Commonwealth Countries: Driving FinTech Innovation

The Commonwealth

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Executive Summary

The second wave of FinTech

Since the last financial crisis of 2008/09, investments in technology-enabled financial services ('FinTech') have been growing. Yet the COVID-19 pandemic has created and amplified a second wave of FinTech advancements, leading to increased financial innovation. Emerging technologies, such as artificial intelligence, big data, blockchain, digital identity and digital financial services are changing the financial landscape as we know it. Several Commonwealth member countries, such as Kenya, Nigeria, The Bahamas and the countries of the Eastern Caribbean Currency Union are at the forefront of the revolutionary advances in FinTech.

The Commonwealth FinTech Programme

The Commonwealth FinTech Programme has had two main outputs to date: knowledge products and FinTech training courses, with the overarching aim of highlighting the use of FinTech in achieving development goals. As part of the FinTech training courses, the Commonwealth Secretariat has partnered with several universities to offer funded FinTech courses enabling capacity development for more than 100 FinTech professionals in 41 member governments. As part of our knowledge products offering, a FinTech toolkit was developed and launched in 2020 to help governments leverage financial innovation. To continue with the knowledge products, the Commonwealth Secretariat is publishing this, our first FinTech report, drawing together the experiences of our member countries and helping them to understand how they can continue to advance FinTech in their countries.

About this report

The aim of this publication is to provide an evidence-based approach to financial innovations and their impact on the attainment of the Sustainable Development Goals and other areas of development. The report finds that FinTech leads to economic growth and improved economic performance, with increased contributions from the financial sector and e-commerce turnover. FinTech innovations, such as mobile money, have been found to reduce poverty and income inequality and reduce the rural-urban income gap, while increasing financial inclusion. In some cases, FinTech has also been shown to act as an enabler for entrepreneurship among rural residents. FinTech has been proven to help the most marginalised in society – including women and young people – by tackling financial exclusion challenges, resulting in an increase in financial inclusion rates. Now is an opportune time for countries to create an enabling environment for FinTech, so that they can reap the benefits from the technology and its innovative services.

Shared experiences – the FinTech blueprint

The growth and use of FinTech is not homogenous across member countries. FinTech applications, such as mobile money, that are popular in East Africa are different from those, such as central bank digital currencies (CBDCs), that are more common in the Caribbean. Financial policies and regulatory innovations in Europe are different from those in Asia, while the development challenges in the Pacific are different from those of other member countries. This report brings

together key pieces of information from leaders across the FinTech landscape, including FinTech technologies, drivers of FinTech that can be harnessed, case studies, and recommendations and regulatory best practices that will promote the growth of FinTech innovation. The evidence from this report suggests that opportunities are ripe for learning from Commonwealth FinTech pioneers, to support FinTech capacity building across the Commonwealth as well as prospects for partnering and knowledge sharing with other Commonwealth countries. It also provides an opportunity for the Commonwealth Secretariat to be an enabler and supporter of FinTech as the FinTech wave continues.

Acknowledgments

Commonwealth Countries: Driving FinTech Innovation is a first edition report prepared by the Commonwealth Secretariat. Commonwealth member countries, such as Kenya, Nigeria, The Bahamas and those from the Eastern Caribbean are pioneers and world leaders in the FinTech landscape. The key focus of the report is to provide evidence of the technologies used and financial technology services provided by member countries and their impact on socioeconomic development. The evidence in the report also provides opportunities for other member countries in the embryonic stages of FinTech development to learn from and partner with these world leaders in FinTech.

