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With a presence in London, Singapore, Washington and New York, OMFIF is an independent forum for central banking, economic policy and public investment — a neutral platform for best practice in worldwide public-private sector exchanges.

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FOREWORDS

Evolution of money creates prizes and benefits for all

Money is changing fast. As it takes the next step in its digital transformation, this report looks at where that could lead, writes Clive Horwood, managing editor at OMFIF.

Welcome to the 'Future of Payments'. This is a landmark report for OMFIF, coming at the end of a year in which we launched our Digital Monetary Institute. The DMI was set up to bring together policy-makers, technologists, financiers and regulators to explore the opportunities of digital finance.

This 'Future of Payments' report does just that. It shows how payments – integral to all our lives – is the area of financial services most ready for transformation. New technology is coming on stream at an incredible pace. What seemed cutting edge only a couple of years ago is already out of date, as distributed ledger technology and central bank digital currencies form the next stage of an inevitable evolution.

The prize for the winners of this technological race is huge – the payments industry has revenues of around $2tn. The benefits of this contest will be spread broadly too, enabling far more of the world's population to access quick, safe, reliable and inexpensive means for moving or spending their money.

We thank our sponsors - Algorand, Citi, Cypherium, GrabPay, Mastercard, Novi (from Facebook), PayPal and SWIFT – for their thoughtful and engaging contributions to this report. And we look forward to our readers joining us in further discussions through the DMI in 2021.

Digital transition management vital as developments accelerate

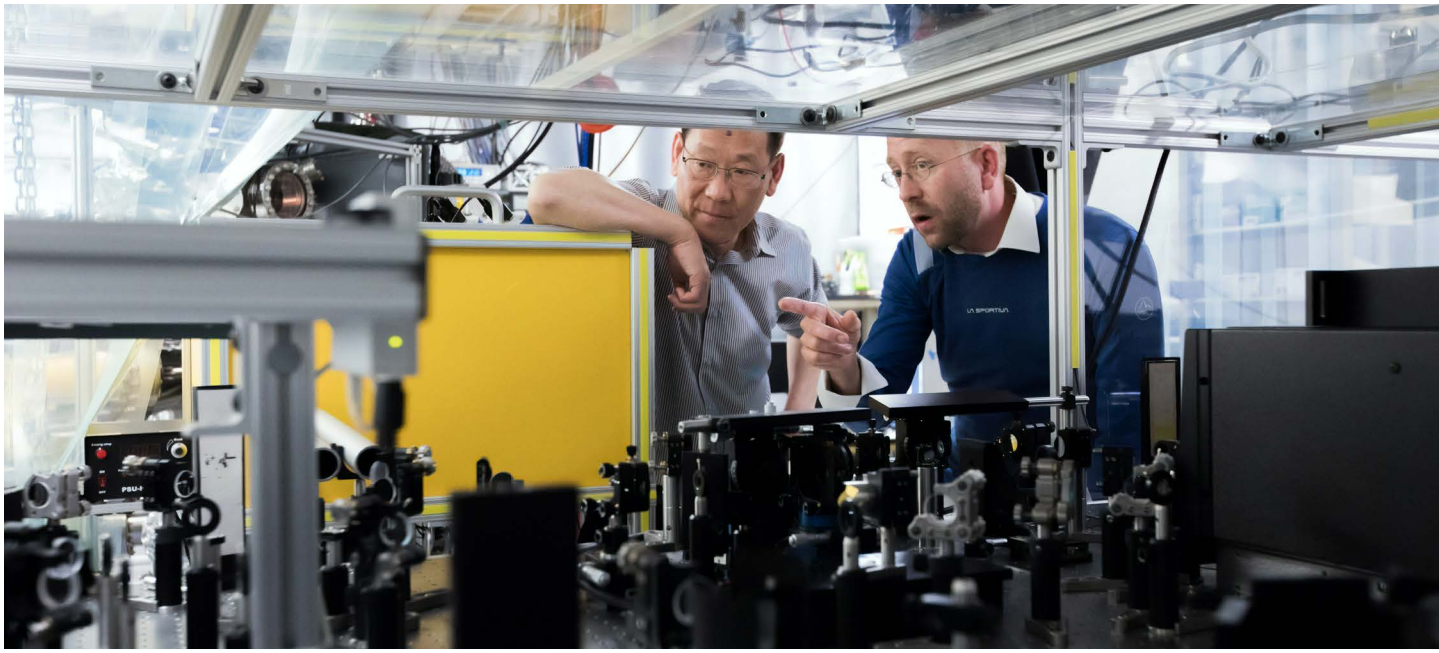
Getting the most out of the emerging digital economy requires collaboration between the private and public sectors writes Philip Middleton, chair of the Digital Monetary Institute.

The 2020 pandemic has turbocharged the development of a complex global digital economy and the sophisticated digital payments systems upon which it will rely. To many, this offers the exciting prospect of cheaper, more efficient and more secure transactions on a global scale. They see this as having the possibility to extend financial inclusion to millions of people, vastly improving the lot of migrant workers and their home economies. To others, it spells the loss of personal control, privacy and sovereignty.

Managing this transition smoothly and preventing disruption of the global financial infrastructure presents a series of massive challenges for consumers, the private sector, governments, central banks and other influential policy-makers. The competing claims of private and public money, privacy and transparency, different consumer groups and the merits of various technology applications, both old and new, will lead to much scrutiny and debate.

It is likely that the future digital payments landscape will comprise of a complex tapestry of multiple private and fiat currencies with profound implications for regulation and supervision, and cross-border and domestic interoperability. There will be critical questions about the balance of co-operation and competition between public and private sectors, and about relationships between nation states and their currencies.

This report explores, with both insight and lucidity, these and other issues that will fundamentally reshape the financial services industry and the lives of billions of people around the world.



PREFACE

PLAYERS FROM ACROSS THE PAYMENTS INDUSTRY OFFER INSIGHTS FOR THE FUTURE

IN THIS REPORT, OMFIF takes stock, describes and evaluates the current payments industry, including services offered and the infrastructure to support them. The study highlights the key trends and innovations that are likely to shape the future ways in which people will pay, save and transfer value – domestically and across borders. It focuses on the retail payments industry but also comments on wholesale payments.

The report offers a guide to the problems in the current monetary set-up. It allows regulators to explain their concerns about private solutions and to offer ideas as to how these could be addressed. It is based on an in-depth survey of 20 central banks, regulators and policy-makers, globally.

Contributors' insights are reflected throughout this paper and summarised faithfully to give an overview of the development of the payments industry. The report showcases the potential for new ways forward by examining the changing payments landscape through a regulatory lens. It also explores innovative developments under way in the system of traditional payment providers, technology companies and more recent entrants to the financial industry.

We would like to thank the following organisations, individuals and their teams from the payments industry for their contributions and perspectives:

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Steve Kokinos, Chief Executive Officer, Algorand

Neha Narula, Director of the Digital Currency Initiative, Massachusetts Institute of Technology Media Lab

Harry Newman, Global Head of Payments Strategy, Swift

Huey Tyng Ooi, Managing Director and Head of GrabPay, Grab

Naveed Sultan, Global Head of the Treasury and Trade Solutions Group, Citigroup

novi
from FACEBOOK

Never a better time to transform payments services

In a post-pandemic world, it is more crucial than ever that we work together to make payments of all kinds easier to access, less costly to conduct, and faster to process, writes Tomer Barel, chief operating officer of Novi.

DIGITAL technology has transformed nearly every aspect of how we live and work. From how we communicate, monitor our health, entertain ourselves, learn and more – there is almost no area in which digital technology has not become integral to the experience. In many cases, it has made things work better and faster.

Many of us already use mobile apps to do our banking, pay our bills and send money to loved ones overseas. But sending money from here to there is still complicated.

Existing money networks are closed systems, and they are not well interconnected. Sending money within one of these systems can be expensive and slow. A single transaction can take days and cost the sender, on average, 7% on top of the amount they are sending.

Payment services and wallets are limited in their effectiveness because of the underlying infrastructure powering them. You may be able to send and receive money from one digital wallet, but you typically can't send and receive money between wallets made by two different companies. They operate in separate silos, limiting the reach and efficiency of these kinds of networks.

'There is no reason that sending money to a friend, family member or business partner shouldn't be as easy as sending a text message.'

An innovative technology like blockchain can help provide the infrastructure to facilitate fast, cheap and stable money movement across service providers and institutions, and among different people all around the world. The barrier to access modern digital money and financial services would be greatly lowered – enabling billions to participate in the world's economy.

This could not come at a better time. More than 2.5bn people live in countries with poorly developed financial services and 1.7bn people do not have a bank account. One in nine people globally depend on money sent from family and friends abroad to cover food, housing and healthcare costs. The pandemic only underscores the urgent need for a contactless, frictionless, simple, fast and inexpensive way to move money around the world.

There is no reason that sending money to a friend, family member or business partner shouldn't be as easy as sending a text message. With new technologies like blockchain gaining more mainstream traction, there is already the means available to make it happen. Anyone with a smartphone will be able to access this new digital financial infrastructure. Of the 1.7bn people who sit out of the financial system, 1bn have access to a mobile phone. This offers them a path into the digital economy and access to the coming system of interoperable digital wallets and currencies.

There is no question this digital transformation is coming soon. China is developing a central bank digital currency, with digital renminbi tests already underway. More countries around the world are recognising the importance of CBDC and are exploring their own new digital currencies. The continued, global work on such technology is essential to the transformation of the world's digital financial infrastructure.

The fragmented global financial structure is not sustainable. In a post-pandemic world, it is more crucial than ever that we work together to make payments of all kinds easier to access, less costly to conduct, and faster to process. In doing so, the lives of billions of people will improve. With broader access to affordable and equitable financial systems, educational achievements, better nutritional health, and greater employment opportunities will grow across the globe. ●

EXECUTIVE SUMMARY

THE FUTURE OF PAYMENTS IS HERE

PAYMENTS are not just being disrupted, but utterly transformed by new technology.

The way we pay for goods and services has evolved constantly over the past 50 years. We swapped cash for cards. Service providers such as Visa and Mastercard became a feature of daily life. We shopped on the internet and paid for items electronically. We discovered PayPal, Apple Pay and Alipay, and then found that our mobile phones were all we needed to shop. As the means of payment changed, whole infrastructures adapted and developed around them.

The pace of change in payments today is unprecedented. A confluence of factors is driving the transformation. This OMFIF report examines how the future of payments will look, and surveys central banks' and regulators' opinions as to the challenges and opportunities they face.

Mobile ownership and telecommunications technology are driving the digital economy forward. Demand for real-time clearing and settlement of high-volume, low-value payments between retail businesses and individuals is accelerating. Consumers value the ability to conduct instantaneous fund transfers around the clock. This desire for speed, convenience, ubiquity, safety and affordability in conducting digital transactions has been turbo-charged by the need to preserve public health and reduce dependence on physical cash during the pandemic.

The relentless and irreversible shift from the age-old reliance on physical cash poses problems but also brings benefits in the developing world. Innovation in payments must consider accessibility, affordability and inclusion for those on the periphery of the financial and payments infrastructure.

Although many of the payments innovations and business models linked to mobile and e-money originated in developing countries, these now have palpable effects in advanced economies as well, disrupting the traditional activities of banks and other payment providers. Smaller fintechs and large techfins are injecting greater innovation, collaboration and competition into the payments arena and broader financial services.

The advent of cryptocurrencies and distributed ledger technologies has spurred a wave of research from governments and central banks. Apart from the roll-out of fast retail payment systems that offer near-instantaneous domestic clearing and settlement, there is broader potential for profound changes in how central banks can promote better speed, security and access to payments. Consideration of CBDC implementation and the notion of digital sovereign fiat that can be transferred quickly and cheaply is sparking further changes that could transform the execution of monetary transactions.

Regulators need to keep pace with these innovations. New, non-traditional payment entities will emerge as systemically important components of the financial system. Proactive central banks and regulators, keen to harness the benefits of payments innovation without undue policy risks, engage more with industry.

As many central bank respondents to OMFIF's survey indicated, their governance and involvement in hybrid systems for payments and money will encompass not only a role as issuers of sovereign digital fiat, but also as standard-setters to protect consumer needs and innovation enablers for greater payments competition.

82%

Main concern of regulators regarding new entrants in the digital payments sector is cybersecurity, according to 82% of the OMFIF survey respondents

KEY FINDINGS FROM THE OMFIF FUTURE OF PAYMENTS REPORT

Central banks see an expanded role for state regulation and innovation policy support to keep pace with rapid evolution in payments systems and instruments

• 94% of central bank respondents identify setting revised regulatory or technical standards as an essential responsibility of the state in the future payments industry.

• Three-quarters (75%) of respondents identify payments systems governance as a key function of the state, with 56% seeing a greater future role for public-private partnerships in payments.

•Effective payments regulation will also increasingly involve providing direction on responsible innovation and industry-level engagement as 88% of respondents select innovation facilitation in payment technologies as an additional key role for the public sector.

Cyber risk management and the protection of consumer data rights stand out as key regulatory concerns for emerging payment technologies

• 82% of central bank respondents select cybersecurity as a key regulatory concern in the proliferation of new payment technologies to ensure consumer safety and confidence that data, digital identities and transactions are secure and reliable, and to prevent illicit movement of funds.

• 71% of respondents highlight that digital payment infrastructures should have measures that safeguard consumer privacy while balancing this with financial integrity and transparency requirements.

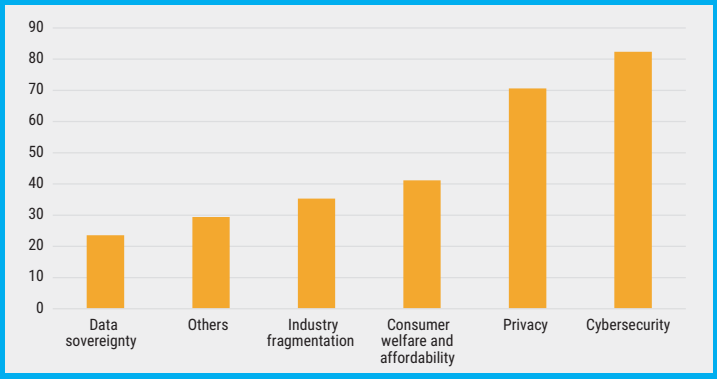
• A comparatively lower proportion (35% of respondents) sees industry fragmentation as a pressing regulatory concern. Given that alternative payment infrastructures and instruments in many jurisdictions have yet to reach a critical mass, central banks see that promoting common technical standards for payment innovations can help to solve or prevent the fragmentation of payment rails before they become systemically important.

56%

Respondents to the OMFIF survey who said that central banks could or should explore direct collaborations with private entities in designing and managing payments system architectures

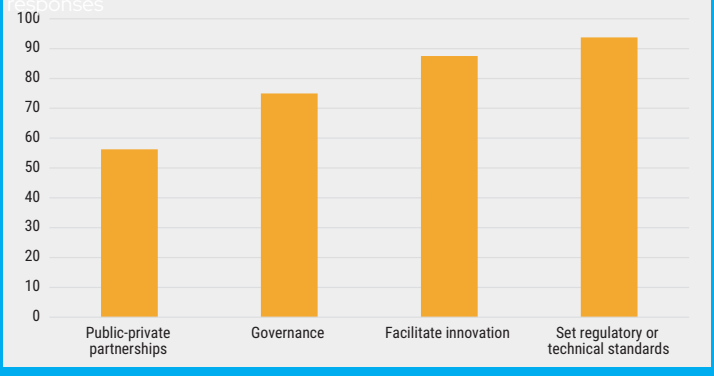
1. Cybersecurity and privacy should be major focus areas for new entrants

'What are your key concerns for new stakeholders offering digital means of payments?', % of responses



2. Public governance of payments will keep pace with private innovations

'What is the role of the state in the future payments industry?', % of responses



Source: OMFIF Future of Payments survey

1 Key trends in payments

SECTION 1:

THE PAYMENTS REVOLUTION GATHERS PACE

Advances in technology and changes in consumer behaviour have driven exciting changes in digital payments systems worldwide. But it has taken a global health crisis to give that transformation further impetus and ensure it has a lasting impact.

The Covid-19 pandemic has had a big impact on digital payments, accelerating the shift away from cash to various electronic alternatives. The health crisis has changed how people behave and live their lives, whether because of a greater emphasis on hygiene and social distancing, or because of government-ordered lockdowns. Rather than risk infection from physical contact with others, or even from handling notes and coins, more people opted for online or digital payments instead.

Many businesses have been hit by the collapse in demand for inessential goods and services, and there is little indication as to when prospects could recover, if at all. Firms, large and small, had a greater chance of survival if they operated online. This pivot to online shopping and e-commerce reinforces the growing importance of digital payments systems.

As one Southeast Asian central bank told OMFIF, 'The Covid-19 pandemic has elevated the urgency of adopting safe, efficient, reliable and convenient digital payment services. Amid social distancing measures, restricted mobility and rising uncertainty, digital payment services have mobilised retail payments, enabling users to send and receive funds through electronic means.'

Payments revenues worldwide have doubled in the decade to 2019 to reach $2tn, according to McKinsey's latest Global Payments Report. Even though payments revenues are estimated to have fallen 22% in the first half of 2020, the decline has been accompanied by growth in online payments. In the US, online retail spending rose 30% in the first six months of the year relative to the same period in 2019. Credit and debit card transactions in the UK for July 2020 fell 16.4% year on year, but in the same period the share of online transactions increased to 40.7% from 29.8%.

The consumer habits formed over the course of the past year are likely to persist even after the pandemic ends, according to respondents to the OMFIF Future of Payments survey of central banks conducted for this report. Amazon reported a 40% year-on-year increase in net sales in the second quarter of 2020, driven by demand for online grocery shopping, a platform which it had launched before the Covid outbreak. Just as the 2003 Sars epidemic prompted a rise in e-commerce and digital payments

in China, the Covid-19 pandemic is expected to have a lasting impact on consumer behaviour across the world.

A HISTORY OF PAYMENTS

The evolution of payments systems started long before digitalisation. Paper money was used in the 18th century for domestic and international transactions. Cash continued to play a central role in retail payments globally over the next two centuries until cards emerged as an alternative in the middle of the 20th century.

Credit cards originated in the US, initially as store cards issued by department stores, hotel chains and oil companies in the 1920s. Customers could use these cards to pay for transactions with the merchant that issued them. Universal credit cards, which could be used in a variety of stores and transactions, came later, in the 1950s. The Diners Club Card was the first of this kind, although purchases made on credit had to be paid in full by the end of the month. Modern-day credit cards, which allow for balances to be carried over to subsequent months for a fee, soon followed. The American Express card, launched in 1958, was the first of this kind.

These cards allowed merchants to settle transactions directly with the cardholder's bank, removing the need for payment by cash. The proliferation of credit cards meant that consumers could spend ahead of payday and that in turn boosted retail businesses. Because credit cards are backed by credit, they can be used to pay, but are not true cash alternatives. Debit cards, on the other hand, represent actual funds stored in the cardholder's bank account.

Both credit and debit cards contributed to the rise of e-commerce, as they could be used to pay for goods and services ordered online. PayPal was set up in 1998 and started off as an online money transfer system. Users linked their credit cards to their PayPal accounts, or deposited money from their bank accounts. Consumers who didn't have credit cards started using it for online shopping, and it became the preferred payments platform for online auction site eBay.

With the proliferation of smartphones, particularly after the introduction of the iPhone in 2007, online and non-cash payments took off. The consumer experience underwent a dramatic change: there was no need for a personal computer or laptop because consumers could use a smartphone to make electronic payments on the go.

By 2012, mobile payments had reached $163.1bn worldwide. Since then, non-cash transactions via mobile applications, digital wallets and QR code payments have increased steadily, and are estimated to have topped $1tn in 2019.

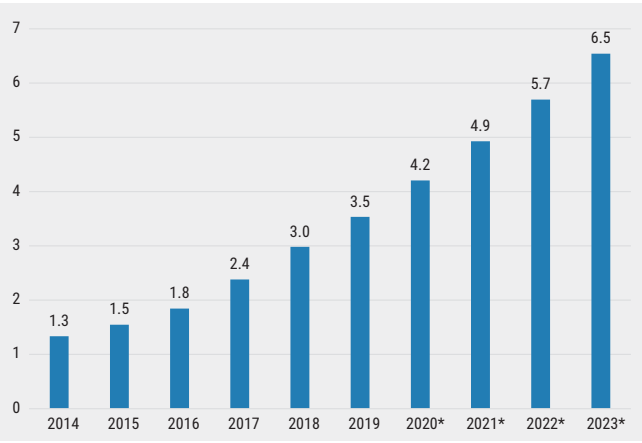
The majority of survey respondents explicitly noted the growth of contactless and digital payment methods in their respective payments systems, albeit with some variation. For example, 75% of Swedes already have a mobile payment application installed on their devices, whereas digital payment use in the Philippines is less widespread, accounting for only 10% of total volume in 2018.

ALIGNED DEMAND

Digital payments have grown in parallel with e-commerce and other digitally enabled services. Online retail sales are projected to reach $4.1tn in 2020, more than tripling from $1.3bn in 2014 (Figure 1). The growth is facilitated by digital payments platforms and vice versa, as the digital payments industry is also expanding to meet the demand created by e-commerce.

China is a notable example, as it leads in both areas. Online retail spending in the country is expected to reach $2tn in 2020. The People's Bank of China reported an exponential increase in the volume of mobile transactions to 61bn in 2018 from 1.7bn in 2013. The country's two dominant mobile payments platforms, Alipay and WeChat Pay, account for 93% of these transactions.

One reason why mobile wallets in Asia succeeded is because they evolved from popular digital services that already had a high volume of transactions. Alipay enabled mobile payments for the e-commerce giant



1. Digital payments facilitate online retail growth

E-commerce sales*, $tn
*Estimates

Source: Emarketer, OMFIF analysis

Algorand™

How systems that foster trust will usher in a new payments era

Legacy financial systems lack the tools to advance global payments. Blockchain solves this, writes Steve Kokinos, chief executive officer of Algorand.

