-wallets, to thrive. Two key services offered under the RPP include DuitNow Transfer and DuitNow QR. DuitNow Transfer enables a sender to transfer funds by referencing the mobile phone number, National Registration Identity Card (NRIC) number or the business registration number of the recipient. DuitNow QR, on the other hand, is the national QR payment solution which enables a merchant to accept payments from customers of all participating banks and non-bank providers using a unified QR code.

This effort has been complemented by the issuance of the ICTF by BNM in 2018 to foster seamless transactions across domestic financial institutions including non-bank players. The ICTF mandates banks and eligible non-bank e-money issuers to collaborate at the infrastructure level by leveraging on RPP to ensure the interoperability of their respective credit transfer services. This has enabled users to benefit from instant and seamless payments between bank accounts and e-money accounts for both peer-to-peer fund transfers and payment to merchant. The RPP also plays a critical role in ensuring users of mobile banking can benefit from the instant and seamless payment experience similar to e-wallet through the DuitNow rails. Finally, the participation of non-bank players in the RPP fosters financial inclusion as their target market is primarily the underserved segments of the population.

3.5 Myanmar

The CBM gained greater autonomy under the CBM Law adopted in 2013, which defines broadly the main responsibilities of the central bank, including developing, overseeing and promoting efficient payment and settlement systems. This autonomy has been further strengthened by the Financial Institutions Law introduced in 2016, which defines CBM responsibilities and its powers to formulate payment system policies, to oversee payment systems, to license payment service providers and to operate payment systems. Additionally, this Law has introduced important elements of a modern legal basis supporting payment systems and instruments, including innovative payment instruments, and has opened payment services to non-bank financial institutions.

Under the National Payment System Strategy (2020–25), the CBM is now leading the change to build an efficient and competitive payments and settlements system that is intended to promote non-cash payments, improve customer access to payment services, and foster financial inclusion. The strategic areas of focus include the following: modernising the payment and settlement infrastructure; strengthening institutions; and enhancing payment instruments and services. The CBM is now implementing the digital payment switch for processing of retail payments in Myanmar. The digital payment switch being implemented will include the following

[4] See https://paynet.my/publications/Digital-Payments-Insights-Study-2022.pdf.

modules: payments switch and faster payments; QR-code generation; and repository. This project is expected to be completed at the end of 2024.

In line with developments taking place in other countries in the region, Myanmar is also seeing a trend towards greater adoption of digital payment solutions. In particular, QR code payments have gained greater adoption in the retail payments sector. Supporting this trend, the CBM set up the National Standard for Myanmar QR code to develop fast, easy and cost-efficient QR code payments in cooperation with the industry. The design features allow CBM to upgrade the Myanmar Merchant QR code specifications to be enabled for cross-border transactions when needed.

The use of mobile banking and internet banking has also grown significantly in recent years transforming the way people in Myanmar manage their finances. The CBM currently allows 18 banks for mobile banking and 10 banks for internet banking. To support the provision of banking services to people living in remote areas via mobile phones, CBM allows wallet-based mobile financial services to be offered by banks, mobile network operators and non-bank financial institutions.

3.6 Nepal

Nepal has witnessed a large increase in the adoption of digital payment and financial services that has been made possible through the development of digital infrastructures as well as the access to and affordability of internet services and smartphones. With the growing use of the electronic payment systems in Nepal, under the NPSDS 2014 mentioned earlier, efforts are being taken to modernise the payments system by identifying key infrastructures and prioritising fintech and digital economy strategies. NRB has also played other crucial roles in promoting digital payments such as observing Global Money Week focusing on digital payments, celebrating fiscal year 2021-22 and 2022-23 as Electronic Transaction Promotion Years, promoting digital payments and raising digital financial literacy through the Financial Inclusion and Consumer Protection Division.

In 2016, the Interbank Payment System (IPS) was launched to facilitate fund transfers between multiple banks without the need of a cheque. The interbank payments were further simplified with the introduction of real time, fast payment systems, namely connectIPS in 2018 and Fonepay Interbank Fund Transfer in 2019. For the development of retail payment systems, NRB implemented the Retail Payment Strategy, 2019. Following this, NRB has amended/reviewed the existing legal frameworks and has also implemented new policies. The new legal frameworks include the following: Payment and Settlement Bylaw, 2020; Licensing Policy for Payment Related Institutions, 2023; simplified KYC for Small Merchants; and NepalQR Standardisation Framework and Guideline in 2021.

Merchant QRs are now the most widely used modes of retail payment in Nepal and they have played a crucial role in promoting digital payments and reducing the use of cash. From the 2022 to 2023 financial year, there has been a 190 percent increase in total number of QR transactions. To further support QR payments and bring small merchants into the digital banking channel, NRB has issued simplified KYC requirements for small merchants. With a simplified onboarding of small merchants in the banking channel, the avenues to issue merchant QRs to them has also been simplified.