The report was prepared under the general guidance of Dr Ruth Kattumuri, Senior Director of the Economic, Youth and Sustainable Development Directorate, and Travis Mitchell, Adviser and Head of the Economic Policy and Small States Section. The core writing team included Sophie Brain, Heather Cover-Kus, James Gregory and Akeem Rahaman. Valuable support and feedback were provided by Christine Awiti, Devyn Holiday, Motselisi Matsela and Tamara Mughogho. Enock Bamusi provided valuable logistical and administrative support.
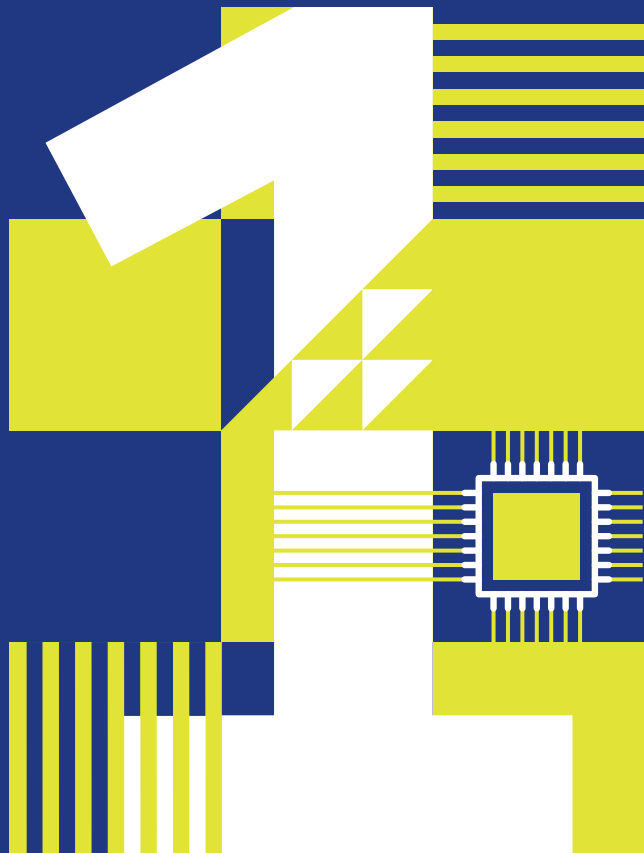
Acronyms and Abbreviations

AI	artificial intelligence
AML/CFT	anti-money laundering/ countering financing of terrorism
APIs	application programming interfaces
B2P	business-to-person
B2B	business-to-person
CBDCs	central bank digital currencies
CCAF	Cambridge Centre for Alternative Finance
DEX	decentralised crypto exchanges
DFS	digital financial services
ECCB	Eastern Caribbean Central Bank
ETP	enterprise technology provisioning
FinTech	finance technology
FCA	Financial Conduct Authority (UK)
GDP	gross domestic product
GSMA	global system for mobile association
HFT	high frequency trading
IMF	International Monetary Fund
InsurTech	insurance technology
IoT	'the internet of things'
KYC	'know your customer'
MAS	Monetary Authority of Singapore
ML	machine learning
MSMEs	micro, small and medium-sized enterprises
MPoS	mobile point-of-sale
NLP	natural language processing
OTC	over the counter
P2P	peer-to-peer
P2B	peer-to-business
PoS	point-of-sale
RegTech	regulatory technology
SDGs	Sustainable Development Goals
SMEs	small and medium-sized enterprises
WealthTech	wealth technology
WEF	World Economic Forum

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FinTech: What It Is and Why It Matters

FinTech: What It Is and Why It Matters

1.1 Introduction

Since the last financial crisis of 2008/09, investments in FinTech have been growing. This has been mainly due to deficiencies and shortcomings in the traditional banking and financial services sector (Deloitte 2020), especially in small states and developing countries where large percentages of the population are unbanked or underbanked. New technologies have been used to introduce innovation into financial services. From artificial intelligence (AI)-based tools for lending and trading, to mobile-based banks and digital payments, financial technology (FinTech) has changed traditional banking and financial services. The onset of the coronavirus pandemic in 2020 has served to further speed up digitisation and accelerate FinTech adoption. In the face of COVID-19 challenges, FinTech innovations have been resilient for the most part and even grown in some areas, rising to meet the obstacles presented by the pandemic. Recent research by the University of Cambridge, the World Bank and the World Economic Forum shows that FinTech operations across the globe grew in 2020, with an average year-on-year increase in transaction numbers and volumes of 13 per cent and 11 per cent respectively (CCAF et al. 2020).