THE economy functions on complex systems that present challenges and opportunities when it comes to payment services for consumers, businesses, governments and financial markets. Legacy financial systems do not have the efficiency, trust or accessibility needed to advance global payments. Blockchains solve this by bringing trust to otherwise untrusted systems.

To ensure public blockchains operate as trustworthy, programmable systems, they require transparency, compliance and security. Consumers must be able to instantly see transaction settlement, businesses need to view records and calculate figures easily, and regulators need to offer compliance measures. Purpose-built primitives must help enable scalable and seamless programmable compliance where needed. Advanced capabilities must allow issuers to directly include third-party regulators in their compliance operations without the need to invite them into the general management of issued assets. Blockchains must provide the highest degree of security through programmable consumer controls to protect users and secure a decentralised network of nodes.

To be truly scalable, secure and support billions of users, a foundational blockchain protocol needs to enable all forms of exchange running at the full speed of the network. This is critical for global payments as well as the creation of complex financial products. To make this possible, the Layer-1, or core technology rather than something built on top of it, must be designed to do just that.

New financial tools, processes, and services that solve real-world problems are being built with technology such as Algorand. Unlike other fintech solutions, which still rely on old infrastructure, Algorand enables the development of a wide range of scalable, secure and compliant applications to power frictionless financial exchange.

Implementing trust through legacy methods and available technology is simply not feasible. The path to generating trust is through programmable systems and programmable money, or real money that is represented digitally.

This form of money has rules that can be enforced by the money itself via smart contracts, which are coded into the system and replace the need for a trusted intermediary. Advanced smart contracts, like those available on Algorand, enable programmable money by automatically executing transactions using code stored on the blockchain when agreement terms are met. Smart contracts will replace traditional agreements. As an essential blockchain functionality that allows frictionless transaction methods, smart contracts give end-users more control with fewer intermediaries.

> ‘The path to generating trust is through programmable systems and programmable money, or real money that is represented digitally.’

This new way of handling payments and sophisticated transactions paves the way for truly peer-to-peer transactions and more financial inclusion. It removes friction from financial exchange, providing more efficient and accessible ways of transacting between any party.

Programmable money goes beyond just elegant and efficient technology. Critical in bringing all of this to life are tools and enablement programmes that open the doors for developers to easily create simplified financial programming. Lowering the barriers to entry for those who will develop new products, tools and services will represent a major tipping point in the future of payments and financial services.

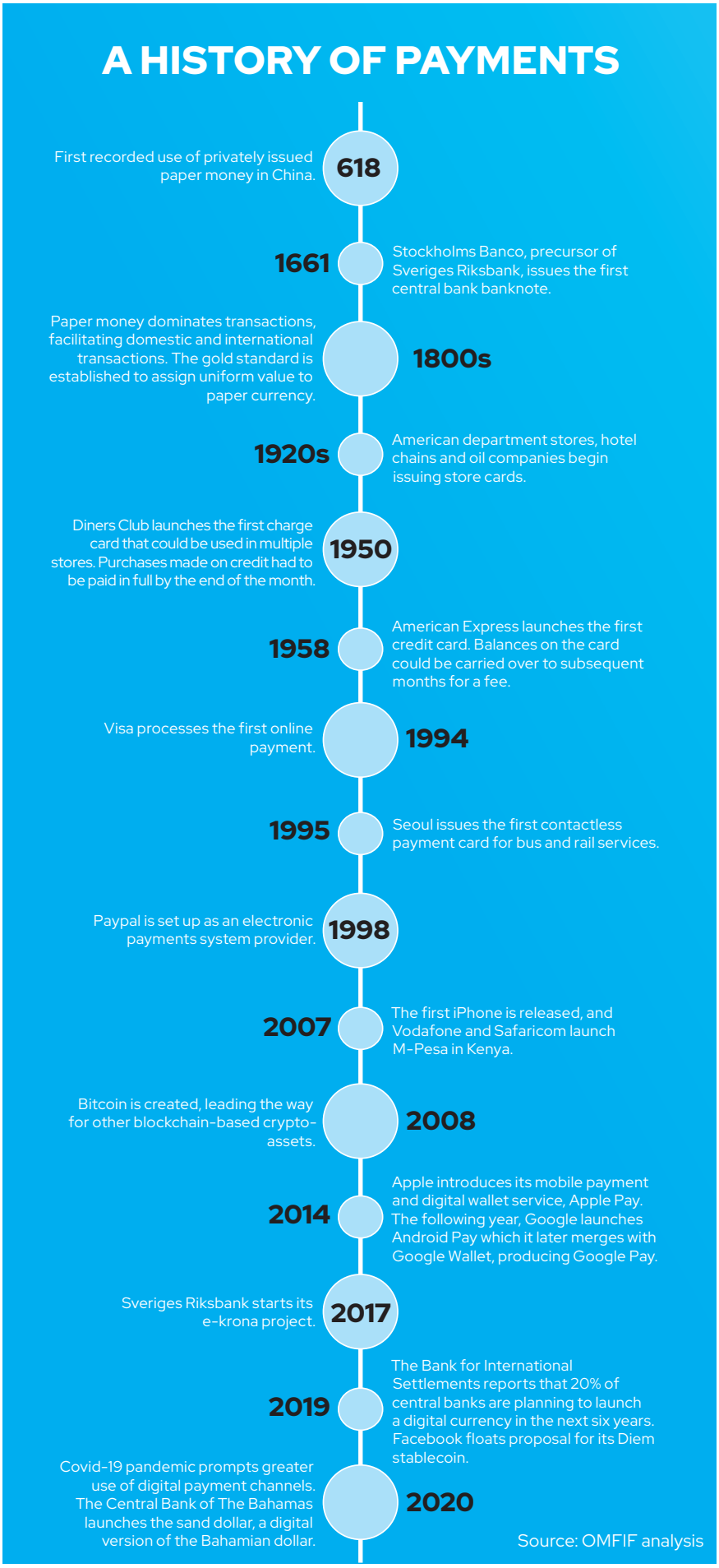
Blockchain offers a completely different way to organise and manage payments systems. It provides real-time, cross-border payments worldwide – and even new ways to store value. A platform like Algorand, paired with fintech’s latest developments and simplified developer toolkits, has the potential to take the lead in the race for payments innovation. ●

Alibaba. WeChat Pay facilitated transfers between contacts on a messaging app. Southeast Asia's GrabPay and GoPay are offshoots of ride-hailing services Grab and Gojek respectively. The growth of these platforms on the back of other services is similar to PayPal's earlier success in serving the eBay auction market.

Mobile payments also pave the way for financial inclusion. Kenya's M-Pesa, a regional and global pioneer in this area, had signed up 41.5m subscribers by 2019, up from just 20,000 a decade earlier. In 2019 alone, there were over 50m new registered mobile accounts in sub-Saharan Africa. In addition to enabling payments, mobile money services have become a tool for microfinance and small businesses.

Mobile payments have also facilitated remittance flows. The World Bank estimated global remittances in 2019 amounted to $714bn, of which roughly three quarters are sent to developing countries. Worldwide remittances are expected to decline 19.7% in 2020, reflecting the economic impact of the Covid pandemic on migrant workers in their host countries. But mobile payments will probably continue to be an important tool in these cross-border transfers because they offer a low-cost alternative to traditional banking. A report by the Financial Stability Board found that in the fourth quarter of 2020, the global average cost of remitting $200 was 6.8%, exceeding the G20 target of 5%. Innovations in mobile payments and digital platforms will be crucial for reducing transaction costs.

Covid-19, which brought about such widespread economic disruption, has led to greater financial and digital inclusion. One survey respondent reported that 1.6m individuals gained access to their country's formal banking system during the first half of 2020, while mobile banking transactions rose 192% during the same period. The International Monetary Fund reports that mobile money networks have enabled some governments, including those of Namibia, Peru, Uganda and Zambia, to extend fiscal support to people and



'One survey respondent reported that 1.6m individuals gained access to their country's formal banking system during the first half of 2020, while mobile banking transactions rose 192% during the same period.'

businesses.

Another respondent noted how digitalisation has helped to bridge gaps in the banking system in difficult geographic conditions. In Vanuatu, for example, the global charity Oxfam partnered with Australian fintech Sempo to deliver post-disaster support. Using a blockchain-based platform, they disbursed cash assistance to individuals who had been affected by Cyclone Harold and Covid-19.

Digital literacy is an important factor in the evolution of payments systems. Younger consumers are able to adapt to digital payments faster than older generations, partly because they are more familiar with newer technology. Data from the World Bank's Global Findex 2017 database shows that younger adults are more likely to make mobile or online payments than older consumers.

In high-income countries, over 60% of individuals between the ages of 15 and 59 have made digital payments, compared with just above 40% of older consumers aged between 60 and 69. The difference is starker for low- and middle-income economies, where about one fifth of younger adults have made digital payments, compared with only 5% of those in the older cohort.

Generation Z, the cohort born between the late 1990s and the early 2010s, and millennials, who were born between the early 1980s and the middle of the 1990s, grew up in a digital environment. Millennials witnessed the early days of the internet, e-commerce and social media, and experienced the transition from cellular phones to smartphones. Gen Z, on the other hand, went straight to the more modern iteration of mobile phones.

Aside from their technological know-how, members of these cohorts are familiar with a faster pace of change. These younger consumers have experienced rapid transformations in financial and commercial systems within their lifetimes and are better prepared to adapt to evolving payments systems. They are also more likely to understand the benefits, rather than feel threatened by change, as they have grown up with the convenience of a digital environment.

DIGITALISING CURRENCIES

With the digitalisation of payments systems, the retail landscape may be ripe for the introduction of a digital currency. Whether publicly or privately issued, a digital currency is a type of currency in a digital form. It can be centralised, with a central point of control over money supply, as is the case with a digital currency issued by a central bank, because the issuer retains monetary control. It can be decentralised, where control over money supply comes from various other sources. A crypto-asset is an example of a decentralised currency, where transactions can take place directly between peers without intermediaries.

The development of digital currencies could significantly change the existing global monetary system, which has been largely denominated in – and dominated by – the US dollar for over a century. In the late 19th century, the gold standard initially emerged as a means to assign uniform value to paper currency, leading to the establishment of an early international monetary system. The Bretton Woods system was formalised in 1944, creating a mechanism for international exchanges of currency. Participating nations pegged their currencies to the US dollar, which in turn was linked directly to gold.

The system broke down between 1971 and 1973 as US economic policy made it impossible to maintain gold convertibility. A more liberalised international monetary system followed, where currencies were allowed to float and fluctuate dynamically against each other. The change gave countries flexibility to cope with the volatility of oil prices. However, the US dollar remained dominant as countries continued to hold the currency and used it to settle most international transactions.

The dollar's position was largely unchallenged in the latter half of the 20th century, but the rise of digital payments could have implications for the importance of any currency. While central banks are only just entering the field of widescale digital currencies, banks and fintechs have familiarised consumers with the concept of digital money by building cashless platforms for existing currencies. As the volume of transactions they facilitate grows, these privately owned and operated systems will radically change payments and banking, potentially dominating entire financial systems.

The changing payments landscape and proliferation of privately issued digital tokens raise the possibility of central banks losing monetary control. Many central banks are now considering the possibility of individuals storing, spending and moving value without relying on the fiat currency system.

To mitigate this concern, several institutions are considering whether to issue their own central bank digital currencies. A study by the Bank for International Settlements highlighted that 20% of central banks aim to launch a digital currency in the next six years. Such CBDCs present an opportunity for central banks to upgrade the incumbent centralised payments and settlement systems.

The shift towards digital currencies is an important step in the continuous evolution of payments systems and instruments. Technology and innovation, driven partly by changing consumer behaviour, has transformed payments systems around the world. ●

CYPHERIUM

How to help digital payments grow up

Digital payments will soon become the main way money is moved around the world. Hurdles must be overcome to reach that future, writes Sky Guo, chief executive officer of Cypherium.

DIGITAL PAYMENTS are progressing from an experimental phase to one of integration, implementation and development. This transition comes as a result of the technological innovations of blockchain and smart contract platforms like Cypherium, which are increasingly central to new digital payments systems.

Decentralised payments systems prevent data breaches, downtime and reliance on intermediaries. Blockchains can process transactions instantaneously even across borders, unlike any other current system. Smart contracts will enable greater transparency and money will become programmable, preventing fraud and tax evasion, and speeding up the application of monetary policy. Mobile banking will allow greater access for billions of people. Aspects of these systems and central bank digital currency initiatives highlight what is happening in the digital transition.

Mobile payments systems help the financially underserved and enfranchise those excluded from participating in globalised commerce. Mobile payments systems also attempt to make that participation efficient and seamless.

Millions of people use mobile money and wallet services. bKash and M-pesa have the most registered subscribers, with 16m and 42m respectively. Much innovation has been focused in Africa, where rural economies can be made far more robust through the democratisation of financial instruments, such as saving and borrowing as well as payments. These projects largely precede blockchain, which they are now turning to for scalability and safety.

Mobile payment hotspots overlap only slightly with the kinds of national digital banking initiatives that are sprouting up across the world. There are a few CBDCs going live in developing nations, such as the Bahamas and Cambodia. Most experiments, though, are taking place in the developed nations of Europe and Asia. In Europe, there are projects like the Swedish Riksbank's eKrona and calls for innovation in France and the Netherlands. In Asia, the People's Bank of China's digital currency/electronic payment project is the most advanced. It has been able to coordinate with tech giants like AliPay, WeChat and Huawei, which is making CBDC compatible phones.

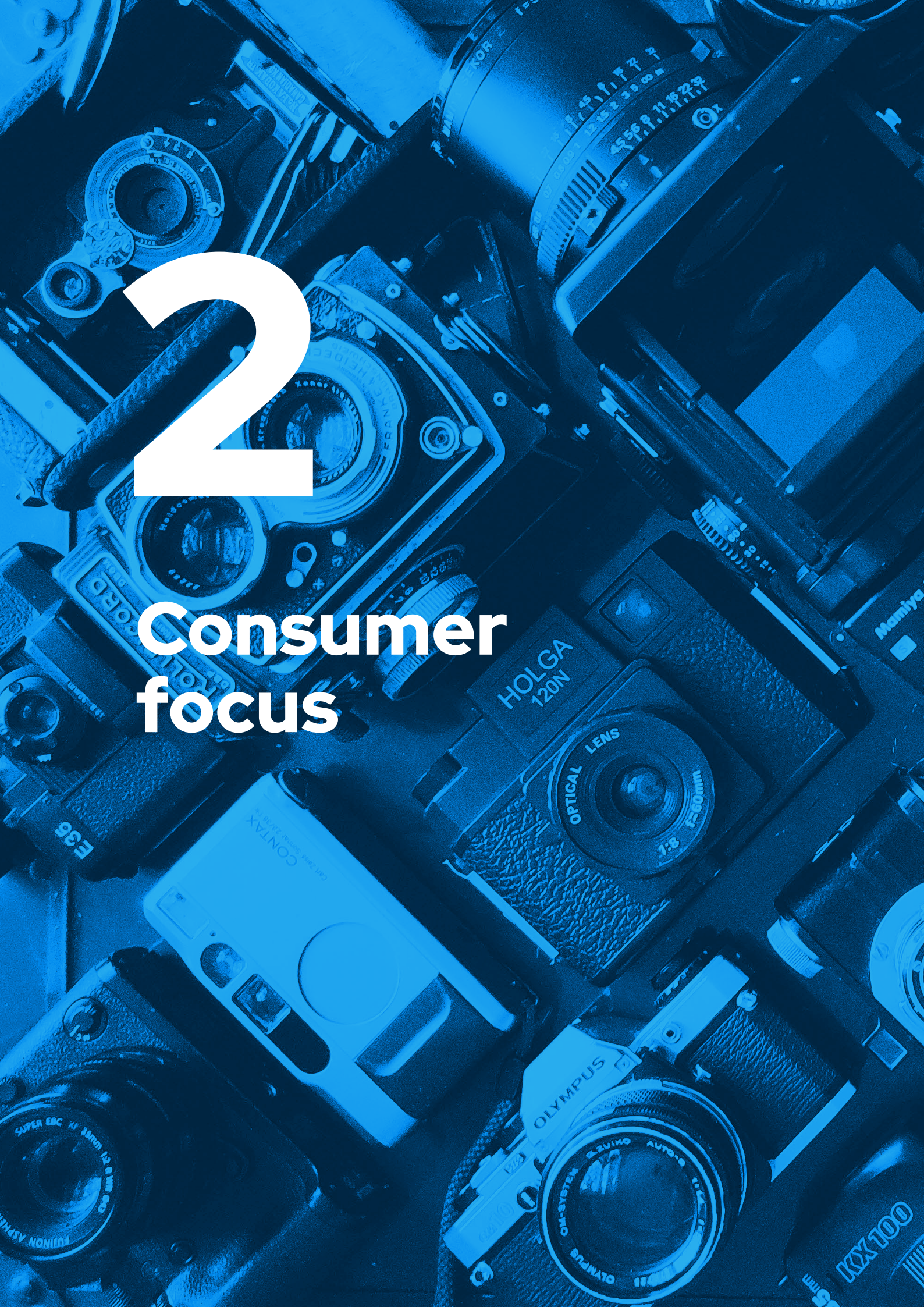
That coordination solves one problem western firms face. As public payments systems reduce the need for intermediary services, companies like Mastercard, Visa, and PayPal are looking for ways to maintain their future market positions. Their role could be as intermediaries between CBDCs and private industry or as point-of-service systems providers.

Moreover, CBDCs are closed systems. They cannot interact with each other without mediators, creating barriers to exchange. Central banks are unlikely to allow access to their systems, for obvious security reasons. Diem and other international initiatives intend to become retail digital currencies for billions of users. This could be impossible, however, as no country may be willing to allow others to have full access to domestic financial transactions and undermine monetary policy.

> 'As public payments systems reduce the need for intermediary services, companies are looking for ways to maintain their future market position.'

One prominent solution comes from Cypherium. It has developed its digital currency interoperability framework to support the autonomy of central banks by not having outside parties issue, distribute or supervise the transfer of CBDC. It is a novel approach that consists of six major bodies: the central bank, CypherLink (a notary mechanism), Cypherium Connect (a plug-in module for banking systems), Cypherium Validator (a verification machine), a mediation institution and finally the user.

A likely scenario will see blockchains adopted as parts of new systems, as go-betweens for both public-private collaborations within national economies and international public-to-public interactions. Major payment corporations and banks, like JPMorgan Chase, Square and Facebook, continue to develop their blockchain teams. This, ultimately, follows the lead of developers working on blockchain networks themselves, such as Cypherium, which are the industry's present authority and at the cutting edge.



2

Consumer focus

Nikon
NIKKOR-S Auto 1:2.8 f=85mm
No.206638
OLYMPUS
OM-1
SMC PENTAX 67 1:4.5 75mm
PENTAX
RZ67 PROFESSIONAL II
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Canon
Nikon
NIKKOR

SECTION 2:

THE CUSTOMER IS RIGHT AT THE FOREFRONT OF DIGITAL CHANGE

Younger consumers thrive in the digital environment. Their behaviour and preferences will shape the future of payments. But system providers must also safeguard consumer rights and privacy, especially for older users.

Consumers have different demands, expectations and preferences in the digital world, which in turn affect their use of payments systems. One of the most important factors influencing these choices is age, because this usually indicates the level of familiarity and experience with technology used for financial and retail transactions.

Young consumers tend to be comfortable with all forms of payment methods, and this is often attributed to their proficiency with technology and digital platforms. Older individuals may be slower to adapt to – or prefer to avoid – modern modes of payments. But members of the younger generations – Gen Z and millennials – have been quick to adopt digital channels.

Both of these younger groups grew up during an era of rapid developments in technology. When smartphones took off, with the launch of the iPhone in 2007, millennials were old enough to be students or just starting work, whereas members of Gen Z were either just starting, or already at, school. Both cohorts are expected to dictate consumer trends in the near future as their participation in retail and commerce increases.

To these groups, smartphones are not only communication devices, but also tools for a plethora of activities integrated in daily life. They use mobile gadgets for socialising and entertainment, as well as for banking, shopping and transport. The integration of multiple functions in one device presented an opportunity for payment platforms, which they captured through digital wallets. Apple Pay, for instance, enables the use of a single payment channel for multiple applications installed in users' Apple gadgets. In China, applications such as WeChat and Alipay have bundled together distinct services into one portal to create super apps.

This consolidation has contributed to the growth of digital payment platforms and has encouraged a preference for convenience and streamlined products. In Southeast Asia, the popularity of ridesharing services Grab and Gojek allowed both companies to slowly establish their own e-wallets, thanks to their captive markets. GrabPay and GoPay are still small relative to regional pioneers WeChat Pay and Alipay, but they owe their existence and success

to the trend for more integrated, streamlined consumer services.

Some digital payment platforms are taking integration further by reframing how users approach their own financial activities. Applications specifically designed to facilitate savings, investment and insurance have emerged, allowing users to manage their finances without the help of human agents. These apps can encourage desirable, profitable and responsible financial behaviour, such as when they can be pre-programmed to force users to save, by deducting money and putting it into a savings account.

Some apps have integrated social media features into their platforms, allowing users to invest and trade alongside their friends. The convenience and social dimensions of these apps are intended to appeal to younger consumers, although older customers who want to reduce the burden of financial chores can also benefit.

Social norms and behaviour are increasingly reflected in the types of digital payment channels that have emerged. Venmo, owned by PayPal, is designed specifically for peer-to-peer transfers – for example, to split a restaurant bill or share costs – and encourages interaction between users. A key feature of Venmo is that users can request money, overcoming social and cultural taboos about paying up. Venmo has grown in popularity and has a user base of more than 40m, while total payment volume increased to $37bn in the second quarter of 2020 from just $8bn two years earlier.