NRB has also taken a number of other initiatives. It has enabled the settlement of FPS like connectIPS in the central bank money through the RTGS system. It is also exploring to onboard other Payment Service Operators (PSOs) in the RTGS system to facilitate settlements of all domestic digital transactions in the central bank money. Further, NRB has empowered the Nepal Clearing House Limited (NCHL), a licensed PSO established with 10

percent stake of NRB and 90 percent stake of Banking and Financial Institutions (BFIs), to implement and operate the National Payment Switch. This initiative is seen by NRB as a stepping stone for ensuring interoperable and low-cost payment network enabled by the National Payment Switch.

3.7 Sri Lanka

In 2013, Sri Lanka launched the Common Card and Payment Switch (CCAPS) designated as the national payment switch under the guidance of the National Payment Council and the Central Bank of Sri Lanka (CBSL). CCAPS was established with the objective of creating a single platform for electronic retail payments in the country to achieve cost efficiency and customer convenience for retail payments. The CCAPS aimed to shift Sri Lanka's electronic payment systems to a new interoperable architecture that allowed customers to seamlessly access payment services through multiple channels. They consist of the Common Electronic Fund Transfer Switch (CEFTS), Common ATM Switch and Common POS Switch.

The CEFTS launched in August 2015, is Sri Lanka's Instant payment system, which enables online real-time fund transfers and payments within the country, allowing customers of CEFTS Members to initiate transactions on a 24x7 basis through various channels such as internet banking, mobile banking, ATMs, kiosks, and over-the-counter services. Transactions conducted through CEFTS are credited to recipient accounts in real time by the recipient's bank, enhancing the efficiency of fund transfers. The adoption of Instant Payment Systems and other electronic payment solutions has paved the way for a transition towards a less cash-oriented society in Sri Lanka. The CEFTS has provided the foundational infrastructure for several innovative payment products in Sri Lanka, some of which are discussed below.

One is the LANKAQR, introduced in 2018, which is the national QR Code standard for local payments to promote customer convenience by offering an easy and efficient method for initiating and accepting payments using mobile devices. With the adoption of LANKAQR for the acceptance of payments, merchants benefit from the low cost of transactions as the merchant discount rate offered by financial institutions on QR-based payments is very competitive, and the interoperability of LANKAQR eliminates the requirement of a multitude of QR codes being displayed by the same merchant. In a recent development, CBSL, in collaboration with stakeholders involved in LANKAQR, has established network-to-network partnerships with payment systems in China and India. Through these partnerships, LANKAQR is now accepted via the UPI in India and mobile applications integrated with UnionPay International in China, allowing customers to make payments at merchant locations in Sri Lanka.

Another innovation is JustPay introduced in 2017. JustPay is a secure and convenient payment mechanism to facilitate real time low-value retail payments. The JustPay mechanism allows customers to connect their bank accounts to a Mobile Payment Application of any other bank or a third-party Mobile Payment Application and make payments. JustPay Web, an extension of JustPay, provides customers with an alternative to Internet Payment Gateways, enabling direct payments through bank accounts using browser-based web applications.

A third innovative product is PayMe. PayMe is a messaging service that generates payment links, enabling secure and convenient real-time payments via any PayMe-enabled mobile or web application. It supports corporate and peer-to-peer payments, simplifying payment collection. PayMe ensures security by eliminating the need to share bank credentials and providing instant payment confirmation. With customisable links, easy reconciliation, and multiple payment options, PayMe aims to offer an innovative digital payment solution.

3.8 Thailand

Thailand's success story of its nationwide digital payment adoption began in 2016 with the launch of its retail fast payment infrastructure, PromptPay. Initiated by the Bank of Thailand, along with various government agencies and the industry, PromptPay has transformed payments for ordinary citizens, businesses and the government, and has become a key driver of Thailand's journey towards digitalization.

One of the key aspects of PromptPay is its versatility. While mainly used for real-time fund transfers via proxies and merchant payments through standardised QR codes, it also allows for multiple use cases, such as social welfare distributions, tax reimbursements, cross-bank bill payments, and e-donations. The user base of PromptPay has been expanding as well: As of January 2024, about 78 million identification numbers (including mobile phone, citizen ID, and wallet ID) have been registered, with a transaction volume increasing dramatically from 9.5 million to 61.1 million transactions per day, or more than 5 times over the past 4 years.

Accordingly, the overall usage of digital payments in Thailand has grown from 139 to 549 transactions per person per year, or almost 3 times over the past 4 years, ranking Thailand among the top in the world in retail digital payments. With concurrent declines in non-digital payments such as cheques and ATM withdrawals, it is expected that digital payments usage will continue to increase; hence an ambitious target has been set for 800 digital transactions per person per year by 2025.