However, the growth and use of FinTech is not homogenous across the world. FinTech applications that are popular in East Africa are different from those more common in the Caribbean. Financial policies and regulatory innovations in Europe are different from those in Asia. The development challenges in the Pacific, meanwhile, are different to those in North America.

Despite this, across the Commonwealth we have seen the rise of FinTech, with several

countries becoming worldwide leaders in different technologies and applications. This report therefore aims to provide a foundational understanding of where and how financial technology is being used across the Commonwealth. It seeks to answer the question, 'What is the status of FinTech across the association and where do the challenges and opportunities lie?' Does FinTech take a different form in the Commonwealth Pacific than it does in the Commonwealth Caribbean? What impact is FinTech having on Commonwealth countries in Africa and in Asia? Which regions are engaging with mobile money as opposed to cryptocurrencies? Is regulation affecting FinTech growth and adoption? What are the policy recommendations to help countries capitalise on the benefits of FinTech development?

Chapter 1 reviews what FinTech is and its relationship to socioeconomic development. Chapter 2 then reviews six major FinTech applications and how they are being employed across the Commonwealth. Chapter 3 explores the main drivers of FinTech and its adoption by Commonwealth member countries. These drivers include demand-side drivers, such as financial inclusion, supply-side drivers, such as digital infrastructure, and regulatory frameworks that promote the adoption of FinTech. Chapter 4 concludes with a discussion of suggestions and prescriptions to address the challenges faced by FinTech service providers for future FinTech development.

1.2 What is FinTech?

'FinTech' refers to technology-enabled financial services. Any technology that is used to streamline, digitise or enhance traditional financial services is considered FinTech. It covers software, apps and algorithms for

computer and mobile-based services, as well as hardware – like smart piggy banks, virtual reality trading platforms or digital identity cards. FinTech includes simple transactions, like transferring money from one person to another, and more complex activities like cryptocurrency exchanges.

To assess its use across the Commonwealth, it is helpful to further classify things. FinTech can be examined in two ways: 1) by technology used; or 2) by the financial service impacted.

FinTech classified by technology used
The Commonwealth FinTech Toolkit (Commonwealth Secretariat 2020) explores FinTech based on the technologies used. The toolkit is a knowledge resource for governments looking to leverage financial innovation to grow their economies and support development goals. It aims to build the FinTech knowledge and capabilities of senior government officials. A working group of experts drawn from Commonwealth central banks, large global banks, start-up companies and non-profits identified six key FinTech technologies based on their relevance, scale, maturity and potential impact on consumers, businesses and financial systems (ibid.). The six technologies are as follows.

1. **Digital financial services (DFS)**, which refers to the digitisation of:

    • financial transactions (such as moving money from one person to another);

    • identity (unique representations of an individual person); and

    • systems (the infrastructure that underpins financial services: communications networks, hardware and software).

DFS applications range from mobile money such as M-Pesa in Kenya, to digital-only banks like Monzo in the UK, to non-mobile-based digital payment platforms like Paytm in India.

2. **Artificial intelligence (AI),** which is the technology that helps a machine to think like a person. It is being deployed within banks to interface with consumers and businesses, and within government itself. Machine learning, a particular type of AI, has offered new opportunities in financial services and shaped new offerings. Examples of machine learning include using AI to detect fraud in financial services, chatbots and facial and fingerprint recognition.

3. **Digital identity,** which can be defined as a set of digital records that verify that an individual is who they say they are, allowing them to engage in transactions in the modern – digital – world. Digital identity is a keystone issue in helping an additional 2.2 billion people, mostly in Africa and Asia, to access financial services.

4. **Blockchain,** which is a type of peer-to-peer database that uses data 'blocks', all of which update one another automatically as they grow to build an immutable (permanent) record. It is both more secure than other forms of database because it is harder to insert bad data, and more user-friendly because it makes it easier to access that data. Blockchain allows parties who do not necessarily trust each other to co-operate towards shared outcomes, which is useful in several financial service applications. Blockchain is the technology employed in many cryptocurrencies and central bank digital currencies.