DIGITAL LITERACY AND INCLUSION

Older people are perceived to be less inclined to use digital platforms because of their relative lack of experience with modern-day technology. Had there not been a pandemic, they would have continued using familiar payment methods such as cash and bank cards. However, because the elderly are more vulnerable to Covid-19, changing their payment habits is a matter of greater urgency. They stand to benefit the most: shifting to digital payments can reduce the need to travel, minimise contact with other individuals and generally reduce their risk of exposure to the virus.

There has been limited evidence of this shift, prompted by lockdown measures. A consumer behaviour survey by tech consulting firm Capgemini found that one-third of older consumers increased their use of digital payment methods at the start of the pandemic. The study, conducted in 11 countries in April, found that 37% of consumers between the ages of 61 and 65, and 33% of those aged 66 and over, reported this change in their payment behaviour.

All of the countries covered by the Capgemini survey had imposed some form of restrictions on movement as a result of the pandemic, with various degrees of severity. The greatest increase among older consumers was in India, where 80% of consumers aged 56 and over said they had been using digital payments more: For all age brackets taken together, the aggregate was 75%.

To sustain such shifts in behaviour, traditional banks, fintechs and other payment channels need to make sure that their services cater to older customers and their specific needs. For example, older users may prefer to speak with a customer service agent on the phone rather than chat online with a bot. Speaking to a person directly about their questions or concerns adds a greater sense of security, especially if they fear becoming victims of online fraud. A more personalised approach may help to get older customers used to digital payments.

80%

Proportion of Indian consumers over the age of 56 saying they have used online payments more often since the outbreak of Covid-19

Digital literacy may also be important for accessing government assistance. In the US, pandemic-related unemployment support was disbursed through prepaid debit cards: claimants could apply for these online. Individuals who are already familiar with card-based transactions would find this straightforward, whereas people who are used to receiving their wages in cash or by cheque are more likely to struggle, and may need customer support at a time when banks are closing branches or scaling back counter services.

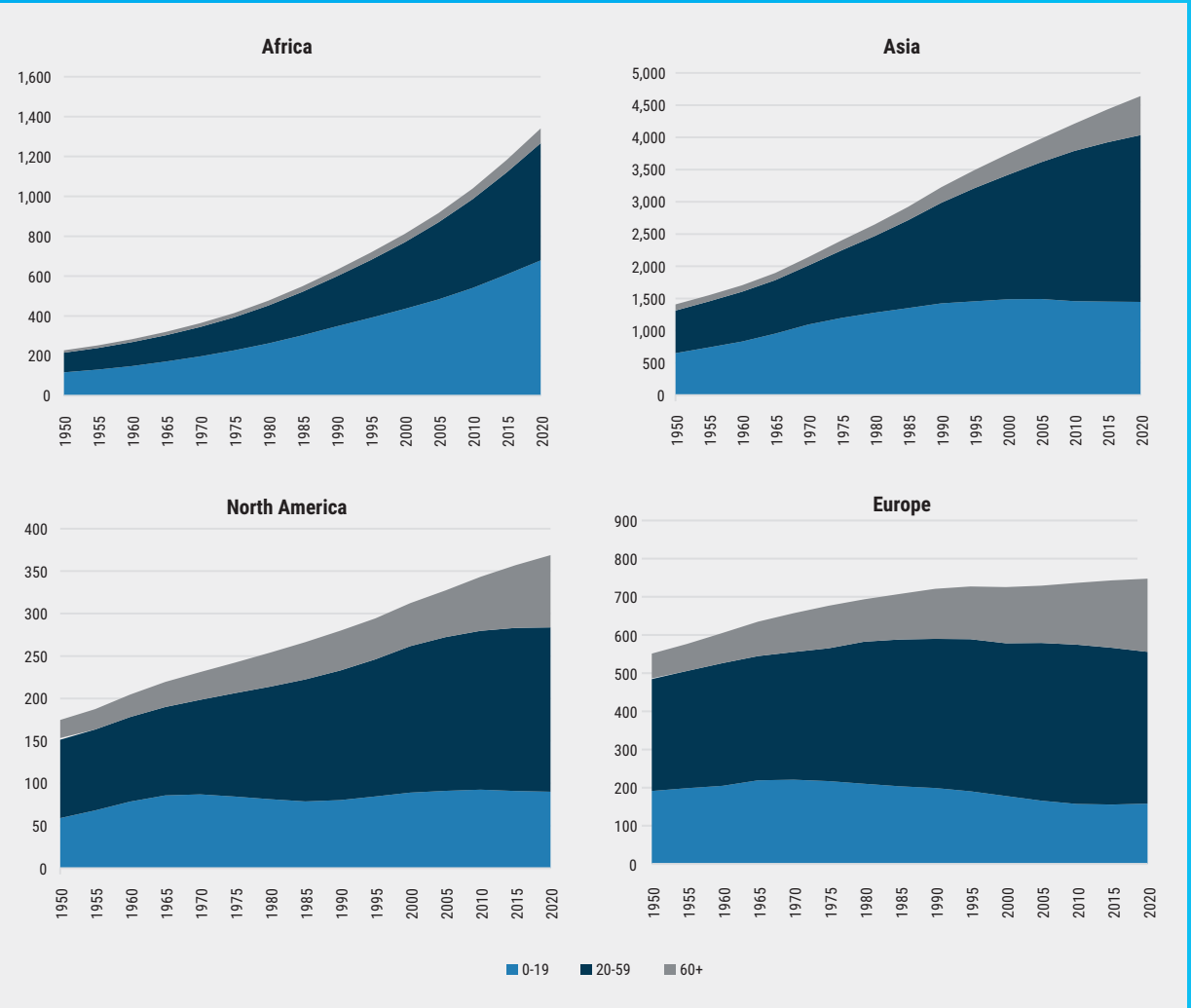
A report by the Federal Reserve Board published in November 2019 found that more than 40% of rural counties in the US – which often are home to poorer communities and people with fewer years of education – lost bank branches between 2012 and 2017. Altogether, there were

DEMOGRAPHICS BY REGION AND ECONOMY

GENERATIONAL disparities in consumer behaviour and preferences are evident and fairly consistent across different economies and cultures, although the proportion of younger or older people varies from place to place. Asia and Africa have younger populations, indicating a greater share of consumers who are tech-savvy or fluent. With the rise in the number of younger people, especially in Africa, this trend will continue. The demographic profile partly explains why certain countries have moved faster in adopting digital payments systems. A sharp increase in the total population also presents opportunities for scaling up digital payments as the overall consumer base expands.

North America is on a similar path, although the change is more pronounced in the segment of the population aged between 20 to 59. Millennials and their parents form a growing share of the consumer base in the region. Europe's population, in contrast, is growing older. With a larger portion of the population over the age of 60, banks and payment providers face a more urgent need to develop services that can adequately meet the demands of older consumers.

1. Younger consumers form a growing share of regional markets
Population by age group, millions



Source: UN World Population Prospects, OMFIF analysis

1,533 closures during this period, representing 14% of the total number of bank branches in these counties. Covid-19 has probably increased the number of bank branch closures – and not just in the US. While the shift away from bricks-and-mortar banking facilities is a consequence of wider digitalisation and reflects changing consumer demand, there is a risk that older or vulnerable customers will be left without access to services.

SAFEGUARDING CONSUMER PRIVACY

The benefits and convenience that consumers enjoy from digital financial services come with their own set of risks. The threat to privacy is the most relevant for consumers, as the protection of personal data is important for individual security.

Thanks to the digitalisation of payments, firms have been able to systematically collect and store greater amounts of personal data than ever before, enabling them to analyse consumer preferences more effectively and align their products and services accordingly. However, if security is weak, customers become vulnerable to financial crime, identity theft and fraud. Data privacy protection is one of the preferred characteristics for any payment instrument, as revealed by OMFIF's consumer trust survey in 2020, in which 39% of the respondents said they considered privacy protection to be the most important characteristic when making payments. Respondents felt that cash performed this feature best. Digital money, on the other hand, was well regarded for its speed, yet generally performed poorly across all categories, especially safety, wide acceptance and privacy protection. This suggests two immediate priorities for regulators who want to make their jurisdictions more open to digital currencies. First, broaden the scope of possible uses, and second, design a reliable safety net around digital money to foster consumer trust. Data protection measures are essential if digital payments channels are to be secure. As one Southeast Asian central bank respondent noted, 'Protecting personal data against unauthorised alteration, destruction, or access is integral to earning public trust in and facilitating adoption of digital financial services. Standards on security and access controls for providers, complemented by relevant regulatory requirements on data protection and governance, need to be in place to [address] issues around customer consent, data security and consumer protection.'

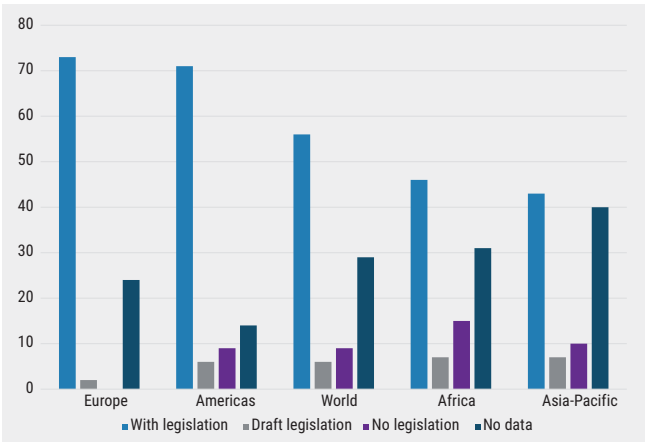
Regulators have issued guidelines and laws to safeguard the use of personal data. In some jurisdictions, ▶

'The benefits and convenience that consumers enjoy from digital financial services come with their own set of risks. The threat to privacy is the most relevant for consumers.'

2. European and American consumers have greater control over personal data

Countries with online consumer protection laws, % by region

Source: United Nations Conference on Trade and Development, OMFIF analysis



PayPal

Digitalisation can improve financial health

Digital cash has the chance to reach the billions of people without access to the formal banking sector. To do so requires sustained and intentional effort, write Usman Ahmed, head of global public policy and research, and Ivy Lau, global public policy and research manager at PayPal.

FOR most of history, acquiring, managing and sending money were interconnected in theory but disparate in reality. We took different actions, used different services and visited different places, depending on where we were in the process and what funding instruments we were using. However, technology and partnerships can bring these practices together and make them more accessible and customisable. It is now possible to receive, manage and send money using apps on a smartphone, simplifying tasks that are costly in terms of money, time and mental bandwidth.

The Covid-19 pandemic has dramatically accelerated the move to digital. The payments system is no exception. Despite this, cash won't disappear any time soon and there are parts of the payment process that remain outside the digital ecosystem. Governments still send out physical cheques to citizens, as do employers to their employees. Small businesses are struggling to meld their physical and digital businesses, dealing with expensive and ill-fitting systems. There are 1.7bn people outside the formal financial system. For billions more that system is too expensive and slow. The future of payments is about filling these gaps.

'Technological advances, such as artificial intelligence, blockchain, biometric authentication and improved analytics, will facilitate this move towards a digital, democratised payment landscape.'

The opportunity exists to democratise financial services and improve the financial health of consumers and businesses. Technological advances, such as artificial intelligence, blockchain, biometric authentication and improved analytics, will facilitate this move. But we must be intentional in how we design services to ensure they reach and benefit the underserved.

A lack of access to institutions, funds and clear account information can disproportionately impact poorer individuals. By offering a more convenient and less expensive way of managing and moving money, without the constraints of geography or time, mobile payments, digital wallets and person-to-person payments can help the underbanked take more control of their financial lives. For example, consumers can easily utilise different payment options for different circumstances, which is important for managing costs. Moreover, one of the features of mobile payments is automatic tracking and display of a clear and real-time record of how a user is spending money, enabling them to improve decision-making.

While technology is creating completely new avenues and channels to democratise financial services, it is only through partnerships that we can truly maximise these opportunities. Partnerships enable us to further digitalise cash, the biggest impediment to meaningfully democratising finance for consumers. Partnering helps remove friction from the payment experience and push the economy further into the digital age. Moving forward, deeper engagement and closer partnerships across the public sector and non-governmental organisation community, around areas like digital identity and central bank digital currency, are needed. This deeper engagement could unlock incredible gains for individuals and businesses when acquiring, managing and sending money and reduce costs across the financial services ecosystem.

Finally, safe and secure digital payments serve as baseline architecture upon which other financial services can be offered in an inclusive and prudent manner. At PayPal, we can utilise data from mobile payments, in partnership with financial institutions, to underwrite working capital loans for small businesses, an example of how integration between payment and other aspects of financial services can help improve financial health and define the future of payments. ●

3. Examples of data privacy laws

Country	Law
Argentina	The Argentinian Data Protection Authority issues guidelines for the processing of personal data for electoral purposes, setting basic guidelines to ensure the integrity and protection of personal data.
Australia	**Privacy Act 1988 and Australian Privacy Principals** The mix of federal, state and territory laws applies to private sector entities with an annual turnover of at least Aud3m and all Commonwealth government and Australian capital territory government agencies. Under the Privacy Act, the privacy commissioner has authority to conduct investigations and enforce penalties on those who fail to implement the law.
Brazil	**Brazilian General Data Protection Law** Published on 15 August 2018, the Lei Geral de Proteção de Dados largely aligns with the European Union's General Data Protection Regulation, providing a comprehensive framework regulating the use and processing of all personal data.
California	**California Consumer Privacy Act** The CCPA empowers residents of California to understand the types of personal information that businesses gather and gives them the right to prevent the sale of their personal data to other parties.
Canada	**Personal Information Protection and Electronic Documents Act** The PIPEDA is one of 28 federal, provincial and territorial privacy statutes governing the protection of personal information in Canada's private, public and health sectors. It applies to consumer and employee personal information.
Chile	**Chile Privacy Bill Initiative** This initiative establishes the protection of personal data as a constitutional right. It regulates the processing of personal data performed by public and private individuals and organisations. Additionally, Chile has different laws regulating personal data.
China	There is no single comprehensive data protection law, but there are rules regulating personal data protection and data security. For example, the PRC Cybersecurity Law was the first national-level law to address cybersecurity and data privacy protection.
India	**India Personal Data Protection Bill** The bill applies to both government and private entities that conduct business, offer goods and services to data principles and conduct activities such as profiling of data subjects in India.
New Zealand	**The Privacy Act 1993 and Information Privacy Principles** These laws regulate how agencies collect, use, disclose, store, retain and give access to personal information. Enforcement is through the privacy commissioner, who has the power to investigate.
Singapore	**Personal Data Protection Act** Coming into effect in 2013, the PDPA applies to organisations collecting, using or disclosing personal data in Singapore whether or not the organisation has a physical presence in Singapore. Separate regulations govern the collection of personal data in the public sector.
South Africa	**Protection of Personal Information Act** The right to privacy is recognised as a fundamental human right in South Africa. The POPIA specifically regulates the processing of personal information. It provides guidelines to help public and private bodies comply with the rules.
Vermont	**Vermont Data Broker Regulation** This law, which came into effect in January 2019, aims to regulate the activities of any business entity that collects and processes information about consumers with the intent of selling or licensing the data.

notably in Europe and in North America, consumers have greater control over sharing their personal data. Asia Pacific has the fewest countries with online consumer protection legislation – only 43% of the region, compared to 73% in Europe and 71% in the Americas. Similarly, Asia ranks below the world average in terms of the number of countries in the region that have regulations on data protection and privacy.

In the US and Europe, data protection and regulatory constraints have become stricter to establish firm rules on the use of consumers' personal information. The European Union's General Data Protection Regulation regulates the use of personal data of all EU citizens, based on the idea that privacy is a fundamental right. Stricter data protection laws present a new regulatory hurdle for businesses that rely on personal data for the growth of their digital payments systems and other services.

The GDPR applies to the European Economic Area, which includes EU member states and Iceland, Liechtenstein and Norway. The coverage of this regulatory framework ensures that companies operating in multiple jurisdictions in the region are following a standard set of rules. In the US, different states have their own privacy laws, which means that companies have varying levels of access to personal data depending on location. This fragmentation makes it more difficult to scale up new payments systems.

In China, digital payments providers were able to leverage their access to personal data to expand their services. WeChat and Alipay have become super apps by making data-based, personalised recommendations that promote the use of other services integrated with their payments systems. Chinese policy-makers recognise the dominance of these platforms. A comprehensive personal data protection law is being drafted, and is expected to place greater importance on obtaining consent for the collection and processing of personal data. Other countries such as Singapore, India, Brazil and Australia have issued their own regulations. The lack of a single, global framework can hamper the growth of digital payments systems on an international scale. In August 2019, the International Organisation for Standardisation released guidelines to help businesses comply with privacy and data protection regulations in different jurisdictions. ISO standards, although useful in aligning with existing regulations, highlight the fragmentation across jurisdictions. As consumers become more concerned about how their personal information is being used, the need for a globally harmonised data protection framework will become even more important in enhancing public trust in digital financial services. ●

4%

Companies that fail to comply with the GDPR can be fined up to 4% of their annual global turnover

GrabPay

Digital payments are the key to inclusive growth

To ensure people have a fair chance to reap the benefits of Southeast Asia's economic success, policy-makers and companies must collaborate so that no one is left behind in the digital payments transition, writes Huey Tyng Ooi, managing director and head of GrabPay at Grab.

GRAB'S foray into digital payments took root in 2016 when the company introduced a cashless stored value option allowing top-ups to its in-app mobile payment solution, GrabPay. This provided a more secure way of transacting by reducing dependence on physical cash for public transport, and further expanded the convenience of cashless payments to our unbanked customer base in Southeast Asia. GrabPay was the first digital payments provider to obtain access to e-money licences in the six major Association of Southeast Asian Nations countries, allowing a range of services including online acceptance, prepaid top-up, remittance, and peer-to-peer funds transfer.

Covid-19 presents an opportunity to create a more sustained shift to digital payments. The pandemic has shown that for most businesses, survival depends on digitalisation. Digital payments are the foundation of online commerce. To enable Southeast Asia to unlock the benefits of widespread digital payments adoption, there is much work to be done.

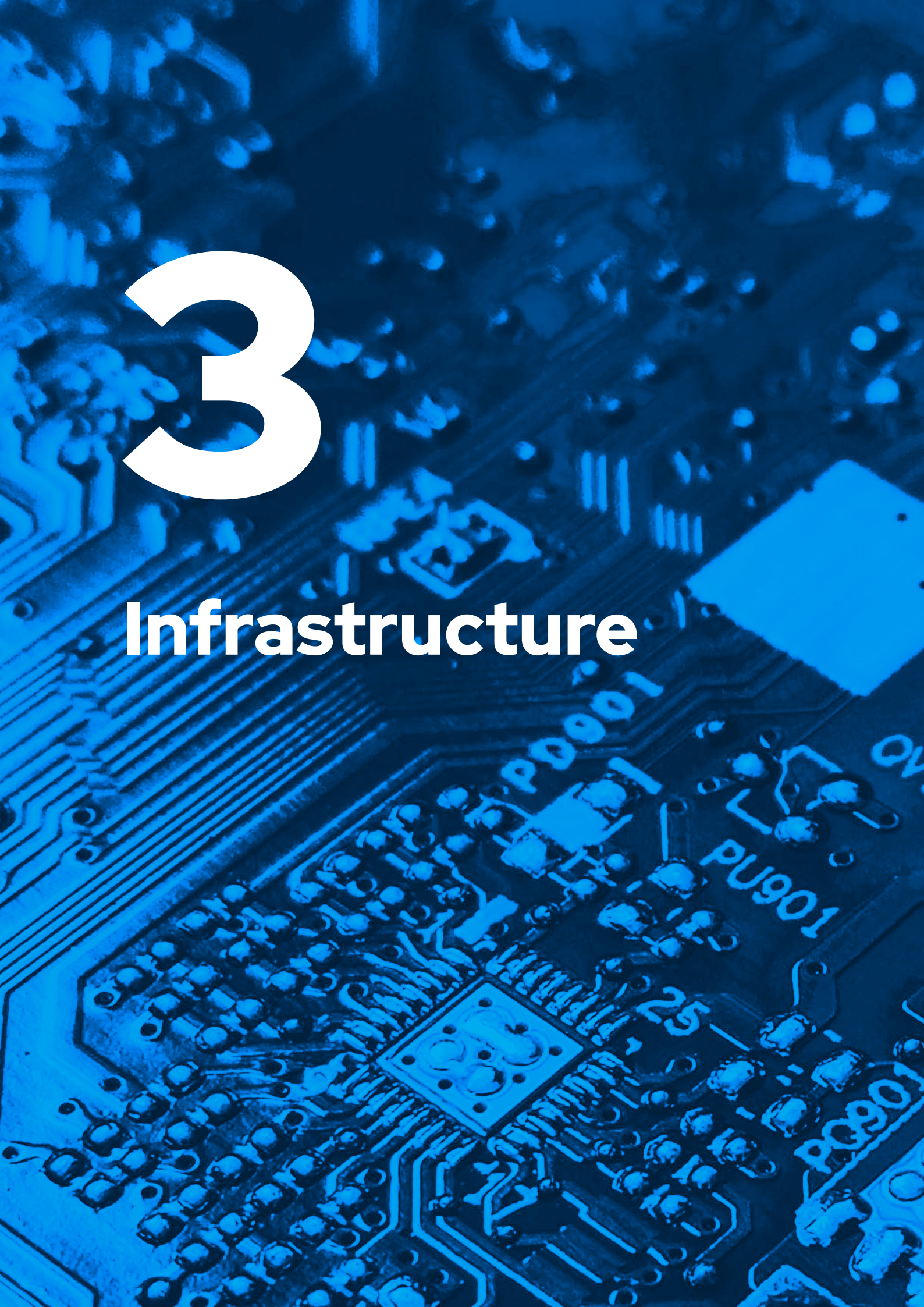
'Malaysia's ePenjana initiative incentivises citizens through an Rm50 handout that can be claimed via an e-wallet of their choice.'