Building upon its domestic success, Thailand has also spearheaded cross-border payment connectivity. For cross-border remittances, Thailand and Singapore collaborated to launch PromptPay-Paynow (PPPN) in 2021 as the world's first retail fund-transfer linkage. Under PPPN, users can conveniently send money using the recipients' phone numbers as proxies. Its attractive fees and almost instantaneous transaction have made PPPN very popular in both countries, with over 1.6 million total transactions since its launch. It is also the basis for Project Nexus, a multilateral payment linkage in which Thailand and other countries in the region are part of, which will make global payments cheaper, faster, more transparent and more accessible, in line with the G20 targets.

Furthermore, Thailand is also leading the world in connectivity for cross-border QR payments, currently with eight corridors: Japan, Cambodia, Singapore, Malaysia, Indonesia, Vietnam, Hong Kong and Laos. This service facilitates travellers – especially those without credit cards – and merchants, particularly those without card-reading machines, with greater access, convenience and cost savings.

4. Impediments and challenges

Study Group members report that despite the wide array of benefits offered by digital payments, significant challenges remain in their utilisation and development. Foremost among these challenges that many members note is the persistent threat of fraud, which undermines the trust and security essential for the widespread adoption of digital payments. The implementation of the ISO 20022 messaging standard and ensuring seamless interoperability across different payment system operators were also highlighted by members as posing a number of challenges. As regards the implementation of the FPS for retail payments, Study Group members are generally positive about the benefits they bring. These aspects are examined below.

4.1 Threat of fraud and cybersecurity risk

As innovations in digital payments gather pace, new payment technologies can introduce vulnerabilities that could be exploited by malicious parties. Phishing scams and identity thefts

pose constant risks to consumers and financial institutions. Furthermore, cybercriminals are now using social engineering to gain access to sensitive information. Social engineering fraud is the act of influencing a person to divulge sensitive information or to perform a task, which typically results in a voluntary payment to the fraudster. Creating awareness to these risks and empowering people with financial knowledge and basic digital skills is the first line of defence. But as social engineering fraud is predicated on human psychology, these types of crimes are particularly manipulative and effective. Indeed, the fraudsters skilfully exploit customers' inherent mental biases by inducing a "hot-state" – an emotionally charged state in which customers' ability to think clearly is impaired. Study Group members note that even in urban areas with greater financial literacy, cybercrimes and banking fraud remain elevated. Building safeguards against these crimes as digital innovations gather pace will remain a challenge.

Notwithstanding the fact that heightened awareness alone is insufficient in reducing fraud, it is imperative that digital financial literacy is a prerequisite to ensure widespread adoption of new forms of retail payments. At the same time, strengthening the coordination between various stakeholders – government agencies, telecom operators and law enforcement agencies – and establishing cross-border cooperation arrangements in combating these types of frauds will be needed. In Sri Lanka, enhanced cybersecurity measures are being deployed to safeguard digital transactions and customer data. In addition, initiatives to promote financial literacy and inclusion are being undertaken to bridge the gap in the access to payment innovations and to educate the public about potential risks.

The BOT reports that they have encouraged banks and payment service providers to integrate facial recognition technology for electronic KYC during the account opening and e-wallet sign-ups. This adoption is seen as not only enhancing operational efficiency, but also reducing the time required for customer onboarding, and they help in minimising identity fraud. Further, the establishment of a National Digital Identity (NDID) platform has enabled the exchange of customer KYC data among financial service providers. Despite these initiatives, incidents of digital fraud and scams, such as SMS and phone call impersonations, continue to rise in Thailand. To combat this, the BOT collaborates with industry and government agencies to establish comprehensive measures aimed at preventing, detecting, and responding to fraudulent activities, while also providing support to victims.

BNM also reports that e-payment fraud continues to be a threat, and as the retail payment transactions become more seamless and transcend beyond national borders, tackling fraud will become more challenging. To address this, BNM has intensified its efforts to preserve public confidence in the use of digital payments and has adopted a three-pronged approach namely prevention, awareness and enforcement. With respect to prevention, a series of countermeasures were introduced for financial institutions to strengthen their fraud risk management and control measures. These countermeasures have shown positive outcomes in Malaysia. Creating consumer awareness on the evolving modus operandi of the fraudsters and scammers is also critical. In this regard, BNM, government agencies and the financial industry have intensified scam awareness campaigns nationwide. On the enforcement front, efforts to crack down on the fraudsters were given greater focus including expediting the recovery process of stolen funds.

In Hong Kong, the HKMA works closely with the Hong Kong Police Force and the industry and has implemented a FPS alert mechanism. Its aim is to inform FPS users about potential fraud risks before conducting transactions. For example, the paying user will receive an alert if the payee's FPS proxy ID (such as mobile phone number, email address, or FPS Identifier) is labelled as "High Risk" in the anti-fraud database developed by the Hong Kong Police Force.

Upon receiving an alert, the paying user will be reminded to carefully consider whether to proceed with the transaction or to cancel it.