5. **Cybersecurity,** which poses a serious and widespread challenge for financial services, with significant impacts on both consumers and businesses. A lack of digital literacy and underinvestment in technology systems have resulted in a weak cybersecurity infrastructure, which has been unable to prevent the theft not only of hundreds of millions of pounds but also of billions of people's personal information. Effective cybersecurity consists of strong systems, digitally literate people and robust security processes.

6. **Big data/big data analytics,** which is the lifeblood of AI, as it fuels AI algorithms. Big data is known for its volume, velocity, variety, veracity and value. Financial institutions use big data/big data analytics for activities ranging from personalised marketing to alternative credit assessment.

FinTech classified by financial service application

Alternatively, FinTech can be examined by the financial service impacted. There are 13 primary FinTech activities or verticals and 103 sub-activities or sub-verticals. Nine of the primary activities are retail facing, which means that they provide financial services and products to consumers, households, and micro, small and medium-sized enterprises (MSMEs) (Cambridge Centre for Alternative Finance 2020). Four primary FinTech activities are market provisioning, as they enable or support the infrastructure or key functionalities of FinTech and/or DFS markets (see Table 1.1).

This financial service application approach, organised through a taxonomy of FinTech activities, seems the most feasible and practical approach for helping to understand FinTech.

To further narrow the scope of this exercise, the Secretariat surveyed Commonwealth central banks and Ministries of Finance on FinTech use to understand which elements of Cambridge's FinTech taxonomy were being applied within the Commonwealth. Fourteen (14) member countries across three regions responded to the questionnaire. Five FinTech applications were identified as the more prominent and impactful across the Commonwealth:

• mobile money and other digital payments

• central bank digital currencies (CBDCs)

• enterprise technology provisioning

• cryptocurrency

• alternative credit

On this basis, in trying to understand FinTech in the Commonwealth, the report will focus on examining the deployment and impact of these specific FinTech services in Commonwealth countries.

1.3 FinTech for development

In addition to understanding what FinTech is, it is equally important to know why it matters and how FinTech can support a country's development goals. It is widely known that people do not invest in technologies; they invest in solutions to their problems. Across emerging markets and developing countries, FinTech innovations are being used to meet financing needs and support socioeconomic development. Unpacking the mechanisms through which FinTech impacts various aspects of growth and development can help to motivate the push for innovation in developing countries.

Table 1.1 FinTech activities.

Primary FinTech activity		Sub-activity/business models included in each activity
Retail facing (consumers, households and MSMEs)	*Digital lending*	P2P/marketplace consumer lending, P2P/marketplace business lending, P2P/marketplace property lending, balance sheet consumer lending, balance sheet business lending, balance sheet property lending, debt-based securities, invoice trading, crowd-led microfinance, consumer purchase financing/customer cash-advance, digital merchant-cash advance solutions
	Digital capital raising	Equity-based crowdfunding, real estate crowdfunding, revenue/profit share crowdfunding, reward-based crowdfunding, donation-based crowdfunding
	Digital banking	Fully digitally native bank (retail), fully digitally native bank (MSME), marketplace bank (retail), marketplace bank (MSME), banking as a service (BaaS), agent banking (cash-in/ cash-out)
	Digital savings	Digital money market/fund, digital micro saving solutions, digital savings collective/pool, savings-as-a-service (SaaS)
	Digital payments	Digital remittances (cross border-P2P), digital remittances (domestic-P2P), money transfer (P2P, P2B, B2P, B2B), e-Money issuers, mobile money, acquiring services providers for merchants, points of access (PoS, mPoS, online PoS), bulk payment solutions – payroll, grants, etc., top-ups and refill, payment gateways, payment aggregators, API hubs for payments, settlement and clearing services providers
	Digital asset exchange	Order-book, DEX relayer, single dealer platform/OTC trading, trading bots, HFT services, advanced trading services, brokerage services, aggregation, Bitcoin teller machines (BTM), P2P marketplaces, clearing
	Digital custody	Software wallet (mobile wallet/tablet wallet/desktop wallet), web wallet (e-Money wallet), vault services, key management services, hardware wallet
	InsurTech	Usage-based, parametric-based, on-demand insurance, peer-to-peer insurance, technical service provider (TSP), digital brokers or agent, comparison portal, customer management, claims and risk management solutions, internet of things (IoT; including telematics)
	WealthTech	Digital wealth management, social trading, robo-advisors, robo retirement/pension planning, personal financial management/planning, financial comparison sites
Market provisioning	*RegTech*	Profiling and due diligence, blockchain forensics, risk analytics, dynamic compliance, regulatory reporting, market monitoring
	Alternative credit and data analytics	Alternative credit rating agency, credit scoring, psychometric analytics, sociometric analytics, biometric analytics
	Digital identity	Security and biometrics, know-your-customer (KYC) solutions, fraud prevention and risk management
	Enterprise technology provisioning	API management, cloud computing, AI/ML/NLP, enterprise blockchain, financial management and business intelligence, digital accounting, electronic invoicing