Certain consumers, particularly the elderly, are less tech-minded, and reluctant to use digital financial services. They are more familiar with cash and unsure of the security of paying online. It is important to educate them on the benefits and mechanics of paying digitally. Governments and the private sector can drive national education programmes to maximise results. In 2019, Grab conducted digital clinics in partnership with the Infocomm Media Development Authority to help the elderly in Singapore understand how to use the services available on the GrabPay e-wallet.

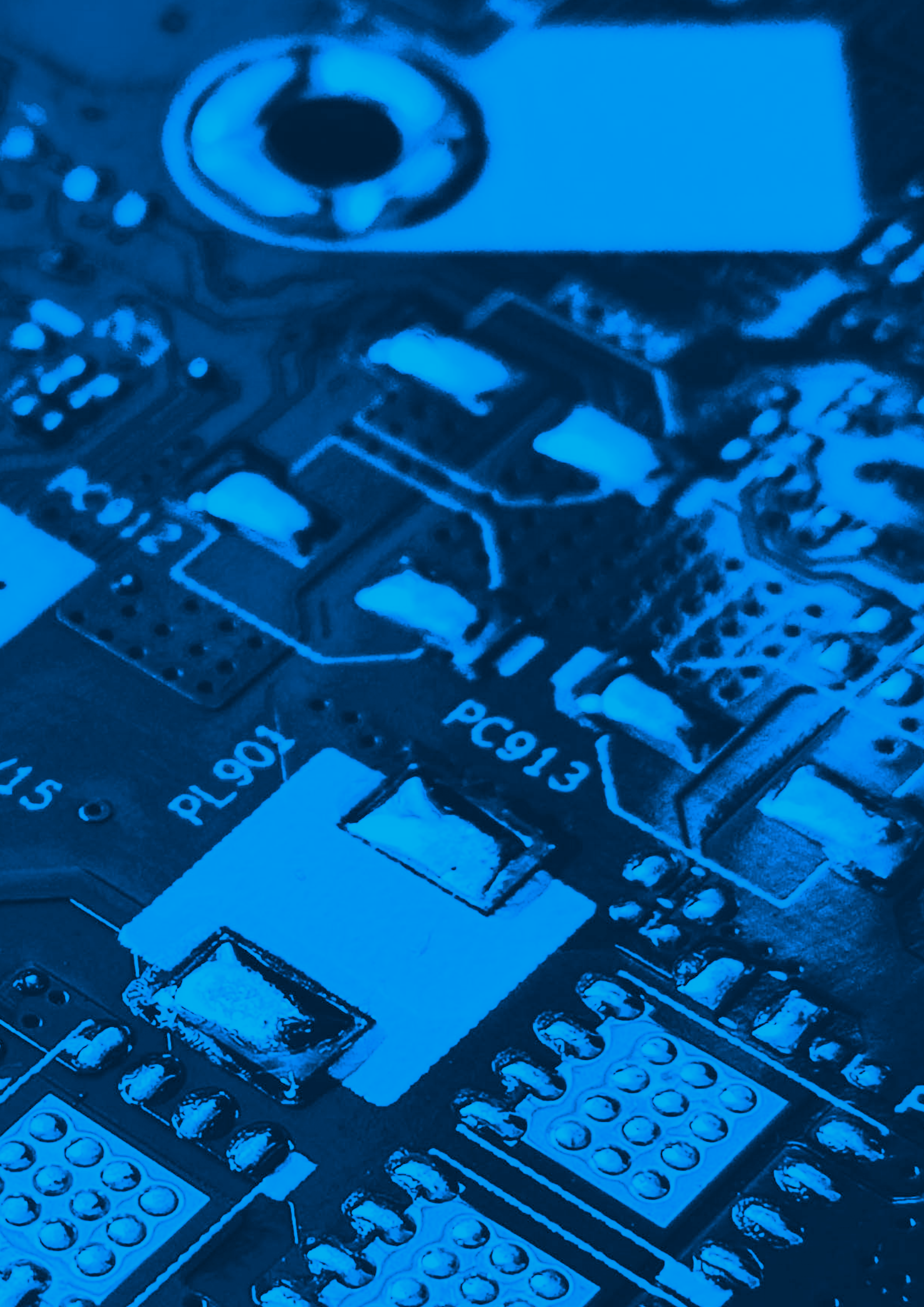
There needs to be more support for merchants and sectors that lack e-payment and digital infrastructures, so that they are not left behind. This particularly applies to traditionally offline businesses, such as small independent merchants like warungs (family-owned businesses – typically restaurants or cafes – in Indonesia), hawker centres (outdoor food markets), and other heartland businesses whose livelihoods have been hit. Offline merchants have the option of diversifying their sales channels to include social media platforms such as Facebook or Instagram, with payment facilitated via a remote GrabPay link sent to the customer. Rather than taking steps in isolation, a holistic approach is needed to ensure that support for this segment makes a difference across the entire value chain. Suppliers to hawkers and wet markets tend to transact only in cash, therefore the upstream supply chain should be digitalised.

Public-private partnerships can demonstrate the practicality of digital payments and make them accessible to all. Malaysia's ePenjana initiative incentivises citizens through a Rm50 handout that can be claimed via an e-wallet of their choice. This encourages Malaysians to spend on local businesses, but more importantly, it accelerates the adoption of digital payments. Four times more senior citizens have claimed their subsidies compared to the previous disbursement. Mobile wallets can also be employed to disburse much-needed financial relief during a crisis. In the Philippines, employees under the government's small business wage subsidy programme can receive financial relief via multiple e-wallet providers Singapore's financial regulator is working with consumer banks to promote the use of PayNow and the Singapore Quick Response Code.

Asean is set to become the world's fourth largest economy by 2030, but not everyone has the equal chance to succeed alongside the region's growth. Shaping the future of payments here must therefore be driven by a strong desire to advance inclusive growth, made possible through product innovation and greater public-private collaboration. ●



3 Infrastructure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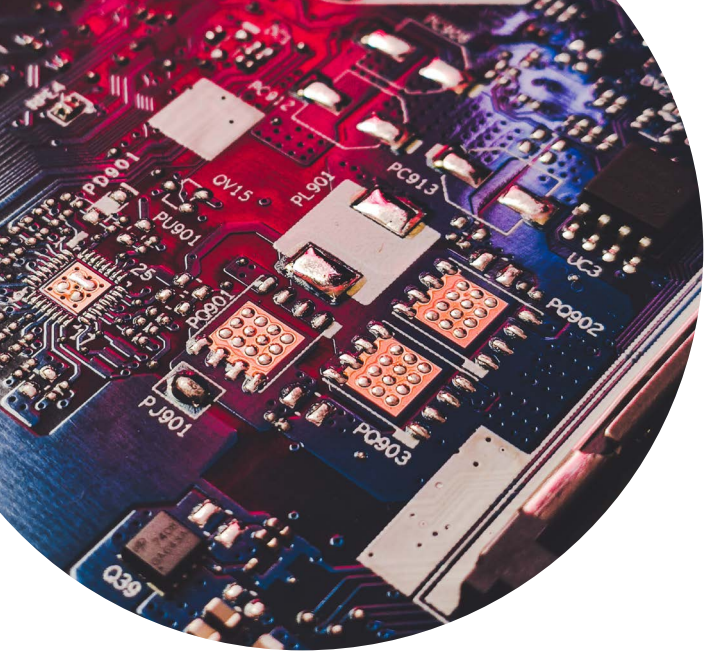


SECTION 3:

LEGACY INFRASTRUCTURE HAMPERS PROGRESS

There have been significant changes in the kinds of payment instruments used, with a shift from cash to cards and mobile payments. Yet the infrastructure for clearing and settling these payments has improved more slowly.

The act of making a payment is fast, convenient, secure and low cost in most developed economies. For consumers, the experience at the front end has improved over the decades, thanks to the introduction of new methods of payments that offer real-time settlement, are widely accessible and accepted, and are backed by robust legal and regulatory frameworks. These attributes make them more convenient than cash.

Cash as a means of payment is limited by its physical properties: both parties involved in a transaction must be present to confirm payment and settlement. Cash must be stored (which usually bears its own costs), there is a risk it could be counterfeit, and its physical properties make it almost impossible to use for high-value purchases. Cash is used less in developed countries and more in developing countries: paradoxically it is cheaper to distribute cash in developed countries given the economies of scale in distribution and management costs, while in developing countries, distribution is expensive but demand for cash is higher because of the lower financial inclusion rates.

Yet cash has important benefits. Transactions happen in real time with delivery and payment occurring simultaneously. There is also less ambiguity when confirming the final settlement or agreeing which part of the transaction occurred first. It does not rely on any digital infrastructure and therefore is not subject to any outages that can interrupt services. That is particularly important for rural populations, which may not have adequate access to digitalised payment infrastructure.

With the increasing substitution of cash, there has been a proliferation in the number of payment solutions arriving in the market to fill the gap. Of the different payment options available, cards and contactless mobile payments have dominated. However, the options available today are still largely underpinned by traditional infrastructures.

LEGACY RELIANCE

Typically, commercial bank money is accessed for payments through requests by the deposit holder. These payment requests that initialise bank transfers can be authenticated through, for example, debit cards, mobile payment applications or in

person with proof of identification. When consumers make a payment to another agent such as a retailer, their respective commercial banks settle these transactions against each other through the wholesale payment system, in some cases via central bank reserves. Commercial bank deposits are not backed one-to-one with central bank money, although they are – in most cases – convertible at par.

A trusted third party conducts these transactions between accounts from different commercial banks, provided they hold balances between themselves on the same ledger. This happens at the central bank through the real-time gross settlement system. The RTGS facilitates the real-time movement of funds between accounts held by commercial banks at the central bank. The UK uses the clearing house automated payment system (known as Chaps), the US uses Fedwire, and the euro area has Target-2.

Survey respondents agreed that these systems needed upgrading. Central banks have highlighted that there are inefficiencies in the RTGS despite ongoing and costly improvements. The system is still susceptible to technical faults and complexities in how certain trades are verified and settled. One respondent noted that to improve RTGS, efforts were needed 'to make it more resilient, to widen its access and interoperability, to improve user functionality and to strengthen end-to-end risk management'.

The system is prone to errors and outages, so backroom manual interventions are frequently needed to correct these. Many incidents go unreported. The Bank of England suffered a major outage in October 2014. Hackers tried to steal nearly $1bn from Bangladesh Bank in February 2016 using fraudulent Swift messages: They succeeded in getting the central bank to transfer about $81m. Given the system's centralised nature, it remains vulnerable to single points of failure. A cyber attack or system failure would mean that participants are unable to transact central bank money.

Survey respondents also said that the RTGS system presented an additional problem for those new players that are eager to enter into the payments systems. Entrants face high regulatory barriers to access core payments infrastructures, which could lead to a lack of competition and innovation.

Smaller, new entrants could find it difficult to comply because of a mismatch in broad and bulky banking regulations. Non-bank institutions, which tend to be the innovators in the payments market, are the ones most likely to be affected by these barriers to entry and this, in turn, will reduce competition in the market.

Overall, the growth of non-bank payments service providers challenges the legacy of central bank payments infrastructure and balance sheet being largely limited to banks.

To address this issue, in 2017 the Bank of England became the first G7 central bank to grant access to settlement accounts in RTGS to certain non-bank payments providers, subject to them meeting appropriate regulatory and technical standards. The central bank could also consult on the appropriate level of access to their balance sheet, including necessary safeguards, to decide whether and how to allow non-bank payments providers to hold overnight balances at the Bank of England.

One East Asian central bank said it aims to develop an open and interoperable payment system infrastructure and related system to foster innovation while maintaining the system's stability and security. This, it said, 'will continuously enable future payment systems to cater to the needs of different target groups in the public, private and government sectors with appropriate technologies. For example, promoting pilot projects in partnership with the public and private sectors for the implementation of end-to-end e-business processes and digital payment to reduce costs and increase operational efficiency.'

ADOPTING INSTANT PAYMENTS

One major issue central banks find with RTGS is the lack of support for 24/7 payments settling in close-to real time. The development of instant payments over the last 10 years allows for the transmission of payment messages and provides availability of final funds to the payee in real time or nearly real time on an almost around-the-clock basis.

These respondents found no significant shortcomings with these instant payments systems. They highlighted that one major benefit compared with the traditional system was the ability to overcome time restrictions of transactions between different institutions, as well as the openness. These open systems subsequently allow end-users to use any number of intermediaries, such as different payment service providers and banks.

The introduction of this central infrastructure puts everyday banking on a new foundation, and with the development of innovative end-user solutions, based on the core system, instant payment can be an alternative to cash as a means of payment, even where previously

only cash was available. One central bank said, 'Since all [payment service providers] had to join the system, all domestic payment accounts have become reachable, allowing instant payments to become the new norm.'

One advanced economy central bank is also planning a major consolidation of its payments architecture. The central bank's plan is to replace the existing interbank retail payments systems: It aims to develop an infrastructure that supports instant settlement with a view to ending multiple-day clearing cycles and ensuring fast and resilient 24/7 clearing. The goal is to establish a system that is easy to access, easy to upgrade and make innovations, and able to provide new capabilities that payment service providers (including banks) can exploit for their customers' benefit.

However, operational issues persist, where high liquidity cost or counter-party risks are transferred to the payments service provider. These systems require immediate clearing between the payments service providers of the payer and payee, but the settlement of funds between providers does not have to occur immediately. The availability of payee funds and inter-provider settlement can occur either through real-time or deferred settlement.

In real-time settlement, the debiting and crediting of funds from the payer to the payee occur at the same time as the debiting and crediting of the respective payment service providers. Credit risk is removed, but providers are required to hold sufficient liquidity to settle in real time at all times.

A deferred system works by batching and executing the associated settlements of the payment service providers at a specified time, while still allowing for real-time debiting and crediting for the payer and payee. In this model, credit risk arises for the providers, as they would advance funds to the payee before interprovider settlement takes place.

Emerging markets have been early adopters of faster payments systems. These countries lack mature, legacy retail payments systems and so the marginal benefit of adoption is likely to be higher, meaning the decision to invest may be easier in the absence of well-established infrastructures. However, the pace of adoption of instant payments systems globally proved slow (see p. 44).

'One respondent to the OMFIF survey noted that to improve RTGS, efforts were needed 'to make it more resilient, to widen its access and interoperability, to improve user functionality and to strengthen end-to-end risk management.'

CHALLENGES FOR EMERGING MARKET ECONOMIES

The retail payment experiences in emerging markets have been very different, reflecting various challenges including the lack of digital and financial inclusion, the high cost of making transfers and remittances, the absence of advanced wholesale payments systems such as RTGS, the poor network infrastructures and the persistence of cash economies.

Facilitating and securing the operation of payments systems is part of a central bank's mandate, as a smooth functioning payments system is critically important to the performance of an economy. However, in ensuring redundancies in payments, central banks face real-world constraints. Central bank survey respondents from emerging markets highlighted that some of the key technological pre-requisites needed to facilitate the adoption of digital financial services revolve around connectivity, identity, data protection and information security.

CONNECTIVITY

In advanced economies, basic digital connectivity has become the norm. In contrast, central banks in emerging markets underscore the need for digital infrastructures used to enable fast, reliable and affordable internet connections supported by adequate mobile network infrastructures and agents that serve as alternative touchpoints covering urban and far-flung rural areas, especially where access to cash and banking services is limited.

One East Asian central bank explicitly stated that the high cost and uneven quality of internet access has been a particular shortcoming in promoting the use of digital payments. It said, 'Internet

connectivity – the foundation of the digital economy – is limited in rural areas, and where they are available, services are relatively expensive and of weak quality.'

The lack of competition, as well as regulatory restrictions in the telecommunications market, are a hindrance to improving networks. This is mainly due to the lack of open access policies in the ownership of public utility companies that is meant to level the playing field for telecoms, as well as to ensure that market competition is driven by service delivery and innovation rather than exclusive ownership of networks.

Smartphones have enabled a technological revolution in digital financial services providing an affordable and mobile way to interact with financial institutions and payment providers. The infrastructure needed to support these devices is crucial to promote the adoption of digital financial services: mobile coverage, low-cost smartphones and affordable data plans.

In low-income populations, if the cost of access to a smartphone is a significant barrier, there is a risk of exclusion. However, falling smartphone and data costs have allowed adoption to rise in developing countries. According to a GSMA report, in some countries, including Malaysia, India and Thailand, the average monthly data usage consumption has surpassed 10 gigabytes. The report also noted that by 2025, smartphone penetration will reach 80% globally.

Once connectivity issues are resolved, more should be done to use these online networks. The focus needs to be on targeted solutions that take individuals' specific needs into consideration, rather than providing blanket solutions.

Encouraging supply-side competition is one effective way to create market-specific solutions. Local vendors and businesses can benefit significantly from digital financial services, especially in economies where account holders are more likely to have mobile phones than debit cards.

10GB

In some developing countries, including Malaysia, India and Thailand, the average monthly data usage consumption has surpassed 10 gigabytes

As more and more retail outlets begin to accept digital payments, consumers benefit from positive network externalities, and the utility of joining the network increases. China offers a good example to follow, as e-commerce functions have improved in line with the growth of scalable and cost-efficient non-bank payments providers such as Tencent and Alipay.

On the demand side, the uptake of digital banking services can be improved if issues of access quality and service affordability are overcome. The partnering of incumbent banks and financial technology companies could prove fruitful. Banks can leverage their capital, trust, customer base and brands to expand rapidly in partnership with fintech companies, which in turn can help fill the gaps in banks' channels, innovations, product sets and processing capabilities.

IDENTITY

Another significant challenge for accessing digital payments is the need for formal national identity documents and their translation to digital identity infrastructures. Especially in emerging markets, the adoption of a national ID system could make it easier to open transaction accounts for the unbanked and underserved sectors of the economy.

One emerging market central

Consumer demand drives payments revolution

In a challenging environment, financial institutions must be responsive to new conditions and market opportunities, writes Harry Newman, global head of payments strategy at Swift.

CONSUMERS' DESIRE for instant, secure payments has driven a revolution in retail payments. Faster payments systems are changing the game by providing close to real-time credit in more than 50 domestic markets.

Wholesale payments have undergone an equally dramatic transformation with Swift Global Payments Innovation, known as gpi. Gpi payments deliver same-day use of funds, end-to-end tracking and final confirmation of credit – together with full transparency on fees charged.

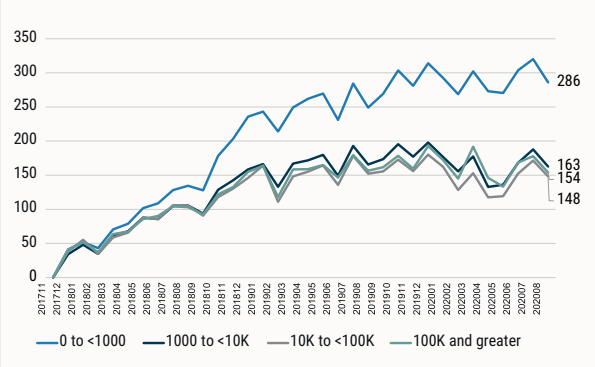
Since the advent of faster payments systems, speed has become a given for domestic transactions. Gpi often matches this and offers transparency via the Tracker and the all-important confirmation of payment. The convergence between domestic and international payments is evident from Swift data. Up to 35% of cross-border payments have at least one leg in a domestic clearing and around one-fifth of gpi payments are direct domestic payments.

Links are being forged between gpi and domestic and regional systems that are streamlining payments account-to-account. For example, in 2019 we launched a new cross-border instant payments service, powered by gpi, which enables domestic market infrastructures with instant payment schemes to connect to the gpi Tracker. We have successfully trialled gpi payments connectivity with the European Central Bank's Target instant payment settlement, known as Tips, and Singapore's Fast and Secure Transfers domestic instant payments system.

Another strong theme in the data is that gpi is delivering effective solutions for lower value, cross-border retail payments. This is by far the fastest growing value segment on gpi.

It is now well-established that gpi is effective in delivering speed, removing uncertainty and reducing delays in cross-border transactions. Much has been achieved but there is still more to be done.

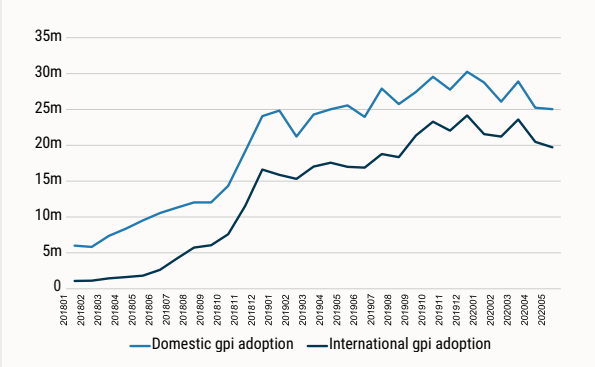
Our data show that regulatory barriers and capital controls are the most significant friction impacting speed and seamless delivery. These are the domain of local regulators and the banking industry cannot solve this issue alone. However, the industry can speed up responsiveness to requests for



1. Low value payments fastest growing segment on gpi

Volume of payments, growth from November 2017 – August 2020, %

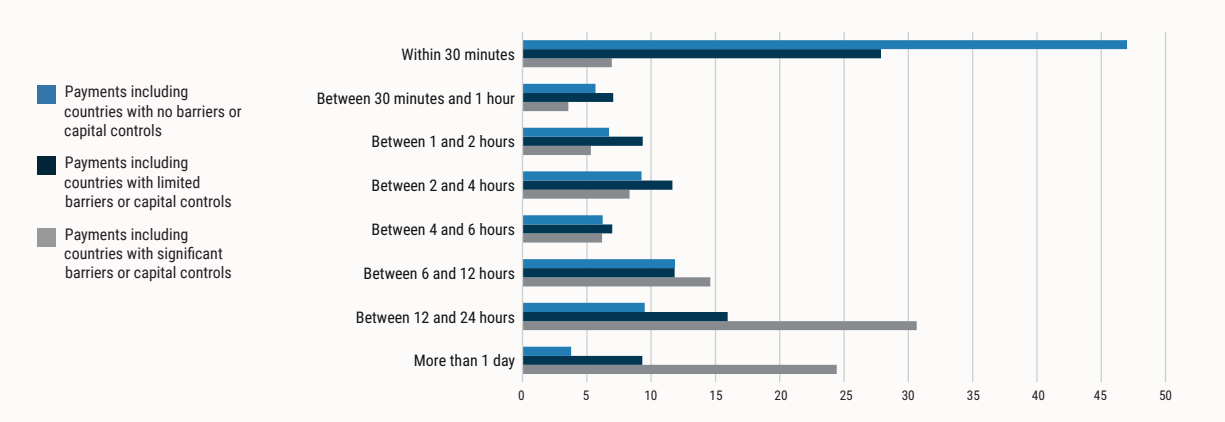
Source: SWIFT Watch



2. Gpi increasingly used for domestic payments

Volume of payments, by month

Source: SWIFT Watch



3. Impact of regulatory barriers and capital controls on transaction speed

Share of gpi payments and its clearing times and reasons of delay, %
Source: SWIFT Watch

documentation and try to smooth the path through the process.