4.2 Implementing ISO 20022

As digital payments gain greater acceptance and the number of instruments that can be used to make such payments grow, there is a need for standardisation of payment services to ensure interoperability and efficient execution and settlement. The ISO 20022 messaging standards is being adopted worldwide by financial market infrastructures and banks for such a standardisation. The ISO 20022 standard has also been endorsed as the messaging standard for retail payments in ASEAN by the Working Committee on Payments and Settlement Systems. Study Group members report they are at different stages of implementation of the standards, with a few drawing attention to the challenges in changing the legacy systems to the new messaging standard. These are briefly discussed below.

Thailand's adoption of the ISO 20022 messaging standard started as early as 2012 when the Bank of Thailand and relevant agencies established the National Payment Message Standard, which aimed to standardise wholesale and retail payment messages based on ISO 20022. Since then, new payment infrastructures and services were implemented to support ISO 20022 – including the country's three core payment infrastructures: BAHTNET (RTGS), PromptPay (FPS) and Bulk payment, along with MyPromptQR (QR B-scan-C) and PromptPay-PayNow (instant cross-border) services. Currently, new services have to implement this standard by default. Nonetheless, the standard migration for remaining legacy services takes a phased approach. Among them, the domestic QR payment (C-scan-B) and the inward remittance under the sponsoring model are identified as the priority services to be fully migrated by 2025. In view of the challenges to ensure interoperability across retail payment services and solution providers under ISO 20022, relevant parties must take into account potential business benefits, resource constraints and changes in operational processes to accommodate richer data flows.

Sri Lanka has adopted ISO 20022 for the RTGS system effective from March 2024. The Bank of Lao mentions that the retail payment system operators had plans to implement the ISO 20022 standards for retail payments as well as ensuring interoperability across retail payment solution providers, but the plans have been delayed due to the Covid-19 Pandemic.

In Malaysia, the ISO 20022 messaging standards have been implemented by PayNet in 2018 through the launch of the real-time RPP. PayNet is the operator of the country's shared payment infrastructures, which is jointly owned by BNM and eleven domestic banks. The cost of upkeeping the shared infrastructure should be allocated fairly among various stakeholders. However, in BNM's experience, this can be challenging given the diverse group of players (banks and non-banks) with different characteristics in terms of size, financial capacity and business model and the likelihood of this cost being passed on to users. This requires an appropriate balancing act between supporting financial inclusion and ensuring business sustainability of individual players, while at the same time promoting efficiency and competition.

In Hong Kong, when the FPS was launched in September 2018, it already supported the ISO 20022 standard. The RTGS systems have also migrated to the ISO 20022 in April 2024. That said, HKMA noted that in adopting ISO 20022, a lot of coordination work is required to ensure the participating institutions are ready, and that their internal systems and the relevant processes can cope with the standards to ensure interoperability with other systems.

The RTGS system, owned and operated by the NRB, is compliant with ISO 20022 standards since 2019. Nepalese BFIs are in the process of upgrading their systems for cross-border

transactions through SWIFT which are compliant with ISO 20022 standards. However, the NRB identifies a number of challenges in implementing the ISO 20022 standards among the licensed BFIs as listed below.

- Existing payment systems are based on local and ISO 8583 messaging standards and many financial institutions rely on these. Integrating ISO 20022 into legacy systems can be challenging due to architectural constraints, outdated technology stack, and limited scalability.
- Data conversion between ISO 8583 and ISO 20022 formats requires careful mapping and transformation to ensure compatibility and data integrity. Such a process can be complex, costly, and resource-intensive especially for institutions with multiple systems and diverse data formats/structures. Moreover, during the transition phase, interoperability between ISO 8583 and ISO 20022 systems may be limited.
- Small and medium-sized institutions may find it difficult to bear the financial cost of complying with ISO 20022, faster payment and interoperability standards, which may limit their ability to participate fully in the modernised ecosystem.
- Adequate training and education are necessary for the workforce as well as customers to effectively implement ISO 20022. Addressing these challenges requires a coordinated effort from industry participants, regulators, and technology providers.

In India, the RTGS system has been compliant with ISO 20022 standards since 2013. The implementation of ISO 20022 standards in NEFT has also been completed, and the transition to this messaging standards by member banks is underway. However, RBI highlights a number of challenges in this process as listed below.

- *Initial Costs*: Significant investment in infrastructure, software and training is required. This disincentivises moving to ISO 20022 standard for financial institutions.
- *Resistance to change due to legacy systems*: Some financial institutions still rely on legacy systems and infrastructure that may not be compatible with ISO 20022.
- *Concerns of smaller financial institutions*: Transitioning to ISO 20022 standard is especially hard for smaller financial institutions such as cooperative banks, which are a crucial pillar in India's financial inclusion story.
- *Training and education*: Preparing staff for the transition to ISO 20022 is essential. Training employees and stakeholders to understand the new standard and its potential impact on their roles is a key challenge.
- *Timing and transition period*: Planning the transition to ISO 20022 and coordinating it with other industry players can be challenging. In the Indian experience, shifting to the new generation RTGS in 2013 based on ISO 20022 format required giving adequate time to the participants to adjust to the transition.
- *Differences even within the ISO 20022 standard*: Many nations tweak the ISO 20022 to suit local realities, thus cross-border transactions and interoperability between payment systems may not be as smooth.