Sources: CCAF (2020); World Bank (2020a); World Economic Forum (2020).

Figure 1.2 FinTech and development.
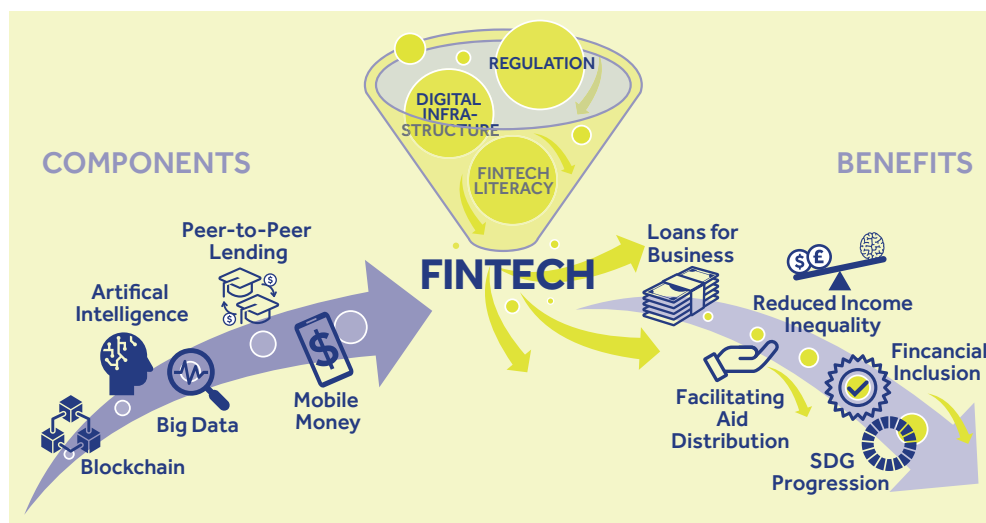
Source: Commonwealth Secretariat.

FinTech and economic growth

Several academic studies have demonstrated a positive link between FinTech and economic growth (Sadigov et al. 2020), building on the body of literature showing the nexus between finance and growth, generally (Levine 2004; Laeven et al. 2015). On average, the FinTech industry can result in average GDP growth of 2.2 per cent (Ayriyan 2021). Kanga et al. (2021) estimated an error correction model to separate the short-term and long-term effects in the relationship between FinTech and gross domestic product (GDP) per capita, using a panel of 137 countries between 1991 and 2015. The findings revealed a direct long-run relationship between FinTech and GDP per capita that was higher than the short-run relationship. The allocation of capital in finance helps to drive growth (Levine 2004 and better financial systems provide a better allocation of capital. FinTech has the potential to improve the efficiency of financial services and thus to support economic expansion. Country-level empirical studies have shown that FinTech is positively correlated with GDP

accumulation in Indonesia (Narayan 2019), and with increased production in South Korea (Shin and Choi 2019).