Similarly, time zone differences contribute to delays; the data show that payments following the sun arrive more quickly than those travelling against local operating hours. While people across the globe will certainly continue to work and sleep at different times, technology improvements including enhanced straight-through processing and 24/7 real-time operating capabilities will reduce the impact of time-zones on payment delivery. Improved data standards, notably ISO 20022, will ease the flow and hand-off of data across the global payments ecosystem and facilitate automation. Here, gpi and Swift will play a large part. Industry-wide migration to ISO 20022 messaging for all cross-border and cash management messages is scheduled to commence from the end of 2022.

In a world experiencing high levels of financial crime, compliance-based queries represent a significant block on the speed of cross-border payments. When it comes to preventing fraudulent transactions, or stopping funds flowing to a sanctioned individual or jurisdiction, compliance must not be sacrificed to speed. But by incrementally harnessing technologies like artificial intelligence we can continue to streamline and strengthen transaction screening.

This is an area where Swift is already playing an important role – providing mutual, non-competitive services for know-your-customer processes, sanctions screening and reference data checking that spread the costs of development for the domestic wholesale and retail markets – and in which we are exploring going further over the next two years.

In a challenging environment, financial institutions must be responsive to new conditions and market opportunities, able to connect seamlessly across ecosystems and ready to build a presence in high-growth segments, such as small and medium enterprises and consumer payments.

And they must always keep the customer experience at the heart of everything they do.

At the same time, they need to be able to reduce costs, future-proof their technology investments and reduce dependency on major migrations. With Swift's new strategy, we are working towards fully-orchestrated transaction management, supported by rich data services. We will help financial institutions reap the benefits of a transformed, seamless and friction-free payments landscape while reducing costs and increasing efficiency for themselves and their customers.

bank promoted the need to develop a National Digital Identity platform, serving as an infrastructure for digital identity verification and authentication. The survey respondent said, 'Biometrics technology has been adopted for e-KYC process to be more secure, better prevent possible frauds, and also enhance financial services through digital channels.'

Another advanced economy central bank highlighted that digital identity could be used not only for KYC procedures, but also for accessing services and authorising payments – and IBAN-mobile phone number translators – suggesting it could bring significant efficiency and safety gains for digital payments. In addition, digital identity identification could also help make security checks smoother, especially in cross-border payments.

Data management and information security are also intrinsic to the development of digital identity, as it requires the availability of both customer data and transactions for electronic processing. Such data management technologies used in the development of these customer identity systems, products and services need to be accessible, affordable, verifiable and accommodate multiple needs and risk levels for a risk-based approach to customer due diligence.

Protecting personal data against unauthorised alteration, destruction or access is essential in earning public trust and facilitating adoption of digital financial services. In this regard, adoption of standards on security and access controls for providers, complemented by relevant regulatory requirements on data protection and governance, need to be in place to ensure that issues around customer consent, data security and consumer protection, among others, are addressed (see p.23).

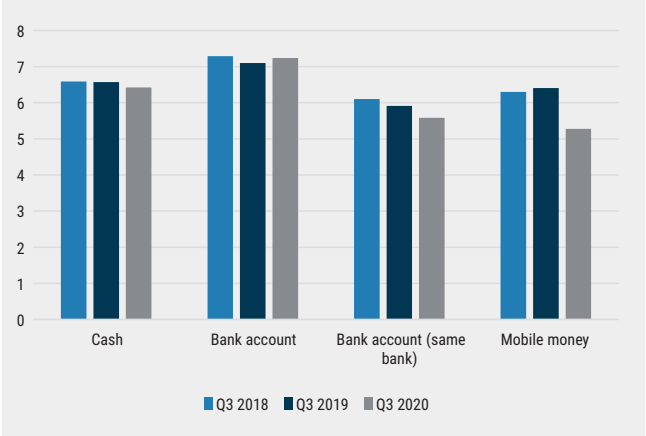
CROSS-BORDER PAIN POINTS

Survey respondents highlight that cross-border payments are often too expensive, slow, opaque and can be limited in their access.

1. Liquidity management makes cross-border payments costly

Cost breakdown for international payment transactions, %

Source: McKinsey Global Payments Map 2019, OMFIF analysis



2. Mobile money offers the cheapest method for remittances

Average cost, % of remittance amount

Source: World Bank Remittance Prices Worldwide, OMFIF analysis

'Protecting personal data against unauthorised alteration, destruction or access is essential in earning public trust and facilitating adoption of digital financial services'

The cross-border payments system relies heavily on correspondent banking networks facilitated by financial intermediaries at multiple levels. A correspondent bank will have either a nostro or vostro account with a counterpart bank in another country. A nostro is the account of a local bank held by a correspondent bank in another country, in its foreign currency. A vostro is the account of a foreign correspondent bank, held by a local bank in its domestic currency. This reciprocal system of accounts facilitates foreign exchange transactions and the flow of funds between countries.

Swift's network allows participants to exchange electronic transaction messages detailing instructions for cross-border payments. However, it provides neither clearing nor settlement. Correspondent banks participating in a transaction

must still process the messages individually at their back end, and subsequently settle any transactions through foreign exchange markets.

This means that cross-border payments are generally more cumbersome and expensive than domestic payments due to the number of financial intermediaries involved in the process. Smaller financial institutions that have not established correspondent relationships with foreign counterparts may be disadvantaged. The shrinkage and consolidation in the number of correspondent banking channels have meant higher costs associated with cross-border payments as institutions seek to reduce their risk exposures. A World Bank report in 2018 on the decline of correspondent banking noted that this trend of de-risking tends to disproportionately affect financial institutions in small, developing countries at the periphery of cross-border payment corridors. For smaller countries, precautionary liquidity required tends to be higher in order to reduce higher transaction risks, given there is greater opaqueness in processes and the overall lack of trust as correspondent banking relationships are reduced.

A study by McKinsey in 2019 on cross-border payments found that the bulk of the costs (nearly 35%) in existing international transactions methods are related to nostro-vostro liquidity and reconciliation due to a lack of real-time data and differences in end-to-end payment processes. A peer-to-peer model could reduce the need to update and reconcile multiple accounts in the post-trade cycle. Enabling direct transmission of information and assets between parties could optimise the operational costs of cross-border payments, as any lack of standardisation could be minimised.

While there are feasible alternative solutions to cross-border payments (e.g. Swift gpi), blockchain and distributed ledger technology, or DLT, have proved to be catalysts in pushing the financial industry's outdated infrastructure to the cusp of technological upgrading. These

34%

The bulk of the costs (nearly 34%) in existing international transactions methods are related to nostro-vostro liquidity and reconciliation

technologies are seeing a greater concentration in their use towards new models for peer-to-peer cross-border payment applications, which will probably grow over the short to medium term.

Lastly, central bank survey respondents said that better interoperability is needed at an international level, especially in the adoption of standards such as ISO 20022 (an ISO standard for electronic data interchange between financial institutions), as well as in the further development of common standards for digital identity and data-entry solutions in order to streamline processes and encourage competition for cross-border payments.

The high costs arising from the operations of making cross-border payments translate into higher costs for users. Traditionally, users make remittances through money transfer organisations such as Western Union or MoneyGram that pass on increases in costs to their customers.

But wider financial literacy, market competition and technology have steadily reduced the costs of remittances. At the end of September 2020, the World Bank found that the proportion of remittance corridors with average costs of less than 5% has increased from 17% in the first quarter of 2009 to 34% in the third quarter of 2020. Banks, mobile operators and money transfer organisations have experienced a general decline in their total average costs, while post offices have recorded periodic increases in average costs since September 2013.

Costs are further differentiated by fee and foreign exchange margins between digital and non-digital remittances. The World Bank noted that fees account for a larger proportion of the cost, and that the rates for non-digital services are consistently higher than those for digital services, regardless of the region where the recipient is located.

In the third quarter of 2020, the cheapest instruments for sending remittances were mobile phones, with fees representing 5.28% of the remittance amount. Sending money to a bank account at the same bank followed, with fees amounting to 5.58%. When the recipient account belonged to a different bank, the costs increased to 7.24%, and when the remittance was sent in cash, fees were 6.42%. However, over the last three years, the average costs have fallen for all methods of disbursement, with mobile money showing the greatest decline (Figure 2).

During the current Covid-19 crisis, migrant workers are expected to experience a fall in their wages and an increase in unemployment. The World Bank estimates that international remittances are projected to fall by about 20% this year. In India and Bangladesh, the countries ranking top and ninth-highest in the world in terms of remittances received, remittances are expected to fall by 23% and 22% respectively. The biggest declines are expected to occur in Europe and central Asia, with an estimated fall of about 27.5% in each, due to the combined effects of the pandemic and low oil prices.

In the short term, it is necessary to keep digital remittance channels open and to work with providers to ensure people can receive remittances without the burden of high costs. Solving operational inefficiencies and encouraging digital remittance channels can subsequently create cost savings for users and provide significant economic benefits for remittance recipient countries. ●


4
The state
of play

SECTION 4:

MOBILE MONEY ENTERS THE MAINSTREAM

Payments systems are invisible – yet indispensable – infrastructures at the heart of an efficient, reliable and competitive economy. Innovations have driven the growth of the payments industry, offering retail users a range of options to pay, save and transfer value.

INDIVIDUALS, enterprises and financial institutions rely on payments systems to successfully settle purchases and pay wages and other bills on a timely basis. Digitalisation is changing the architecture of payments systems, pushing the frontiers on speed, efficiency, cost, security and economic safety. The impact of digital technologies on payments has accelerated in recent years due to a confluence of events. As a survey respondent from a European central bank noted, rapid developments in payment systems have been underpinned by the emergence of new, internet-based technologies alongside new market participants and growing demand for instantaneous payments.

The global payments industry is constantly upgrading and improving: Advances in technology, accompanied by more streamlined regulatory approaches to fintech in payment processes, have paved the way for the development of faster, cheaper and more inclusive means for individuals and businesses to transact. The potential impact of innovations in payments systems has increased. Payments system improvements have traditionally occurred or been conceptualised at an isolated domestic level, and confined to specific economies. However, as global economic activity becomes more integrated, innovations in payments often have significant cross-border implications in multiple jurisdictions. Various parties or interests from both the public and private sectors are closely involved in the innovation of new technologies and business models which alter the conduct of economic transactions.

The most radical proposal in existing payment methods is in the medium of exchange itself, with the emergence of alternative currencies that could potentially become widely accepted as legitimate forms of payment. Crypto-assets (such as bitcoin) and private-sector stablecoins (such as Diem) are fast emerging as potential payment rivals to conventional, sovereign-backed fiat accepted by businesses and individuals. Separately, central banks and governments are exploring the possibility of digital fiat in the form of central bank digital currencies.

These digital innovations in retail payments are changing the way

that money can function as an asset: money acts as a unit of account, a store of value, and a medium of exchange. The shifts in payments processes and infrastructure lay the foundations for a long-term migration of payments into the virtual world which has become all the more relevant and necessary because of the Covid-19 pandemic and the need for safer means of conducting economic activities.

MOBILE-ENABLED INCLUSION

Mobile money emerged in the early 2000s as an alternative to card-based payment. This innovation – of linking mobile phone usage and network credits as a monetary medium – originally arose from the practice of transferring pre-paid airtime as a virtual currency in exchange for cash, or other goods and services. This has been very effective in expanding the scope of financial inclusion within developing countries in Africa and Asia, especially in communities which lack access to formal financial services. A survey respondent from a Latin American central bank noted that innovative electronic retail payment services play an important role in closing financial inclusion gaps and catering to the unbanked.

Mobile payments offer several key advantages over cash as a medium of payment, greatly reducing operational costs and time delays. With the rapid rise in mobile internet penetration and smartphone usage, mobile payment platforms have become a more convenient and user-friendly alternative to cash (Figures 1 and 2).

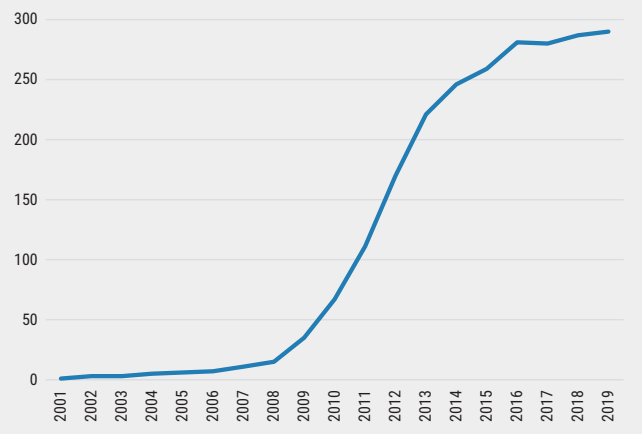
Kenya's M-Pesa platform is a well-known pioneer in mobile payments. It was launched in 2007 by the mobile network providers Vodafone and Safaricom and is now the leading digital payments system in Kenya, used by over 70% of the population. It operates in many other countries too, including Tanzania, Congo, Egypt, South Africa, Lesotho, Mozambique, Romania, Albania and India. The M-Pesa wallet allows users to deposit cash or transfer funds to other M-Pesa customers, and to withdraw cash from the wallet. These deposit and withdrawal functions are enabled by a broad network of Safaricom-affiliated retailer agents. M-Pesa subscribers can store, transact or send money through this network without even accessing a formal bank account or physical bank branch. Their pre-paid mobile accounts function as current accounts, with the ability to make small consumer payments from one account to another using mobile numbers as identifiers for payment instructions.

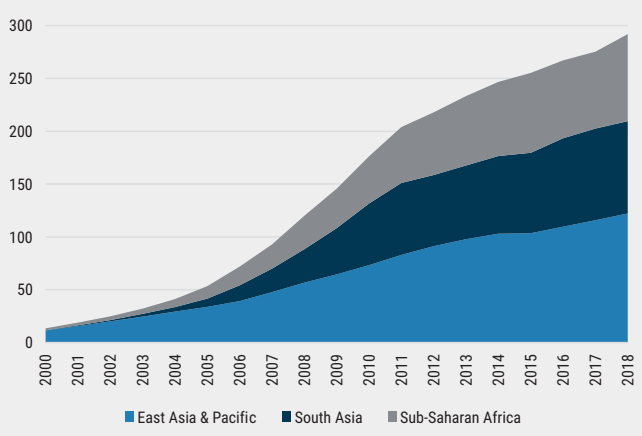
Two related trends are shaping further innovation and regulatory change within the mobile payments landscape. First, non-bank mobile-wallet providers have entered the fray. Firms offering non-payment digital services have been able to establish their own e-wallets and

1. Mobile money has entered the mainstream

Number of live mobile money services

Source: GSM Association, OMFIF analysis





2. Acceleration of mobile penetration underpins mobile money growth

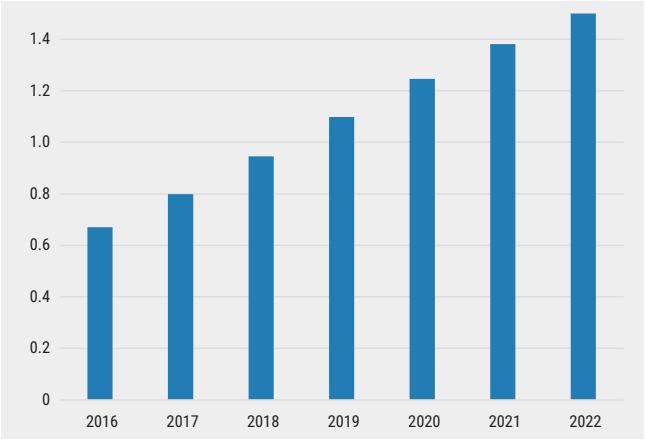
Number of mobile cellular subscriptions per 100 people

Source: World Bank, OMFIF analysis

3. Mobile usage expected to reach 1.5bn

Number of users, bn

Source: Expert Market, OMFIF analysis



payment channels by leveraging their existing distribution network and customer base. This includes e-commerce platforms and other non-payment entities offering mobile-powered services.

Second, mobile financial services have expanded beyond payments to include lending, insurance, wealth management and credit-based activities. In this respect, attaining regulatory approval and licensing to provide digital or virtual banking and lending services is seen as the next step on the path to widespread mobile payment adoption. As the growth of mobile wallet users worldwide is projected to reach nearly 1.5bn by 2022 (Figure 3), mobile money-based payment platforms are fast becoming the most vibrant area in digital financial services in which incumbent financial institutions and fintechs compete and collaborate.

PICKING UP THE PACE

Commercial banks are also revamping their existing payments infrastructure, either in collaboration with, or under pressure from, central banks. Co-operation between the two sides is sparking greater innovation, collaboration and vibrancy in the retail payments arena, which had conventionally been dominated by large commercial banking infrastructure.

Jurisdictions that already had well-developed infrastructure for the clearing and settlement of retail payments have had little incentive to innovate in the past. Central banks and supervisors had traditionally been focused on mitigating systemic risks from the wholesale payments sector, which executes high-value, high-priority payments between major financial institutions. Cross-border infrastructure such as Continuous Linked Settlement (CLS) – a platform functioning as an international multi-currency clearing system on a payment versus payment settlement mechanism – operates by linking together multiple countries' respective central bank RTGS systems that are concurrently running.

'Digital innovations in retail payments are changing the way that money can function as an asset: money acts as a unit of account, a store of value, and a medium of exchange.'

In contrast, retail payment transactions are characterised by a much higher volume of activity, but are generally of lower value and less risky. Unlike high-value interbank transactions, driving RTGS in the retail space has traditionally been too costly or inefficient to justify direct central bank maintenance or management. But the barriers to retail payments innovation are now coming down. Bank-based clearing and settlement systems that have emerged around the world to provide timely and efficient retail payment processing include the New Payments Platform in Australia, Faster Payments Service in the UK, Swish in Sweden, and FAST in Singapore. In a study this year, InfoSys noted that there were at least 54 real-time payment systems already in operation globally, with more planned to go live in future.

There are distinct advantages to building upon the existing clearing, settlement and payments infrastructures of commercial banks. First, these institutions already have expansive networks of customers and intermediaries. Iterative improvements to proven payments rails can achieve scale and be adopted rapidly. Secondly, in many cases, when interbank transactions are cleared via fast payments systems, different banks undertake settlement of sovereign-backed currency within reserve accounts held at central banks. That provides a high level of trust in the process, allowing transactions to be settled between account holders across different payment services providers and banks.

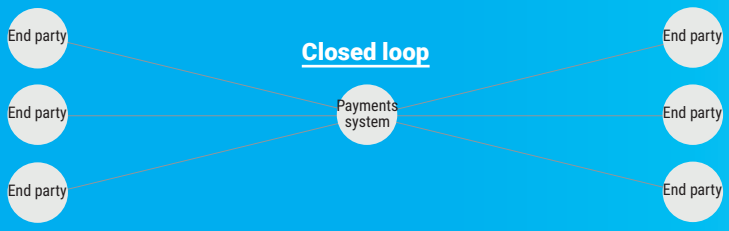
On the other hand, it is clear that existing fast payment infrastructure operated by commercial banks requires further catalysts for innovation and to encourage adoption. One Southeast Asian central bank noted, 'Digital transformation of the banking industry is lagging compared to fintechs.' As shown in Figure 5, there is considerable variation in the pace of adoption of different fast retail payments systems across different jurisdictions. The BIS notes that rapid adopters such as Sweden and Denmark benefit from having user-friendly mobile applications and services built into the front end of their fast retail payment infrastructure. Implementing faster payments also requires the adaptation of services between commercial banks and central banks. For instance, one of the major changes required to implement Hungary's AFR instant payment system, which was launched in March 2020, was the establishment of new mechanisms for round-the-clock liquidity provision from commercial banks.

It is increasingly necessary to provide a broader range of services and products via digital channels that can leverage and support new, fast payment infrastructure used by banks. This can be achieved by developing an open banking system in which third-party fintechs can be interoperable with financial institutions' data and software. Regulators have tended to encourage greater competition by opening up payments to a wider range of providers, because the barriers to entry are high and payments processing requires economies of scale. Recent regulations such as the EU's revised Payment Service Directive and the UK's Open Banking initiative are promoting the concept of 'payments as a service' (PaaS) by allowing third-party fintechs greater access to banking data via open APIs and open source technology.