Further, retail payment systems such as UPI, IMPS and AEPS use the Extensible Markup Language (XML) based messaging system. There is no proposal to migrate these systems to ISO 20022 standards as these systems support both ISO 20022 and ISO 8583. The payment system operator (NPCI), while designing protocols for the above payment systems, did a comparison between XML and ISO 20022 and observed that native XML formats are much

more efficient and scalable. For cross-border transactions and linkages with systems in other countries, both the platforms UPI and IMPS are equipped to support ISO 20022 by way of connectors-build.

As regards the major card networks operating in India, they rely on ISO 8583 protocol. The RBI indicates that the card operators are of the view that ISO 20022 is primarily designed to handle Automated Clearing House (ACH) type of transactions between financial institutions and may not be fully relevant for card transactions. While they acknowledge the current shift towards ISO 20022 in some of international jurisdictions, reservations remain for the need for adoption in the case of India where card payment transactions are already secure and authenticated.

4.3 Faster payment systems

Many central banks in the region view implementation of the FPS more as opening up new opportunities rather than posing challenges. The opportunities that many Study Group members see in implementing FPS is that the infrastructure enables them to establish bilateral cross-border payment linkages within the region. For example, BNM is of the opinion that by linking the real-time RPP of Malaysia with the FPS of another country, they can mimic the faster, cheaper and seamless transactions enjoyed by users domestically in the cross-border space. In addition to bilateral linkages, five ASEAN central banks are also advancing work on a multilateral connectivity model in collaboration with BIS Innovation Hub under Project Nexus.

The NRB is also of the view that as FPS in Nepal are licensed, regulated and supervised by the central bank, it will be easier to harmonise the regulatory standards of FPS with other countries if cross-border payments are initiated through them. That said, NRB raise awareness to the difficulty of carrying out effective Anti-Money Laundering and Combating the Financing of Terrorism (AML/CFT) checks under the FPS, an issue that is more likely to arise in cross-border transactions.

While recognising that FPS is undoubtedly a crucial component in modernising domestic payment infrastructures, the RBI is of the view that its implementation may not always be deemed essential for accessing regional cross-border multilateral payments. This is because there are challenges such as having workable governance and oversight arrangements due to the multi-jurisdictional, cross-border and/or cross-currency nature of these arrangements and cost-considerations. In RBI's view, many countries already possess well-established payment infrastructures that may not be based on real-time payment systems like FPS but are nonetheless effective in processing cross-border transactions. By connecting these legacy systems through interoperable frameworks and standard protocols, countries can facilitate efficient cross-border payments without necessitating the immediate adoption of FPS.

BNM also echoes similar sentiments. It notes that while connecting FPS is a feasible solution to enable cross border payment, alternative means to enable access to cross border payments should continue to be explored given that technology is rapidly evolving. This is to ensure that countries without established FPS infrastructures can also bridge the gap and participate in cross-border multilateral payment networks.

In HKMA's view, FPS implementation sets a strong foundation for enabling access to regional cross-border multilateral payments network, but it does not see FPS as a pre-requisite for building cross-border payments network. As the participation in such networks also depends on factors beyond FPS, such as bilateral agreements, regulatory cooperation and adherence to international standards, these factors become more important in enabling regional connectivity.

5. How will the retail payments landscape evolve?

Members of the Study Group are unanimous in the view that their central banks will continue to ensure that the regulatory framework supports the development of a payment ecosystem that is reliable, efficient and innovative. They are also committed to ensuring that users will have a wide range of digital payment options. Going forward, they expect to see greater interlinkages among the three modes of e-payments – e-money, online and payment card – and payment solution providers will ensure that users can switch from one to another seamlessly. To support the digital payment options in rural areas with limited or no internet access, central banks are also testing offline modes of payment using innovative technology.

In terms of how country-specific payment solutions might evolve over the next 3 to 5 year period, there are some differences of opinion depending on the state of the retail payments industry in different jurisdictions. The BOL suggests that over the immediate future, mobile banking and internet banking will continue to dominate the market, while fintech partnerships and blockchain-based solutions will drive the digital banking narrative. In 2021, the government of Lao PDR granted permission for crypto mining and testing of two crypto currency exchanges in sandboxes over a 3-year period. Following this, BOL has granted a license to one company to test the crypto currency exchange concept.

In Nepal, payments carried out using QR codes are expected to gain more market share and will be the preferred option to initiate retail payments. NRB also expects contactless and biometric payments to gain foothold in the retail payments market. Banks conscious of these trends, will implement omnichannel payments that will integrate multiple payment options to operate seamlessly. Further, NRB expects international wallet providers to enter the retail payment market as cross-border integrations, such as Nepal's National Payment Interface (NPI) and India's UPI, evolve. The NRB is committed to fostering innovations in retail payments and is in process of implementing the Innovation Centre/Regulatory Sandbox to support resilient innovations. The NRB is further exploring the authorisation of digital banks and central bank digital currency (CBDC) by making necessary amendments in the appropriate acts. The NRB aims to launch the CBDC pilot by 2026.