The implications of open banking on payment processes and the broader financial services industry are significant. Under an open banking

CLOSED VS OPEN LOOP PAYMENT ARCHITECTURE

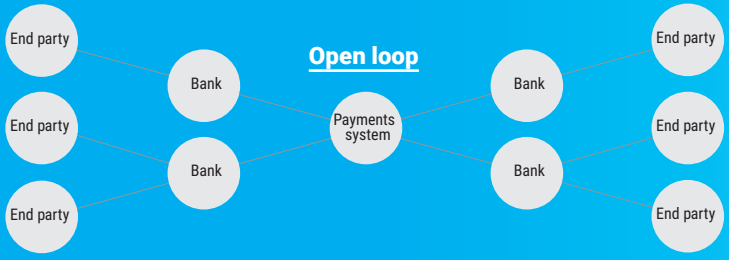
One of the key design questions for current and future innovations in mobile money or e-wallet payment schemes will be where these fall in the continuum of open or closed loop systems. These choices will dictate the degree of interoperability and utility that retail users can derive from mobile money, as well as their capacity to be substituted for general purpose cash.



Open vs closed:

In contrast to established payment intermediaries such as Visa and Mastercard that are, for the most part, universally accepted means of payment, the majority of mobile money innovations exist as closed or semi-closed loop infrastructure. Open loop models are distinguished by having higher levels of disintermediation between end-party transactors and the core payment service provider. Banks, or other intermediaries connect their respective retail customers and merchants with the underlying payment system. Closed loop systems tend to be more brand-specific in their operations and governance, and hence can be more limited in their coverage and ubiquity. Transactions can only be conducted with businesses and individuals that are pre-approved in the issuing entity's network.

There are intrinsic advantages and disadvantages to both payment arrangements. An open loop model allows for rapid scalability of a payments network – as banks or other intermediaries join the platform, all of their end-party customers are accessible to other intermediary institutions. On the other hand, a closed loop arrangement requires direct ties between end users and the payment platform, which could limit its interoperability. However, as closed loop payments systems handle more specific transactions internally with end users, payment providers have the potential to gain much more detailed insights into transactions, as well as cheaper processing costs from the reduction of intermediaries. Nevertheless, as the volume and payment values transacted within closed loop payments increase, the systemic risks of these infrastructures also rise. New regulatory compliance considerations imposed on influential closed loop, mobile money schemes may impact the viability of the original business model.



4. Roll-out of new or improved fast payment systems, selected countries

Source: Bank for International Settlements, OMFIF analysis

Year of implementation	Country	System
2001	South Korea	Electronic Banking System
2003	Taiwan	ATM, FXML, FEDI
	Iceland	CBI Retail Netting System
2006	Malaysia	Instant Transfer
	South Africa	Real-Time Clearing
2007	South Korea	CD/ATM
2008	Chile	Transferencias en linea
	UK	Faster Payment Service
2010	China	Internet Banking Payments
	India	Immediate Payment Service
2011	Costa Rica	Transferencia de Fondos
2012	Ecuador	Pago Directo
	Poland	Express ELIXIR
	Sweden	BiR/Swish
2013	Turkey	BKM Express
2014	Denmark	Net Real-Time 24-7
	Italy	Jiffy
	Singapore	Fast and Secure Transfer
2015	Mexico	sPEI
	Switzerland	Twint
2017	Australia	New Payments Platform
	Thailand	Prompt Pay
2018	Japan	Zengin System
	Hong Kong	Faster Payment System
	Philippines	InstaPay
	Malaysia	Real-time Retail Payments Platform
2019	Saudi Arabia	ARPS
	Netherlands	Instant Payments
2020	Norway	Straksbetalinger
	Hungary	AFR
2023/2024 (estimated)	US	FedNow

regime, data that were traditionally only held and controlled by banks can increasingly be leveraged by multiple providers, for example insurance companies, payment services, credit card issuers and mortgage providers, thereby allowing more tailored and individualised financial services to be provided to individual customers. Although incumbent financial institutions and banks could risk being disintermediated from customers when banking, payments and other financial services can be provided by third parties, the unbundling of vertically integrated financial services could allow banks to leverage complementary value-added services from fintechs.

In the area of retail payments, commercial banks are adopting and integrating certain functions to improve the payments service for their customers: These include providing point-of-sale financing and lending options to streamline transactions, and escrow services that help to instil trust and mitigate security and fraud issues in e-commerce payments. These were areas which survey respondents said showed great promise as well as benefits for end users. One central bank from a developing Asian economy said, 'Advancement in financial technology will encourage bank and non-bank to create value-added service for users in term of convenience, accessibility, safe and cost-effective service, and fees.' For smaller banks with only limited technological capabilities and capital to invest in IT improvements, PaaS could allow them to quickly upgrade legacy infrastructure and offer value-added, third-party services on their core platforms.

Several survey respondents predicted that greater competition from fintechs (as well as collaboration and interoperability with these newcomers), would drive further incentives and opportunities for improvement and service delivery among commercial banks. 'Banks as incumbent financial service providers compete with the emergence of fintechs which offer several services provided by banks. With new competition from the private sector, it is important for banks to actually catch up with [their] new technologies,' according to one southeast Asian central bank.

'Blockchain and DLT have been touted as enabling technologies that could refine payment processes from account-based systems reliant on data in centralised ledgers, to a token-based system in which exchanged items have intrinsic monetary value.'

OVERCOMING LACK OF TRUST WITH DLT

Banks and fintechs are working on ways to improve various aspects of payments, both in the existing domestic retail payments infrastructure and in the area of cross-border transactions. Some fintech innovations are exploring ways to circumvent the established international payment rails completely by experimenting with blockchain and distributed ledger technology.

The ability of blockchain and DLT to enable transparent and immutable transactions in a decentralised and secure environment may open the door to new collaborations and the streamlining of financial intermediation between cross-border transactors. Advances in decentralised data verification and authentication could transform how monetary value is exchanged and validated between transacting parties.

At one extreme, blockchain and DLT have been touted as enabling technologies that could refine payment processes from account-based systems reliant on data in centralised ledgers, to a token-based system in which exchanged items have intrinsic monetary value. The most radical method of side-stepping the commercial bank and financial institution-led payment infrastructure is through public peer-to-peer networks and crypto-assets such as bitcoin. There are other models which still leverage (and are linked to) fiat value, for example challenger fintech actors such as Ripple, which employ DLT to facilitate movements of fiat currency between financial institutions by acting as bridging digital assets. Other developments such as stablecoins (see p.49) are also enabling the wider use of blockchain and DLT to transform payment processes.

CARD PAYMENT PROVIDERS INNOVATE

Several large third-party payment service providers are taking steps to revise their business models and maintain their influence in a fast-changing environment. For example, Visa and Mastercard are expanding and repositioning their portfolio

Digital currency that works for all

Payment systems work best as public-private partnerships, and payments with CBDC should not be an exception, writes Naveed Sultan, global head of the treasury and trade solutions group at Citigroup.

CITI operates in more than 160 countries and jurisdictions and is directly connected to over 250 value-transfer systems through which it processes upwards of $4tn in payments per day. Our global experience as payments practitioners informs our views on the emerging topic of central bank digital currency.

The digitisation of currency and payments is inevitable and central banks will play an important role in driving innovation.

Digital currency in general should be broadly accessible, transferrable in real-time and 'always on'. It should accommodate the needs of emerging forms of commerce like internet of things, support micropayments, enhance wholesale securities settlement and integrate with other digital platforms. There should be a thriving private market in digital payments with high levels of innovation, competition and investment. There are multiple routes to reaching these objectives.

CBDC may help achieve these goals – or detract from them – depending on how it is designed and implemented. The potential development of CBDC should be considered alongside other means to augment payments systems, such as the development of 24/7 real-time gross settlement systems.

'There should be a thriving private market in digital payments with high levels of innovation, competition and investment.'

Policy-makers are rightly weighing up the potential for technological innovation in the issuance of national currency versus the impacts on private financial markets.

CBDC may lead to direct access to central bank money by non-banks and individuals, reducing the deposits banks rely on to extend credit and crowding out private investment and innovation in payments systems. Private credit creation is fundamental to economic growth, generating employment, and social mobility. Private payments systems foster innovation and ensure greater resilience through diversification of platforms.

There are many design considerations for creating a CBDC, both technological and structural. Due to the centrality of currency and payments in the economy, there is the potential for unintended consequences. In order to be effective, CBDC must strike the balance between public infrastructure versus private sector solutions; the respective roles of central bank money versus commercial bank money; and expanded access to digital money versus financial crime risk.

Money has historically existed in both public and private forms, and most of the fiat currency in circulation today is commercial bank money. In a crisis, universal access to central bank money could fuel domestic bank runs and cross-border capital flight.

Payment systems work best as public-private partnerships, and payments with CBDC should not be an exception. Crowding out the private sector will stifle innovation and put central banks in the undesirable and onerous position of conducting know-your-customer processes, enforcing anti-money laundering and combating the financing of terrorism, and providing customer support.

A wholesale CBDC does not have to be universally versatile. It could be engineered solely for use in domains where it would add clear value, such as tokenised capital markets, where the alternative would be private stablecoins with greater credit risk and market risk.

CBDC alone, regardless of its design, cannot expand access to digital payments. There is a need to update laws and regulations in a technologically neutral way.

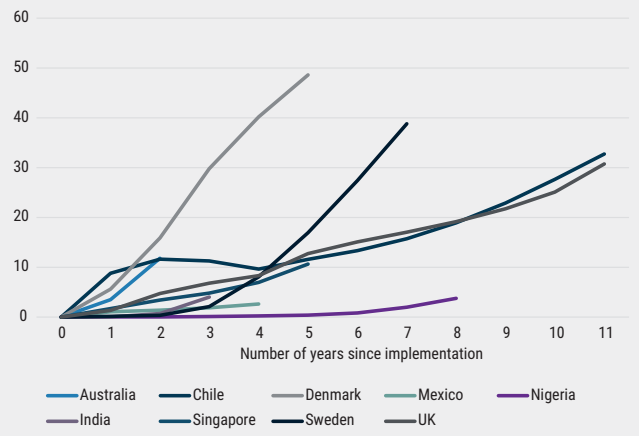
With the above considerations in mind, and in line with its responsibilities in the global financial system, Citi actively engages with central banks and policy-makers in the discussion of whether, and how CBDC might further foster, rather than jeopardise, vibrant private markets in payments and credit. Citi will draw attention to the broad range of best practices that countries can adopt to stimulate the development of effective digital payments systems.

of services to include non-card payments, cross-border capabilities, and other financial service areas.

Card payment networks have existed in parallel with bank account-based payment infrastructures. As improvements in the speed and reliability of fast bank payments make it more viable for businesses and individuals to pay directly without using an intermediary card, both Visa and Mastercard have tried to innovate and shift their services from physical plastic to digital. Mastercard, for example, acquired the UK payment processor VocaLink in 2017, giving it the capacity to handle fast, automated clearing house transactions in multiple markets. In September 2020, Mastercard announced a collaboration with ACI Worldwide, a real-time digital payments software provider, to expand its fast payment services globally. Visa has developed Visa Direct, which allows international P2P payments with other eligible Visa cardholders.

Incumbent card providers are also experimenting with potentially disruptive new payment technologies and infrastructures. Visa B2B Connect, a non-card payment network, employs DLT for end-to-end, high-value cross-border payments between companies and financial institutions. Mastercard has responded to the interest in CBDCs by developing a digital currency virtual testing environment for central banks and private firms to assess interoperability of CBDCs with existing payment rails.

It is not only card issuers that are experimenting with business models and technological innovation. As the boundaries of the digital economy expand, platforms – such as PayPal – which originally functioned as payment gateways for specific e-commerce functions, have consolidated their positions via strategic collaborations and acquisitions. PayPal's initial success was to win the confidence of buyers and sellers on eBay because it acted as a trusted escrow agent intermediating fund transfers at a time when consumers were generally wary of e-commerce sites. Strategic partnerships and acquisitions have broadened PayPal's reach and integration with other retail payment infrastructures. Its acquisition of Venmo and Braintree in 2013 gave it a foothold in the P2P mobile payments sector. Other acquisitions, such as Xoom, iZettle and Honey, have expanded PayPal's reach into retail payment sub-sectors such as remittances and e-commerce. More recently, PayPal has made inroads in the Chinese payments sector by acquiring a majority stake in Chinese payments processor GoPay in December 2019.



5. Inconsistent pace of adoption for fast retail payments

Number of transactions per capita, selected countries

Source: Bank for International Settlements, OMFIF analysis

'As the boundaries of the digital economy expand, platforms – such as PayPal – which originally functioned as payment gateways for specific e-commerce functions, have consolidated their positions via strategic collaborations and acquisitions.'

TECHFINS AND THE POWER OF PLATFORMS

Large technology companies – or 'techfins', to use the name coined by Jack Ma, Alibaba's founder – are yet another important source of innovation and change in the payments landscape. The emergence of these influential actors is adding impetus for competition and collaboration in various parts of the payments chain.

While technology has historically been at the core of transformation in the payments industry, innovations have originated from companies and financial institutions with specialised operations in the sector. Increasingly, however, large technology firms with existing products and services are diversifying their interests into the payments industry and the financial services sector. In contrast

16.53%

Volume of big tech mobile payment services as a share of annual GDP in China

to fintechs, which are new market participants with high uncertainty costs, large technology companies entering the financial services sector have distinct advantages. As well-known and trusted brands with a sizable user base and strong financial position, techfins in financial services could rapidly scale up their activities. These players can also use, and in turn, benefit from aggregated data on consumer behaviour and preferences gathered from across their existing services and products.

Google and Apple are two of the giant technology firms that have steadily developed capabilities in payments and other financial services. They have developed mobile payment apps linked to their respective operating systems on contactless devices. The majority of techfins have mainly focused on entering the payments sector as a bridgehead for other financial services. Payment or e-money licences are often obtained with relative ease compared to other areas such as credit or insurance, which feature stricter legal and regulatory requirements. Payment activities can easily be integrated and offer direct value-adds to technology companies' core businesses and products.

The expansion of big tech into payments and banking has been faster and more pervasive in developing countries where alternative means of digital payments are limited and mobile phone penetration is high. The role of big tech in mobile payments is especially significant in China, which has historically been an isolated market with only limited penetration by mainstream payment infrastructures such as international card providers.

The Bank for International Settlements notes that technology firms' payment platforms fall into two distinct categories. First, there are 'overlay systems' – such as Apple Pay, Google Pay and PayPal – which developed around existing payment infrastructures for clearing and settlement, including credit cards or fast retail payment systems. Second, there are 'proprietary systems' – such as Alipay and WePay – which are more closed-loop in nature, clearing and settling transactions within infrastructures developed and managed by technology firms themselves.

DEVELOPING DIGITAL CURRENCIES

Although technology companies are making inroads into financial services and the payments sector, the expansion is still within the bounds of adding or upgrading existing payments rails, requiring collaboration with banks and incumbent payment network actors. A more radical transformation in payments systems, catalysed by several private-sector players in the technology industry, is the concept of tokenisation and the issuance of digital currencies to replace account-based infrastructures.

Linked to the emergence of

blockchain and DLT adoption in various economic sectors, private digital currency issuance is an area that has generated immense interest and debate in recent years. While bitcoin and other crypto-assets mark an important step on the way towards creating a non-sovereign currency, their high price volatility makes them unsuitable for widespread use as a general means of payments. Innovations in the form of stablecoin tokens, whose values are tethered to reference assets such as fiat currencies to trade at par with existing monetary instruments, are seen as promising steps to extend their payments reach and utility as units of account.

The most prominent proposal for a private-sector digital currency is the Diem stablecoin. This concept was originally floated by Facebook in 2019 as an alternative financial infrastructure that would promote financial inclusion via a new global reserve currency for domestic and cross-border payments.

According to the initial Diem white paper, the stablecoin would be backed by a basket of multiple sovereign currencies, analogous to the IMF's special drawing right, and would be comprised of highly-liquid, short-term government securities and bank deposits. The Diem payments system itself is intended to be built upon a permissioned blockchain, whose operation will be governed by an independent, non-profit association comprised of global businesses and social impact organisations, including Facebook.

'Innovations in the form of stablecoin tokens, whose values are tethered to reference assets such as fiat currencies to trade at par with existing monetary instruments, are seen as promising steps to extend their payments reach and utility as units of account.'

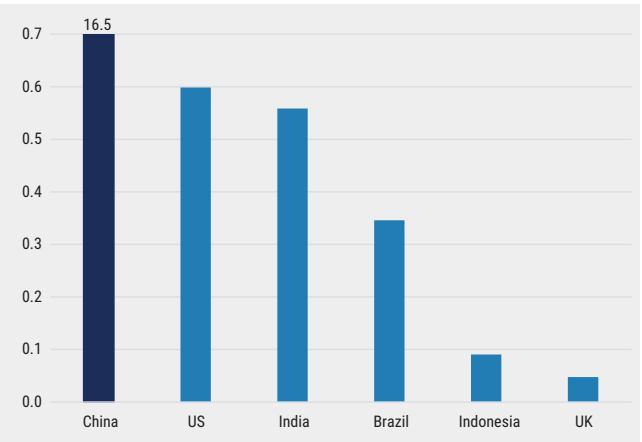
Despite the ambitious original objectives of the Diem project, many central banks and financial regulators are alarmed about the prospect of new monetary instruments from the private sector that could undermine their capacity for conducting monetary policy and maintaining price and financial stability. In the words of US Federal Reserve Governor Lael Brainard, 'We have seen the growth of massive payments networks on existing digital platforms, such as Alibaba and WeChat, and the issuance of stablecoins on a smaller scale, such as Tether, Gemini, and Paxos. What sets Facebook's [Diem] apart is the combination of an active-user network representing more than a third of the global population with the issuance of a private digital currency opaquely tied to a basket of sovereign currencies. It should be no surprise that [Diem] is attracting a high level of scrutiny from lawmakers and authorities.'

Subsequent modifications to the Diem stablecoin, for example in its design and compliance aspects, sparked regulatory concerns. Under the revised white paper published in April 2020, the most significant alteration is the replacement of the original concept of a multi-currency coin linked to a basket of fiat currencies with several single-currency stablecoins that instead serve as constituents for a composite, multi-currency Diem coin. The revisions to Diem also reiterated commitments to closely collaborate with and meet regulatory requirements set in place by central banks and monetary authorities. To ease concerns over its implications for monetary sovereignty and financial stability, Diem has proposed that digital sovereign fiat, or central bank digital currencies, could potentially be integrated into the Diem network in future, and eventually replace the associated stablecoins. Diem's proposed compatibility with digital versions of major central bank currencies could be close on the horizon. ●

6. China dwarfs other big tech markets

Value of big tech mobile payments as a share of GDP, %

Source: Bank for International Settlements, OMFIF analysis



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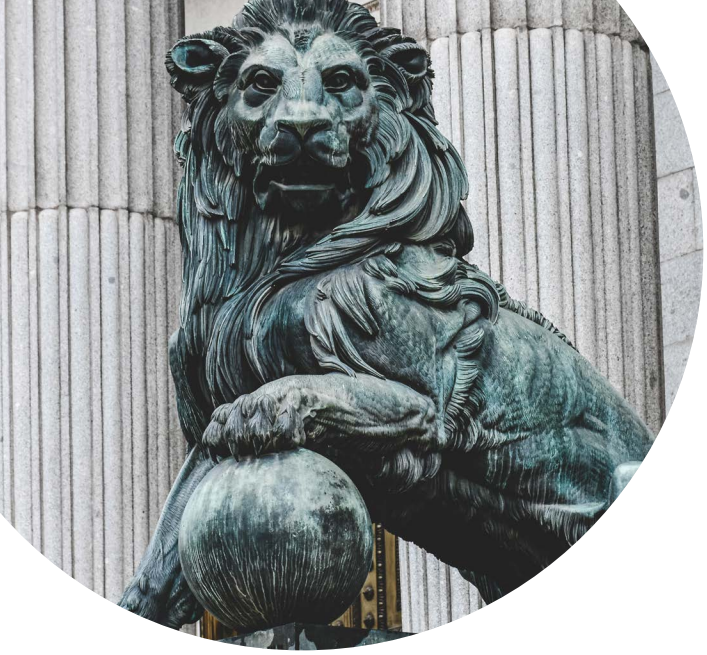
Sovereignty



SECTION 5:

CENTRAL BANKS JOIN THE DIGITAL RACE

The design of new central bank digital currencies will determine the extent of the impact they have on payments and, thereby, on financial inclusion.

CENTRAL BANKS have been forced to explore the possibility of issuing their own digital currencies because of innovations in payments and the emergence of crypto-assets. A central bank digital currency is central bank money in a digital form. Unlike privately issued crypto-assets, this is not a parallel currency. It serves as a new means of payment and as a cash alternative.

CBDCs are denominated in the official monetary unit of the issuing country and are a direct liability of the central bank. Besides maintaining relevance and policy influence within the increasingly digitised payments landscape, the introduction of CBDCs potentially promises to significantly reshape payment infrastructure at both the domestic and international levels.

There is no 'one size fits all' design and underlying technology for CBDCs as these aspects will depend on how central banks choose to be involved in the national payments environment. With regards to design and how these risk-free digital currencies can be made available, two distinct possibilities arise: wholesale or retail CBDCs.

The former conveys a sense of 'business as usual'. Central bank money already exists in a digital form as electronic bank deposits, also known as central bank reserves and, as such, its use is limited to qualifying financial institutions. In contrast, retail CBDCs could be used by households and businesses directly. This form of central bank digital currency would serve as an alternative to cash, with e-wallets, mobile phones, tokens or pre-paid cards providing a means of storage.

Closely linked to the decision to follow retail or wholesale design alternatives, central banks will also have to choose if their digital currencies are going to be a direct or hybrid CBDC. In the case of the former, central banks would handle the issuance, distribution and management of the digital currencies, without any intervention by financial institutions. While this form might favour financial inclusion as a result of the elimination of fees attached to financial services, central banks might not have the infrastructure, the expertise or even the appetite to engage in such activities. With a hybrid CBDC, central banks would be freed from handling millions of retail

clients and assuming tasks that correspond to commercial banks' day-to-day operations. Under such an arrangement, on the one hand, central banks would operate the backup infrastructure to protect the payment system. On the other hand, financial intermediaries would be the ones in charge of making real-time payments and handling every aspect related to managing customers and due diligence, following KYC and anti-money laundering/combating the financing of terrorism standards.

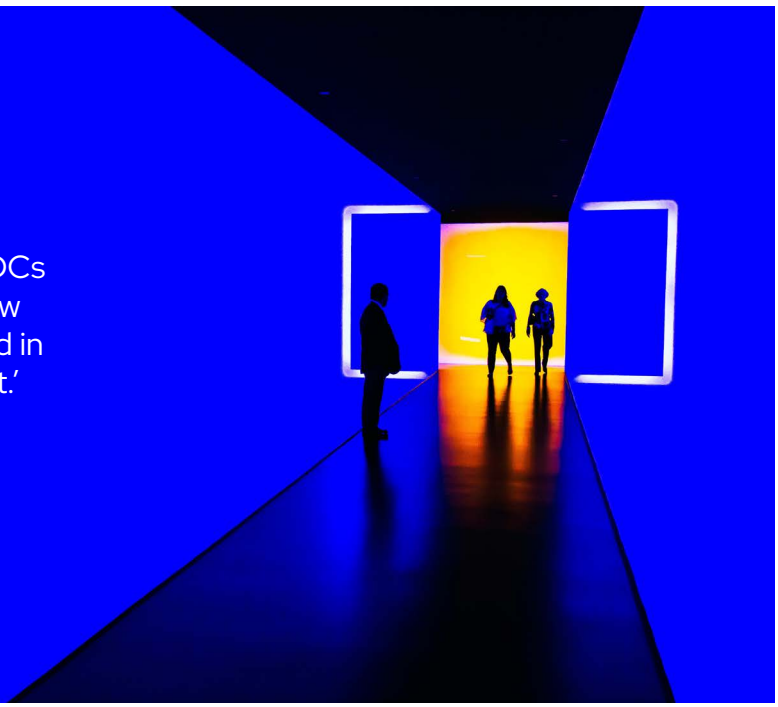
With regards to CBDC's technological design, accounts and digital tokens are the two main alternatives that are being considered to grant consumers access to CBDCs. With the account-based option, consumers will need to have an account, either at the central bank (direct CBDC) or a financial intermediary (hybrid CBDC). Token-based CBDCs will more closely resemble a digital form of cash, stored either in digital devices that can be accessed with an internet connection or in pre-paid cards or tokens that can be accessed offline.

While most central banks around the world are still undergoing research or CBDC pilots to test which of these designs and technologies to use, the Bahamas has already passed to a launching phase. After completing a pilot during 2019 on the island conglomeration of Exuma, the Bahamas launched the first nationwide retail CBDC, the Bahamian or sand dollar, on October 20 of this year.

The sand dollar is a direct liability of the Central Bank of the Bahamas: It can only be held domestically, and it is pegged to the Bahamian dollar. This CBDC is being released gradually through authorised financial institutions, or AFIs, and retail consumers have access to it through digital wallets. These wallets work with a hybrid wireless network which allows consumers to have access and use their money offline. In terms of KYC and AML/CFT, the sand dollar follows a three-tier system in which the lowest tier does not entail strict customer screening, but it does limit the amount of B$ held. The other two tiers have a risk-based approach to KYC and AML/CFT standards.

The People's Bank of China launched its Digital Currency/ Electronic Payment project to create a digital yuan, providing the most advanced example of ongoing CBDC pilot tests. DCEP trials have been rolled out in the Greater Bay Area, Beijing, Tianjin and Hebei province. The PBoC has partnered with state-owned institutions to run pilot tests of the DCEP in industries such as transportation, education, commerce and healthcare. This CBDC will probably be fully backed by the central government and pegged to the Chinese renminbi, with the

'There is no 'one size fits all' design and underlying technology for CBDCs as these aspects will depend on how central banks choose to be involved in the national payments environment.'



intention of replacing cash. Like Alipay and WeChat Pay, the CBDC can be stored and accessed by consumers through digital wallets. However, unlike these networks, the e-yuan will not require people to have a bank account. Another critical aspect of the e-yuan that would further advance financial inclusion is that its transactions will not be subject to any fees. Launching its sovereign digital currency would bolster China's standing in the global political economy, with the digital yuan potentially challenging the US dollar's dominance.

Sweden, a country with low cash usage, is another frontrunner in CBDC issuance. Sveriges Riksbank has been running a digital currency pilot since February 2020. In December 2019, the central bank contracted with Accenture to test e-wallets, distributed ledger technology and interoperability with banks. Other countries in varying stages of CBDC development include Ukraine, Canada, France, South Africa and Brazil. As more countries move away from cash, more central banks are expected to explore the possibility of CBDC issuance.

Financial innovations are evolving and emerging much faster than industry regulation. As innovations in payments systems advance in tandem with the broader digitalisation of economic activities, there will be a corresponding need for central banks and financial regulators to configure their regulatory mandates to these changes. Whether they originate from the private or public sector, upgraded or new retail payment infrastructure must meet financial inclusion and stability policy objectives, as well as ensure security, interoperability, trustworthiness, resilience, speed and cost-effectiveness. Regulators have to adequately balance the enforcement of these measures while still encouraging continued innovation and competition in payments from private sector players. ●

20.10.2020

Date the Bahamas launched the first nationwide retail CBDC, the Bahamian or sand dollar

mastercard

BIS report reinforces principles for CBDC development

Private and public collaboration should be at the heart of the development of digital money. A new testing environment delivers that, writes Raj Dhamodharan, executive vice-president for blockchain, digital asset products and digital partnerships at Mastercard.

CENTRAL banks, financial institutions and tech companies are absorbing the details of a recent report from the Bank for International Settlements. It identified the foundational principles and core features that any publicly available central bank digital currency must have.

The report outlines three key principles for CBDCs, stating that they must be in 'co-existence with cash and other types of money in a flexible and innovative payment system... Any introduction (of a CBDC) should support wider policy objectives and do no harm to monetary and financial stability, and features should promote innovation and efficiency.'

Public and private sectors have a role in creating a safe, efficient and accessible system. CBDC payments should be as easy as existing means and offer sufficient interactions with private sector digital payments systems to allow interoperability.

Mastercard welcomes this report and believes that the principles outlined by the BIS are a promising next step as central banks make decisions about issuing CBDCs. Providing cash to the public is a core responsibility of central banks. Mastercard is committed to supporting countries on their path to payments system modernisation.

For CBDCs to preserve the health of the financial system and ensure that consumers continue to have access to robust payment options, they must adhere to a set of common principles.

CBDCs are an exciting new device in the central bank's toolbox, but that does not mean they are right for every job. Tried and tested methods, such as a real-time payments system, may be a better fit. Policy-makers should compare a CBDC with other forms of payment to find the approach that best fits their needs.

Open and competitive payments ecosystems are critical for enabling access, adoption and payment options. Innovation, financial inclusion and efficient payment flows depend on vibrant private sector competition. A CBDC should seek to preserve those features in its design and distribution.

> 'Open and competitive payment ecosystems are critical to enabling access, adoption and payment options.'

Interoperability between payments systems avoids closed-loop networks that reduce the fungibility and portability of money, fragment liquidity and limit competition. A growing chorus of economists argues that ensuring interoperability between a CBDC and other payment forms can play an important role in strengthening the domestic payment ecosystem and reinforcing the role of central bank money. Consumers will be more likely to adopt a CBDC if it can be used on existing infrastructure and is supported by trusted payment methods that are linked to their existing devices and accounts.

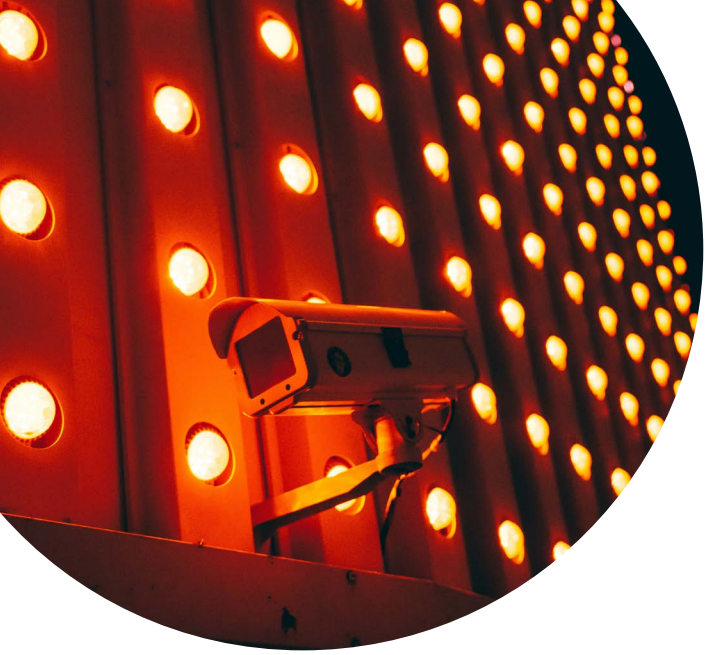
Consumer trust is at the heart of the payments system. Individuals must have confidence that they get what they pay for and are protected in the event of fraud, dispute or data misuse. Gaining that trust requires standards and rules that safeguard the security of every transaction while ensuring all parties are treated fairly and equitably.

In September, Mastercard announced a proprietary virtual testing environment for central banks to evaluate CBDC use cases. It can also be used to simulate the issuance, distribution and exchange of CBDCs.

The BIS report argues that the next steps in exploring CBDCs must be 'cautious, incremental and collaborative'. Mastercard's CBDC testing platform provides an environment for the collaboration the BIS recommends – a place where central banks and the private sector can work together in a controlled environment to transform the way people and businesses transact.

6

Policy



SECTION 6:

REGULATORS ADAPT TO A NEW LANDSCAPE

Central banks and supervisors understand the need for regulatory innovations that suit the dynamic nature of digital payments. Such innovations will expand the roles of regulators beyond their traditional focus on formal financial institutions.

THE FINANCIAL innovation that goes into developing payments fintechs often involves disintermediation and the creation of credit, which can have an impact on the broader financial system and economy. Central banks and financial regulators are keen to encourage such innovation, because of the potential benefits, while at the same time containing any risks to consumers, investors and the overall financial system. Even as innovation by the private sector in payments and fintech accelerates, governments and central banks – which will continue to play a key role in monetary oversight and payments – are expected to remain relevant in the payments landscape in future, as illustrated by the research and implementation of CBDC initiatives.

Respondents to the OMFIF Future of Payments survey were almost unanimous in the view that they and their regulatory peers would continue to play a key role in maintaining and setting responsible standards and principles to govern progress in payments (Figure 1). Although two-thirds of respondents (67%) said that central banks could or should explore direct collaborations with private entities in designing and managing payment system architectures, the survey found a broad consensus that the public sector must now proactively encourage innovative solutions and minimise associated risks. As Jens Weidmann, president of the Deutsche Bundesbank, says, 'In a market economy, offering innovative payment solutions to the public and interacting with customers should be a primary task of the private sector. Central banks have to ensure that the payments system runs smoothly and they can act as a catalyst.'

HARMONISING CROSS-BORDER REGULATORY STANDARDS

A key regulatory objective is improving confidence, security and trust in payments systems. This requires understanding, supervising and, when necessary, intervening to safeguard the interests of retail and commercial users. However, this cannot be conducted on a unilateral basis. As many countries revamp the laws and regulations that govern payment infrastructures, survey respondents point to the compelling need for greater convergence in cross-border payment regulations and standards for payments-related

products and solutions. In addition, they highlight the need to address legal uncertainties surrounding data and underlying technology infrastructures.

Developing common standards and pathways for collaboration in data management and cybersecurity is essential. Regulators need to have access to data on payment transactions to make sure that companies have adequate measures in place to protect against data and identity theft or credit and liquidity risks, thereby ensuring security and stability, and preventing fraud in payment networks. However, due to the increasingly international nature of digital transactions, much more attention needs to be paid to ensuring that cross-border payments do not compromise the domestic policy priorities of central banks. One survey respondent noted that although current regulatory frameworks tackle domestic risks, they would probably need updating if found to be inadequate for cross-border risks.

As many financial institutions and fintechs employ outsourced IT infrastructures from the cloud, inevitably some aspects of handling payment processes may involve data flows across national borders. However, different jurisdictions have different standards for data sovereignty in the financial industry, creating disparities. As one survey respondent said, 'Special effort should be devoted to the strengthening of co-operation among financial authorities, at the international level, in defining and applying common rules and standards. This is a real challenge for authorities, due to the complexity of legislative and institutional frameworks.'

CLARIFYING REGULATORY AMBIGUITIES

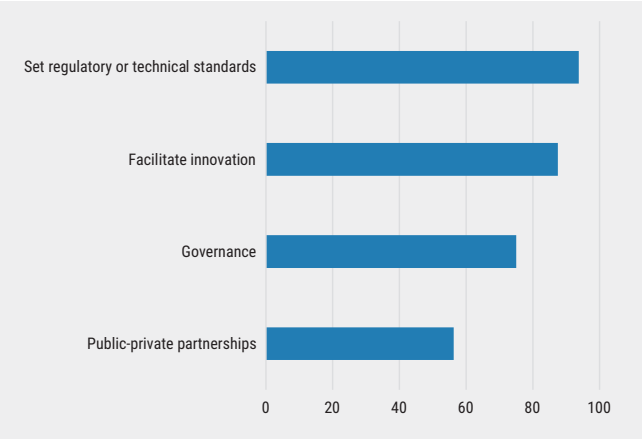
Central banks and financial regulators in many jurisdictions are undertaking regulatory reforms: These are intended to streamline a sometimes dizzying array of ambiguous and contradictory regulations that have failed to keep up with the hybridised nature of digital payments instruments and technologies.

For instance, the emergence of alternative payment instruments such as private tokenised currencies frequently falls into a grey area in many regulatory regimes. Depending on the intended function of tokenised instruments, several regulatory frameworks have determined that in addition to being a means of payment, they could also serve other functions, such as being investible securities or insurance contracts. In the US, the Howey test is used to decide what is a security, based on shared common attributes such as ownership of a collective enterprise's capital structure and the expectation of profit generated via a promoter or a third party.

As a result, digital currencies in the US have fallen under the regulatory mandate of different bodies depending on their intended function and characteristics. For instance, because of the decentralised nature of bitcoin, it is considered a commodity and falls under the oversight of the US Commodities and Futures Trading Commission. In other cases, coin offerings such as Kik's Kin or TON's Gram tokens have been designated as securities, and have been subject to regulatory restrictions and penalties from the US Securities and Exchanges Commission.

There is an urgent need to clarify these regulatory and legal contradictions which have arisen largely as a result of rapid monetary innovation and the emergence of new players and intermediaries in financial services and payments. While retail payments systems have traditionally come under the umbrella of banking regulations, fintechs and large technology firms are also increasingly involved as collaborators or competitors within the payments industry. As a result, effective supervision over the broad spectrum of participants involved in payment processes frequently entails extending supervisory mandates to non-traditional entities.

As the overseers of financial system stability and resilience, central banks and supervisors have the capacity to set important technical standards and expectations for the responsible design and operation of payments systems. One Latin American central bank noted that a priority for its



1. Public governance of payments will keep pace with private innovations

'What is the role of the state in the future payments industry?', % of responses

Source: OMFIF Future of Payments survey

government was 'looking into how to better define the legal perimeter for the payments ecosystem'.

Many central banks have developed – or are in the process of drafting – revised legislation and licensing frameworks to address and regulate new and traditional payment businesses. One example is the Monetary Authority of Singapore's Payment Services Act which came into effect in January 2020. This new licensing framework provides a progressive and flexible means for the central bank to supervise different payment service providers depending on their specific activities and the risks generated from their operations. The PSA covers the characteristics of various payment developments such as digital payment tokens, e-money and money transfer operators and outlines specific licensing and operations requirements for businesses in different fields.

Several of the survey respondents recognised that payments regulation must be updated to be more specific and granular with regard to different business models and payment instruments. In addition, many of them maintain that greater flexibility has to be balanced with equitable expectations and oversight to maintain fair competition and prevent regulatory arbitrage. A Southeast Asian central bank noted in the survey that the regulation of third-party payments system providers 'has to fulfil the obligations, among others, to set and implement a sound risk management, enhance IT security, ensure consumer protection, and comply with applicable laws and regulations. These obligations ensure a level playing field to all payments system service operators, while at the same time provide confidence to customers in conducting payment transactions'.

As new firms enter the payments sector, an important aspect of regulatory reform will be weighing the benefits and efficiency gains of moving to an activity-based regulatory regime rather than continuing with one that is confined to industry-specific entities.

ACTIVITY-BASED REGULATION

One survey respondent described the activity-based approach to regulation as a tool for monitoring and overseeing the operation and services of payment service providers to enhance risk management in specific activities. Such a regulatory model presents several challenges, including maintaining systemic financial stability while encouraging the simultaneous operation of different kinds of payment providers, banks, and other financial institutions, and also limiting the scope for regulatory arbitrage.

In practice, as many jurisdictions embark on initiatives to encourage or keep pace with financial innovation, many are referring to the basic policy principle of 'same activity, same regulation.' As one central bank in the survey explained, 'This means that newcomers must be subjected to adequate AML-CFT security, consumer protection and financial stability requirements, even when these are ancillary or outsourced service providers'. As new technologies and new business models allow non-traditional firms to engage in basic financial service activities such as payments, this policy approach is helping to minimise regulatory arbitrage and avoid migration to firms outside the traditional bounds of central bank supervision.

However, there are limits to how far a purely activity-based approach can be used. Although subjecting all firms involved in regulated activities to common expectations is seen as 'a prerequisite to a well-functioning, competitive market', in one European regulator's words, some survey respondents emphasise that it is also important to customise the precise degree of compliance required from new payment service providers on the basis of systemic risk. Regulatory frameworks and supervisory approaches for banks and other financial institutions are applied to new fintech players to the extent that they are appropriate for their risk profiles and systemic importance. Adaptable regulatory approaches that can be gradually customised to their risk profiles will help maintain financial stability without unduly stifling innovation. As another central

2. Distinct business areas covered by the MAS Payment Services Act
Source: MAS

Payment services areas	Activities covered
Account issuance services	The service of issuing a payment account or any service relating to any operation required for operating a payment account, such as an e-wallet (including certain multi-purpose stored value cards) or a nonbank issued credit card.
Domestic money transfer services	Providing local funds transfer service. This includes payment gateway services and payment kiosk services.
Cross-border money transfer services	Providing inbound or outbound remittance service.
Merchant acquisition services	Providing merchant acquisition service where the service provider processes payment transactions from the merchant and processes payment receipts on behalf of the merchant. Usually the service includes providing a point-of sale terminal or online payment gateway.
E-money issuance services	Issuing e-money to allow the user to pay merchants or transfer to another individual.
Digital payment token services	Buying or selling digital payment tokens, or providing a platform to allow persons to exchange DPTs.
Money-changing services	Buying or selling foreign currency notes.

bank from Europe noted, 'Regulation of payments should reflect the financial stability risk, rather than the legal form, of payments activities. Firms that are systemically important should be subject to standards of operational and financial resilience that reflect the risks they pose.' For example, if payment platforms do not engage in deposit-taking or credit-based activities, some jurisdictions have opted to issue e-money licences which enable proportionately lower KYC requirements for opening accounts.

IDEAL ATTRIBUTES

Regulators acknowledge the need to review or even overhaul the ways that digital payments systems and currencies are managed and monitored, and are in some agreement about the ideal characteristics of robust payments systems and instruments. While priorities, specific laws and regulatory mechanisms differ across jurisdictions, the majority of survey respondents emphasise that the appropriate regulatory and supervisory frameworks and prudential tools for payments system design should broadly focus on two main policy objectives: safety and efficiency. The issue of safety encompasses concerns related to financial stability and resilience, as well as customer privacy, while efficiency relates to the cost-efficiency, competitiveness and innovative aspects of payment systems.

As transactions have increasingly involved the use of novel digital technologies and infrastructures, many survey respondents said that the focus must be on guaranteeing cybersecurity and the integrity of the overall payments infrastructure. Apart from issues related to data integrity and privacy, survey respondents raised other significant regulatory concerns including the affordability and consumer protections embedded in the use of rapidly proliferating payment systems.

CYBERSECURITY

The main concern of regulators regarding new entrants in the digital

EVOLVING REGULATION FOR CHINESE PAYMENTS INDUSTRY

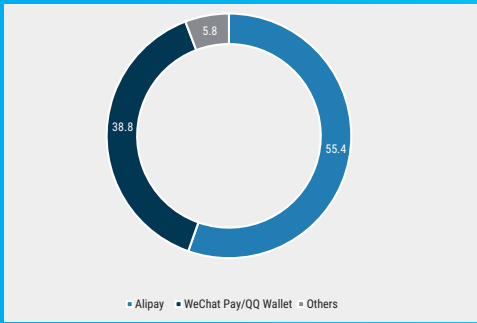
China's mobile payments sector provides an example of how more stringent regulations have been progressively applied to fintechs that have grown in influence and in systemic importance.

China's payments sector is concentrated around a few major payment service providers, which could impact financial stability and consumer welfare. When third-party payment institutions are able to collect large sums of money, it raises the question of whether banks are prepared to offer preferential treatment, or even a lower standard of financial monitoring, to those third parties in order to retain their custom and accounts. Any failure or lapse in detecting breaches or illicit activities in the banking system could have major implications for the stability of the system.

Payments providers want to expand rapidly, which could encourage them to take risks, for example by reinvesting the money from transactions in high-risk, high-return assets in order to maximise profits. They have an incentive to focus on advertising and marketing, rather than on improving their products and service, because this is a faster way to pull in more users and increase the pool of transactional funds. Chinese regulators have used reserve requirements to gradually reduce the level of unused consumer funds kept by third-party payments institutions. In 2017, payments institutions were asked to keep at least 20% of unused consumer funds in special non-interest-producing accounts overseen by the central bank. The mandated reserve funds ratio increased to 50% in 2018, and from January 2019, all unused funds must be kept in a separate account. Although the measures were intended to improve regulatory risk management and financial stability, this evolving regulatory environment has been criticised by some for stifling innovation and for curbing an important revenue source for third-party payment companies.