The BOT has been encouraging financial service providers to embrace new technologies for fostering financial innovation by testing them in regulatory sandboxes. Currently, the BOT is trying to assess the potential benefits and opportunities of using blockchain and digital assets to pioneer new innovations in payment services. In this connection, a cross-border remittance project was tested in the regulatory sandbox. This involved a commercial bank and its fintech partners to adopt blockchain technology for the payment infrastructure and using digital assets (stablecoins) for settlement. The project aims to derive several benefits, such as faster cross-border transactions for customers and reduced costs associated with liquidity management for banks. Looking ahead, the BOT anticipates that further innovations in digital assets, such as programmable payments, will be tested in sandboxes.

The HKMA expects the future of retail payments in Hong Kong will be influenced by the market's readiness to embrace new payment technologies, taking into consideration consumer preferences. In March 2024, a regulatory sandbox to test stablecoins has been introduced and a project known as "Project Ensemble" to test wholesale CBDC transactions for interbank payments and securities settlement has been launched. The HKMA is also collaborating with various financial institutions to develop common standards and to build the foundation for tokenised deposits.

The RBI expects a number of newer technologies to enter into the retail payments systems. One is biometric authentication methods, such as fingerprint scanning or facial recognition,

which will be integrated into payment systems for offline transactions. Customers will be able to authenticate payments using their biometric data to add an extra layer of security and convenience. Another is sound-based methods to authenticate payments. For example, by emitting unique audio sounds, payment devices can communicate with smartphones or other devices to enable contactless payments in offline mode. A number of use cases in regulatory sandboxes are also being tested for retail payments. One is an offline digital cash product which is meant to help in the digitisation of payments in rural areas. This will be started with Self Help Groups (SHG) through an offline payment solution and a digitised SHG-centred ecosystem. It uses NFC or Bluetooth Low Energy protocol for secure wireless offline payment mode where no other connectivity is required at the time of the customer transaction at the merchant location. A second one is a feature-phone based payment solution for P2M transactions over the "sound medium" by establishing a secure channel for data transfer over Interactive Voice Response between devices. The product enables contactless payment even without internet. A third is an offline digital payment solution which utilises distributed ledger technology in combination with private biometric authorisation to secure offline card-to-card and card-to-phone transactions.

BNM states that it is assessing the potential for CBDC to futureproof the financial system in a phased approach. The current focus area is on wholesale CBDC given the potential benefits it offers, especially in the cross-border payment space. While Malaysia's economy is already well-supported by an efficient and robust retail payment system (i.e., RPP), BNM sees the potential of retail CBDC in complementing the RPP and serving as a catalyst to spur greater innovation in the financial sector. As such, BNM also plans to explore the potential role of domestic retail CBDC under its Phase 3 of the multi-year CBDC exploration in promoting innovation (e.g., via a smarter version of central bank money), and to further enhance the diversity and resilience of the retail payment system. Considerations for the issuance of retail CBDC will take into account the appropriate use case as well as its potential impact on monetary policy and financial stability.

6. Summary and conclusions

Payment systems are a critical element of the financial system plumbing that supports trade, facilitates access to finance, and promotes financial inclusion. In the Asia-Pacific region, the adoption of digital payments is gathering pace, and this is transforming the way people conduct their daily financial transactions – be it doing their banking business, paying for their goods and services or how they settle their utility bills. Several smaller regional economies are prioritising the digital economy transition. Central banks are leading the change, and some are even nudging their governments to migrate to electronic transfers from cheque payments to support the digital transition. There is a concerted effort by central banks in the region to reduce the use of cheques in daily transactions.

A significant share of the retail payments has now migrated to mobile and internet-based transfers. A number of central banks in the region have provided thought leadership and the enabling regulation to facilitate the retail payments infrastructure needed for the digital payments ecosystem to develop. Examples include PromptPay in Thailand, the RPP in Malaysia, the CEFTS in Sri Lanka and the UPI in India. The broadening of the access to and the affordability of internet services and smartphones have also helped quicken the pace of the shift to digital payments. Merchant QR code is gaining popularity in the region and is now becoming the preferred mode to initiate P2M payments. Its widespread adoption is also partly due to the more competitive merchant discount rates offered by financial institutions for QR-based payments. Each jurisdiction has come up with innovative mobile apps for making retail

payments that have become household names, and they have also played an important role in enabling the digital payment adoption.