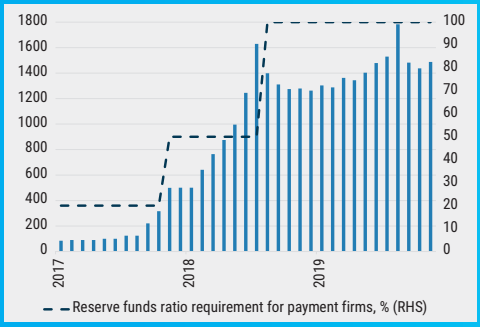
3. Chinese mobile payments sector dominated by duopoly
Transaction volume as market share, %, Q1 2020

Source: iResearch, OMFIF analysis



4. Stricter regulations for Chinese payment providers as deposits grow
Non-financial institution deposits, ¥bn

Source: People's Bank of China, OMFIF analysis

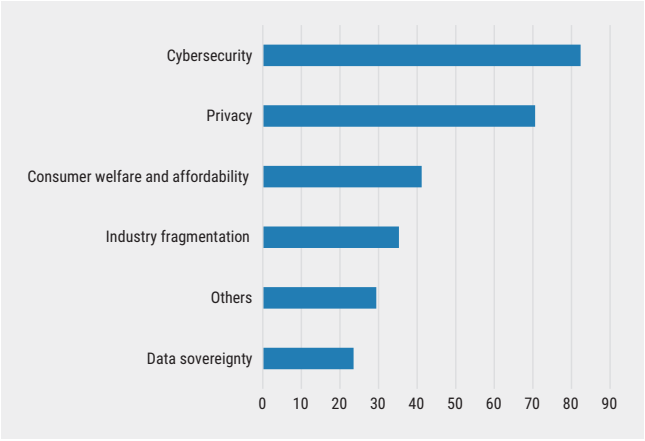


payments sector is cybersecurity, according to 90% of the survey respondents. They highlighted the need to incorporate robust features to guarantee security from cyber attacks, as well as the ability to withstand such attacks and to recover full system functionality rapidly.

Both digital currencies and payments systems are vulnerable to cyber threats. 'The continuous development of new payment methods and of new tools to access them multiplies the possible vulnerabilities of the system and introduces new types of threats,' said one European survey respondent. Financial authorities also recognise the fact that a successful attack on any digital payment service can harm consumers' confidence in the broader system. Even though some differentiation is necessary regarding the minimum capital and liquidity benchmarks required for banks and digital payment providers, regulators have proposed that there should be no distinction with regards to fields such as cybersecurity.

In the case of digital currencies, there is an additional risk of counterfeiting and hacking. Over the years, central banks have developed sophisticated features to prevent counterfeiting. As central banks and private sector entities venture into the field of digital currencies, they must pay careful attention to mitigating counterfeiting and hacking risks.

Digital currency issuers and payments services providers must guarantee resilience (to be able to withstand attacks) and, in the event of cyber attacks, must be able to ensure rapid recovery and safeguard data integrity. Payments systems must be resilient in the face of other external factors such as natural disasters. One way in which digital means of payments have achieved this is by incorporating features that allow the system to function off-line, at least temporarily. Granting off-line functionality could provide a back-up payment solution in the event of natural disasters which prevent people from having physical access to banks or ATMs to withdraw cash or make payments in person.



5. Cybersecurity and privacy should be major focus areas

'What are your key concerns for new stakeholders offering digital means of payments?', % of responses

Source: OMFIF Future of Payments survey

90%

The main concern of regulators regarding new entrants in the digital payments sector is cybersecurity, according to 90% of the OMFIF survey respondents

The Bahamas is a case in point when it comes to resilience considerations. Like many other Caribbean states, the Bahamas is vulnerable to the effects of climate change, especially to powerful and destructive hurricanes that can cause widespread power losses. Because of this, the sand dollar CBDC functions with a hybrid wireless network which allows the digital currency to serve as a means of payment offline.

PRIVACY VS ANONYMITY

There is constant tension in the financial system between the consumer's desire for privacy or anonymity and the regulator's or bank's responsibility for maintaining KYC and AML/CFT standards. As with any other token of exchange, digital currencies can be used for illicit activities. There are possible mitigating measures such as requiring payer and payee identification for transactions above a certain level, or stipulating some form of identification for all digital currency holders. However, like all user policies, these run the risk of being circumvented.

In the case of CBDCs, limits on the amount held might stop the excessive use of CBDCs as a form of investment and prevent potential stability issues stemming from bank disintermediation and bank runs. At the moment, CBDC projects are limiting use to the country's residents only. But if holders of CBDCs are

A universal protocol for value transfer

The internet was built up over decades. It started out as a collaborative project before becoming dominated by a few large companies. That evolution provides a cautionary tale for digital money, writes Neha Narula, director of the digital currency initiative at the Massachusetts Institute of Technology Media Lab.

A digital payment is a transfer of information. The effect of the transfer itself, changing balances in a database, is cheap and easy. Yet estimates indicate countries spend anywhere between 0.5% to 0.9% of their gross domestic product on retail payment transaction costs.

In addition to high costs, payments systems have not kept pace with technological innovation or the move towards a digital economy. While it is easy and cheap to send a photo to anyone in the world, it is slow and expensive to send even small amounts of money outside of a country or network.

Our current payment infrastructure was designed when settling every transaction in real time was unthinkable. We require banks to vouch for participants and collect information about their customers for even small transactions. Payments often don't settle immediately, which requires someone to take on settlement risk and perform onerous reconciliation. There are clearly ways to make these systems better, but large changes require coordination between many different partners, some of whom have a vested interest in protecting high fees rather than improving core technology and increasing financial ease and access for billions.

Today, central banks are considering the issuance of digital currency directly to consumers, providing the backbone of a new digital payments system. This is an opportunity to completely rethink the way payments are made and build faster, cheaper, and more accessible designs.

What's missing is a universal protocol for value transfer, which could form an innovative foundation.

Many cryptocurrency advocates pitch central banks and hope that their protocol will be the 'winner'. Though their software is open source and freely available, they often don't reveal that their institute holds large amounts of their newly issued token and stands to benefit if central banks back their project.

What we saw from the development of internet protocols is that it is often the ones that are truly free and least encumbered that prevail. The internet was a collaboration between government, academia and industry. Internet protocols had decades to develop before venture capital started pouring in. Not so with cryptocurrency. Decentralised cryptocurrency protocols are not mature enough to reach a global scale securely, yet builders are being pressured to generate returns to their investors in a short time, usually in the form of ever-growing token prices.

We also must remember the cautionary lessons from the internet. What was a broad, open platform became dominated by a few large companies that now have influence over users' agency, awareness and attention. When designing digital currency, we can protect users by embedding privacy into new protocols.

> 'We must approach designing a new protocol for money carefully, with neutrality, and by integrating what users need from day one.'

We must approach designing a new protocol for money carefully, with neutrality, and by integrating what users need from day one.

While excitement surrounding digital currencies is understandably on the rise, we must remember that fundamental research is required to understand how to best design this critical infrastructure.

As we research architectures, evaluate trade-offs, and design solutions for digital currency, we cannot approach the problem with the same naïveté internet pioneers had. We don't have that luxury; we know how easy it is for technology to quickly scale with unintended, complex and systemic consequences. Today we have the chance to responsibly redesign money, informed by the lessons of existing payments systems and the evolution of the internet. We have the opportunity to create a new story and to design a future digital economy that handles trillions of transactions securely and includes everyone equitably. ●

allowed to remain anonymous, it would be impossible to limit the scope of users of this risk-free central bank money.

ACCESSIBILITY AND INTEROPERABILITY

Digital means of payment must be accessible 24/7 and all year round. The technologies built around them should not only have the ability to function around the clock, but also be comprised of back-up power generators and a rapid reboot function in case of unexpected shutdowns.

Accessibility also refers to being available to the general public – in other words affordable or low cost. Regulation can play an important role in this by fostering free-market competition and allowing the entry of new players to challenge incumbents. Innovation driven by competition can force down prices so that more people have access to the payments system. One survey respondent said the central bank's efforts were aimed at 'fostering innovation and adapting the regulatory framework to lower costs and foster new entrants to increase competition'.

Lastly, with new payments systems emerging, and the creation of stablecoins and CBDCs, regulators have been increasingly interested in achieving interoperability and standardisation of clearing and settlement rules and infrastructures. These features would allow users of different technologies or systems to interact with one other, improving the effectiveness and efficiency of the payments system. This interoperability must be possible not only in terms of technology but also in terms of costs, to avoid high charges derived from the interaction and transactions between systems. Regulators can help to ensure a more seamless payments infrastructure. One central bank from Europe expanded on how it ensures interoperability as the central bank 'requires market participants to develop end-user payment services based on open data-entry solutions in order to avoid the creation of closed payment solutions and the fragmentation of the market'.

> 'Special effort should be devoted to the strengthening of co-operation among financial authorities, at the international level, in defining and applying common rules and standards. This is a real challenge for authorities.'
>
> **Survey respondent**

This also supports competition and innovation by strengthening interoperability.

FINANCIAL INSTABILITY AND DISINTERMEDIATION

Several financial stability issues arise from increased usage of digital payment instruments such as mobile money and digital currencies: for example, these innovations could have an impact on the operation of monetary policy and the effectiveness of central bank policy instruments.

As a potential substitute for currency in circulation, mobile money can have different impacts on money supply in the economy depending on the country's banking regulations and how mobile money is held within the banking system. Various analyses have suggested that a high degree of substitution, from conventional currencies or bank deposits to mobile money, could diminish a central bank's control over aggregate money supply, increase the velocity of monetary transactions and also affect seigniorage revenues for central banks.

The increase in the use of mobile money also raises questions about the taxation of economic activities as transactions shift towards alternative payments systems. Research in this area is at an early stage. However, several benefits and risks to the financial system have been identified. On the one hand, the pervasive use of mobile money by the informal economy presents an opportunity to broaden the tax base in developing countries. But imposing taxes on mobile money transactions could have a negative effect by discouraging the use of mobile wallets and prompting consumers to revert to cash: The policy would encourage financial exclusion, not inclusion.

Regulators in many jurisdictions are raising questions regarding monetary policy transmission and private-sector digital currencies. This has received particular attention in recent years because private digital currencies can be used by the wider public and not just the financial cognoscenti.

The substitution of sovereign currencies by private digital means of payment could also affect the impact of monetary policy. To control the demand of money in the economy as well as inflation, market liquidity and other macroeconomic variables, central banks implement changes in the monetary instruments they control, such as the nominal money stock or the interbank interest rate. This transmission of monetary policy will be impaired if the national currency is no longer the principal means of payment.

However, private-sector digital currencies are not the only cause for concern for financial regulators, as public digital fiat pose some risks of their own. If central banks opt for a direct design for their CBDCs, intervention of financial institutions may not be necessary for the issuance, distribution and management of this state-backed digital currency.

Significant levels of disintermediation could crowd out bank deposits and reduce the revenue obtained from the provision of this financial service. The reduced revenue could lead to an increase in the interest rate on bank loans, which would depress lending and potentially impact economic growth. To avoid these adverse effects, central banks could opt for a hybrid CBDC to make

sure banks continue providing their key intermediation role. If, on the contrary, central banks choose a direct CBDC, interest rates might be used to avoid the adverse effects on the banking sector. The holding of CBDCs as a form of investment could be discouraged if central banks decide not to pay interest on their digital currency. Alternatively, a tiered remuneration framework could be used, causing interest rates to decrease when CBDC holdings exceed a specific limit.

There is a risk that during times of crisis or stress – when savers tend to have less confidence in the banking sector – the public might turn to CBDCs instead, causing destabilising runs into risk-free central bank money. Since CBDCs are a direct liability to the issuing central bank, they are a risk-free means of payment. Although various mechanisms such as resolution laws, deposit insurance and the central bank's role as a lender of last resort protect retail depositors from financial institutions' liquidity and capital risks, commercial banks deposits are not risk free. As a result, there is a possibility that in times of economic stress, capital flight to safety could lead to massive bank runs into CBDCs, weakening financial stability: This could be avoided by imposing limits on CBDC holdings through regulation.

IMPROVING PAYMENTS SYSTEMS GOVERNANCE

Central bankers who responded to the survey emphasised the need for public institutions to be the setters of standards, supporting the potential of fintech and innovative technology through better regulatory infrastructure.

Regulators face a difficult balancing act in harnessing the benefits of fast-evolving payment technologies while keeping a check on the potential risks. Some regulatory authorities, which lack the technical capacity, have failed to keep up both in the formulation of policy as well as in setting up the infrastructure necessary to facilitate the growth of digital financial services. Some jurisdictions are catching up, but generally the lag has generated market inefficiencies. While consumer demand has driven many technological innovations, the absence of appropriate regulatory frameworks has caused delays in their roll-out.

'Regulators face a difficult balancing act in harnessing the benefits of fast-evolving payment technologies while keeping a check on the potential risks.'

The EU's Second Payments Services Directive, which began its phased enforcement in 2018, introduced regulation that clarifies how existing banking services can adapt to new technology. Also known as the open banking directive, it governs newer payment platforms and sets the requirements for their operation. The Council of the EU approved the directive in November 2015 and gave member states two years to adopt it in their respective laws and regulations. While this implementation timeframe is reasonable, considering the need to amend or introduce new laws, it shows the importance of ensuring that regulatory authorities have the appropriate resources and technical capacity to craft responsive policies that can accommodate the innovations that consumers want.

The majority of survey respondents agreed that there should be scope for greater creativity, experimentation and communication to develop the appropriate methods of payments system governance. As a testimony to this developing culture of innovation, one central bank respondent noted that the Bank for International Settlements announced the opening of an innovation centre in collaboration with the European Central Bank in Paris and Frankfurt this summer.

The industry is adapting to a new environment characterised by new technologies, new players and new activities: Regulators and industry participants will need to work closely to make sure that financial services and payments regulation allow these changes to proceed smoothly. Co-operation and coordination in areas such as regulatory licensing, market access, supervision, and recovery and

'Regulation of payments should reflect the financial stability risk, rather than the legal form, of payments activities. Firms that are systemically important should be subject to standards of operational and financial resilience that reflect the risks they pose.'

Survey respondent

resolution will all be required to test and scale beneficial innovations.

SANDBOXES AND GOVERNANCE STRATEGIES

One mechanism which many respondents mention as a useful method to develop appropriate models of governance over payments and other financial innovations is the use of dedicated testing environments such as regulatory sandboxes or innovation hubs. Governance of payments increasingly requires governments and regulators to be much more proactive in understanding and setting standards for new technologies and business models. The UK's Financial Conduct Authority was the first regulator to devise a sandbox model in 2016. Since then, central banks and regulators from numerous other countries, including Australia, Colombia, Malaysia and Singapore, as well as the Special Administrative Region of Hong Kong, have also developed sandboxes. A recent study from Ross P. Buckley et al. (2020) estimates that more than 50 jurisdictions have introduced financial regulatory sandboxes or similar initiatives.

As policy environments, regulatory sandboxes are seen as a means to adopt a 'test-and-learn' approach for dealing with unfamiliar financial innovations. Potentially beneficial products and services can be tested in a small-scale, live environment, by entities that satisfy sandbox eligibility requirements. On the other hand, innovation hubs provide a way for industry players to access and communicate with central banks and regulators, gaining guidance or approval to navigate different regulatory requirements. These initiatives are seen by respondents as appropriate ways to balance regulatory needs with creative innovation. As one respondent noted, market innovation can be encouraged, while 'ensuring that appropriate prudential standards are observed by market players, hence avoiding potentially good innovations to be constrained by undue excessive regulations'.

Typically, businesses that apply to enter a sandbox arrangement would have to demonstrate that they meet pre-determined criteria, and possess appropriate licensing prior to final approval from the regulators. In the next stage, the sandbox would allow for new technologies and business models to operate under set guidelines for a limited duration or context. One Southeast Asian central bank illustrated this, noting that 'pilot projects may be allowed to run within clear parameters such as specific test time periods, localised markets and limited users'. Finally, testing products and services in a sandbox framework allows for evaluation of the performance, benefits and risks that can guide further development. As one central bank said, this allows them to 'obtain a better understanding of the operating/business models and technical considerations as the product or service is initially being offered in the market'. This enables central banks and regulators to devise appropriate regulations customised to the levels of risk that they observe.

In the rapidly shifting payments landscape, sandboxes can provide an opportunity for new fintechs to demonstrate that their underlying technologies and business models are viable without generating disproportionate risk. For instance, several of the successful applicants to the UK FCA's first cohort of firms entering into their regulatory sandbox incorporated blockchain or DLT to facilitate payments processes. Examples include: Billon, an e-money platform based on DLT to enable secure transfer and the holding of funds using a phone-based app; BitX, a cross-border money transfer service powered by digital currencies and blockchain technology; and Epiphyte, a payments services provider engaging in cross-border payments using blockchain.

Establishing sandboxes is only one aspect of creating a conducive governance framework to engage with fintechs while being mindful of regulatory risks. Sandboxes must also be capable of determining the appropriate criteria and smooth exit processes to introduce successful sandbox entrants to the wider market. For instance, TransferFriend, a cross-border remittance firm, was one of the early entrants into the MAS's own regulatory sandbox from January to May 2018, but it failed to obtain regulatory approval after exiting the sandbox experiment.

As regulatory sandboxes are not indicative of a permanent licence to operate, there are also a variety of other collaborative tools which can be used to enable the responsible introduction of new payment infrastructures and instruments (Figure 6). Apart from wholesale regulatory reform or more targeted and differentiated regulations for specific activities, other means that can be used include having established criteria for licensing exemptions or waivers based on clear criteria, or issuing letters of no objection to specific fintech entities.

The regulatory experiments and testing criteria for how to best manage and integrate new fintech activities and technologies have focused on minimising risks in areas such as consumer welfare, data protection and management, and operational resilience. Due to the niche take-up of alternative payments instruments such as digital currencies and crypto-assets, the general opinion is that financial stability risks from many of these innovations will remain limited for now.

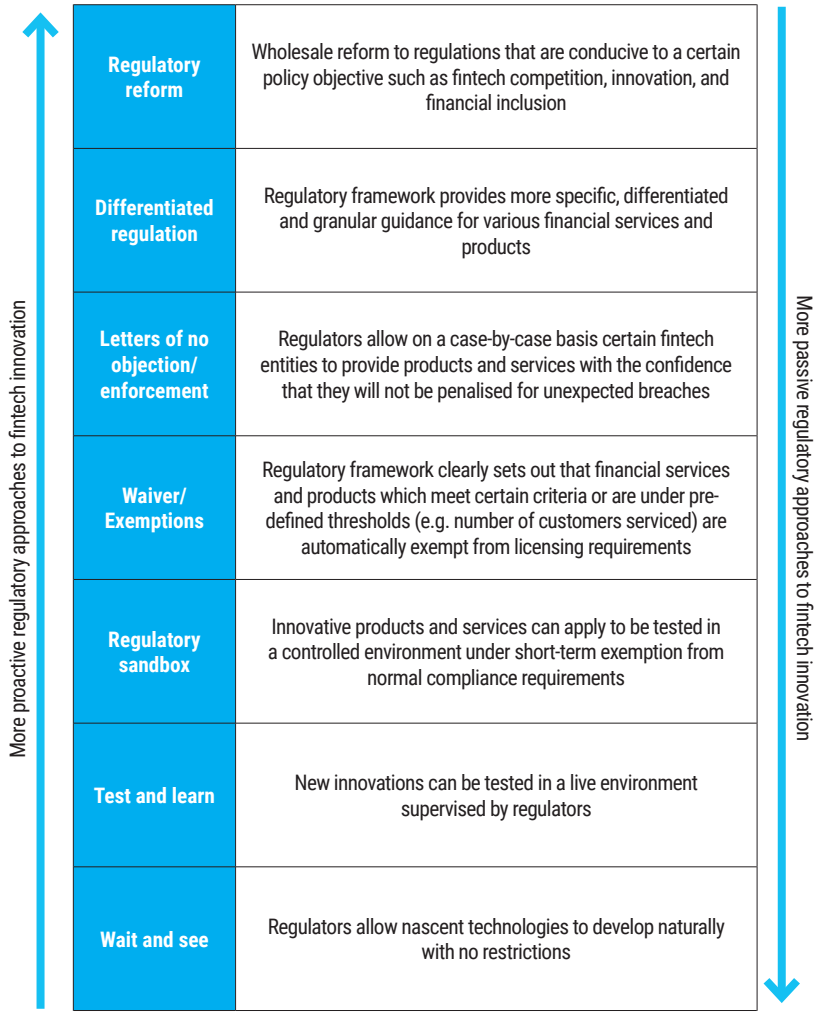
However, several survey respondents noted that it will be essential for governance frameworks surrounding new payments providers and instruments to evolve should these grow in use and importance. As one central bank said: 'In order to ensure the information necessary for regulation and supervision to be effective, all firms above a certain threshold carrying out the activities that make up payment chains should provide sufficient information to support the identification of systemically important payments firms as they emerge'.

Another respondent noted that governance mechanisms and platforms to facilitate the exchange of views and ideas, both informally and within dedicated bodies, would help elaborate upon 'principles and regulations that will enable innovation to prosper, rather than block it'. As the use of radically different payments instruments such as digital tokens or currencies accelerates and mainstream financial entities increase their exposure to such assets, central banks and supervisors will need to maintain an open dialogue with the private sector to reduce risk and reinforce trust in the broader payments system. ●

> 'All firms above a certain threshold carrying out the activities that make up payment chains should provide sufficient information to support the identification of systemically important payments firms as they emerge.'
>
> **Survey respondent**

6. Regulatory approaches to innovation

Source: World Bank



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