However, as innovations in digital payments gathers pace, phishing scams and identity thefts pose constant risks to consumers and financial institutions. Building safeguards against these as digital innovations gather pace is an ongoing challenge that central banks are trying to address. Efforts to promote financial literacy and to educate the public about potential risks when interacting with the digital world are some of the initiatives central banks are taking. With the proliferation of payment devices and payment platforms, ensuring interoperability among them has taken increased focus. Towards this goal, many jurisdictions have implemented the ISO 20022 messaging standards or are in the process of doing so. But some members point out that there are still several challenges in the implementation process. For example, integrating ISO 20022 into legacy systems can be challenging due to architectural constraints, outdated technology stack, and limited scalability. Moreover, the transition to ISO 20022 standards can be harder for smaller financial institutions like cooperative banks given that it requires significant investment in infrastructure, software changes as well as employee training to understand the new standards.

The adoption of retail FPS is being seen by a number of central banks in the region as a facilitator of cross-border payments. Central banks in the ASEAN-5, in particular, are of this view drawing on the experience of the Project Nexus led by the BIS Innovation Hub. The RBI on the other hand, is of the view that FPS implementation may not always be deemed essential for accessing regional cross-border multilateral payment systems. It cites challenges such as having workable governance and oversight arrangements due to the multi-jurisdictional, cross-border and/or cross-currency nature of these arrangements and cost-considerations. BNM is also of the view that while connecting FPS of two countries is one solution to enable cross border payments, alternative means to enable access to cross border payments should continue to be explored given that technology is evolving rapidly.

Looking forward, members of the Study Group are of the view that a number of newer technologies will enter the retail payments sector. They include among others, payments enabled by biometric authentication methods such as fingerprint scanning or facial recognition, and P2M transactions enabled over the “sound medium” by establishing a secure channel for data transfer over Interactive Voice Response between devices. Central banks are also testing a number of proof-of-concept payment options in sand boxes, such as assessing the potential benefits and opportunities of using blockchain and digital assets (stablecoins), and the potential for the CBDC to address gaps in the financial sector and achieve the public policy objective of promoting financial inclusion.

Annexe 1: Retail payment instrument shares aggregated across jurisdictions

The tables below show the relative shares of the payment instruments data across jurisdictions. The aggregated value and volume transactions for each instrument category represents the simple average of the relative shares across all jurisdictions each year. The same caveats noted under Section 2 of the report apply in interpreting the numbers, that is, the relative shares of the aggregate transaction values of different payments instruments in Table A1 are likely to be biased by the inclusion of high value cheques for wholesale payments, which are still being used in some jurisdictions.

Table A1

Relative shares of the aggregate transaction value of retail payment instruments in selected SEACEN members[a] (in percent)

	2017	2018	2019	2020	2021	2022	2023
Cheques	72.9	68.2	54.1	46.4	37.0	32.7	26.8
Digital wallets and prepaid cards	0.5	0.6	0.5	0.6	5.2	5.2	5.6
Debit and credit cards	6.8	7.0	5.2	4.3	3.8	4.0	4.3
Mobile and internet-based	19.8	24.2	40.2	48.6	53.9	58.1	63.3

[a] Hong Kong SAR, India, Lao PDR, Malaysia, Myanmar, Nepal, Sri Lanka, Thailand.

Source: Data submitted by Study Group members.

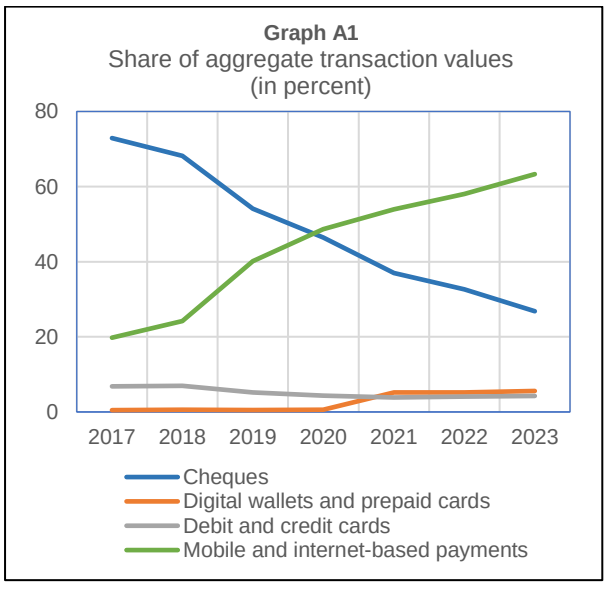
Table A2

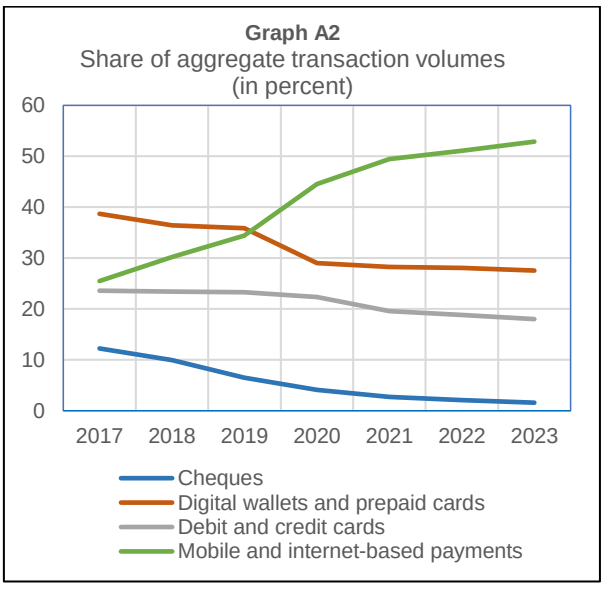
Relative shares of the aggregate transaction volume of retail payment instruments in selected SEACEN members[a] (in percent)

	2017	2018	2019	2020	2021	2022	2023
Cheques	12.2	10.0	6.5	4.1	2.7	2.1	1.6
Digital wallets and prepaid cards	38.7	36.4	35.8	29.0	28.2	28.0	27.5
Debit and credit cards	23.6	23.4	23.3	22.3	19.6	18.8	18.0
Mobile and internet-based	25.5	30.2	34.4	44.6	49.5	51.1	52.9

[a] Hong Kong SAR, India, Malaysia, Nepal, Sri Lanka, Thailand.

Source: Data submitted by Study Group members.





Annexe 2: Mandate of the Study Group

Background

Forms of money, roles of financial intermediaries and nature of payments have undergone dramatic changes in recent years. Nowhere is this change more visible than in retail payments that has an impact on our daily life. Retail payments typically relate to the purchase of goods and services by consumers and businesses and are executed via a variety of payment instruments. Innovations in retail payments have been changing the way consumers pay for goods and services.

As devices that can be used to make retail payments have expanded, so have consumer choices on how to pay. There is now a desire to use every device connected to a mobile or internet network as a potential payment instrument. As consumer preferences change, businesses are forced to offer innovative payment solutions that may include mobile wallets, QR code, crypto currencies and e-wallets beyond the traditional payment instruments such as cash and credit or debit cards. The need for retail faster payment systems (FPS) that enable instant transfers and are available on a 24x7 basis has also become a necessity. Central banks on their part are adding another layer of innovation by introducing retail CBDCs.

As payment devices as well as forms of money have expanded, the need for interconnectivity and interoperability across payment solution providers and payment system operators has become a key requirement. Complying with this requirement has meant that countries must quickly transition to using the ISO 20022 messaging standard for domestic payment systems, which allows for interoperability by using a data format that is platform independent. Many countries have already implemented ISO 20022 standards for domestic retail payment solutions.

Central banks have been supportive of innovations taking place in the retail payments sector. To some extent access to a variety of payment solutions can promote financial inclusion and it has served as an important driving force for these developments. At the same time, as FPS build upon bank account-based credit transfers, this may warrant real time gross settlement systems (RTGS) to extend operating hours to help manage the liquidity and settlement risks. Innovations have also led to the increased role of non-banks as payment solution providers. For central banks, these developments can have implications for the soundness and effectiveness of payment systems by creating heightened demands on liquidity in the interbank system.

Deliverables

To contribute to a better understanding of the innovations taking place in retail payments and to assess both the benefits they bring as well as the key challenges they may pose to the resilience of the payments and financial system as they continue to evolve, the Study Group on *Retail Payments Landscape in the Asia-Pacific Region* will:

- Provide an overview/stocktaking of existing payment solutions for retail transactions and document how they have evolved since 2018.
- Provide statistics on the relative share of various instruments being used for making retail payments (mobile wallets, e-wallets, QR code payments, credit/debit cards, internet-based payments, crypto assets, CBDC and cash).

- Assess any impediments to implementing the ISO 20022 standards and FPS for retail payments as well as on ensuring interoperability across retail payment solution providers.
- Identify potential issues and challenges for central banks arising from innovations in retail payments and in the implementation of fast payments system.
- Provide an assessment of whether FPS for retail payments will be seen as a pre-requisite for enabling access to regional cross-border multilateral payments network.
- Provide details on payment innovations being tested in sandboxes in their respective jurisdictions.
- Provide an assessment of what forms of retail payments may dominate as customer preferences and new technologies evolve in the next 3 to 5 years.

Annexe 3: List of Institutions and Participants

Institution	Participant
Hong Kong Monetary Authority	Stephen Pang Hugo Tse
Reserve Bank of India	K. Vijayakumar
Bank of the Lao PDR	Nilundone Keomanysy
Bank Negara Malaysia	Suriana Jumali Muhammad Puwira Jaya
Central Bank of Myanmar	Yar Zar Lin
Nepal Rastra Bank	Rajesh Paneru
Central Bank of Sri Lanka	Umesha Edirisuriya
Bank of Thailand	Pariwat Kanithasen Kom Sai-ngam

The SEACEN Centre team

Masyitah Rosmin

Srichander Ramaswamy