Sadigov and colleagues (2020) also show a direct correlation between growth (proxied by GDP per capita) and FinTech (proxied by digitisation indicators) in a cross-country analysis. They show that FinTech development directly contributes to economic growth by increasing GDP generated in the financial sector. FinTech also indirectly contributes to growth by increasing e-commerce turnover and real sector financing, thus creating more favourable lending conditions for small and medium-sized businesses. Moreover, FinTech encourages growth by improving financial inclusion (Guild 2017).

FinTech and financial inclusion

'Financial inclusion' refers to individuals and businesses having access to useful and affordable financial products and services, both online and in person, through products such as transactions, payments, savings, credit and insurance. Financial inclusion

also ensures that individuals' needs are met and that products are delivered in a responsible and sustainable way. Financial inclusion propels economic growth (Sethi and Acharya 2018) and FinTech is a key driver for financial inclusion (Jack and Suri 2011; Mbiti and Weil 2011; Ghosh 2016; Gosavi 2017; Arner et al. 2018). An empirical study using the Financial Inclusion Index by Khera et al. (2021), covering a panel of 52 developing economies and emerging markets, found that between 2014 to 2018, an increase in financial inclusion could increase GDP growth by an average of 2.2 per cent (ibid.). Similarly, empirical work in Nigeria between 1994 and 2018 found a positive and statistically significant relation between financial inclusion and economic growth (Jisike and Ifeanyi 2021). With greater financial inclusion in the form of affordable and accessible financial products, economic growth in developing countries, such as India, can increase by up to 14 per cent and in frontier markets, such as Kenya, by up to 30 per cent (EY 2018)

Financial access facilitates day-to-day living and helps families and businesses plan for everything from long-term goals to unexpected emergencies. Technologies like mobile money and peer-to-peer lending improve access to financial services for financially underserved communities or for those that are unbanked altogether. Studies have found a strong link between mobile phone penetration and financial inclusion (Andrianaivo and Kpodar 2012; Ghosh 2016). Of the 1.7 billion unbanked adults, approximately 65 per cent own a mobile phone. Internet technology provides mobile phone users with the opportunity to access financial services (Umar 2021). In Uganda, a rate of change study was done on the speed or momentum of growth on mobile money channels and financial inclusion. Access to financial services was enhanced as mobile money agent outlets increased

from 53,000 in 2012 to 212,000 in 2019 (Ebong and George 2021) Households with a mobile money account tend to have bank accounts, send and receive remittances more frequently, and accumulate more savings (Morawczynski 2009; Jack and Suri 2011; Ouma et al. 2017). Similarly, FinTech helps to improve financial access for small and medium-sized enterprises (SMEs) and MSMEs by facilitating an increased credit supply to SMEs (Hau et al. 2021; Sheng 2020).

FinTech and income inequality
Access to technology can help to close the income inequality gap, for example, through penetration of information and communications technology (ICT) like mobile phones, internet and broadband increases (Asongu 2013; Asongu and Le Reoux 2017; Asongu and Odhiambo 2019). Regarding FinTech in particular, Asongu and Nwachukwu (2017) conducted a cross-sectional investigation of 93 developing countries in 2011 to assess the correlation between mobile banking and poverty and inequality reduction. The authors found that the use of mobile phones to pay bills or to send or receive money was significantly and negatively associated with income inequality, particularly in upper-middle income countries. FinTech also reduces the rural–urban income gap by increasing the probability of rural residents becoming entrepreneurs (Zhang et al. 2020). Chinoda and Mashamba (2021) developed a FinTech, Financial Inclusion and Income Inequality (FFI) model and undertook a structural equation estimation of a panel of 25 African countries (including all Commonwealth African countries) for 2011, 2014 and 2017. The FFI model revealed that FinTech played a fundamental role in reducing income inequality in Africa.

FinTech reduces income inequality indirectly through its impact on financial inclusion. Demir et al. (2020) estimated

a quantile regression with a panel of 140 countries, using Global Findex waves of survey data for 2011, 2014 and 2017. The authors used a quantile regression to investigate the impact of different levels (quantiles) of inequality (as measured by the Gini Coefficient) on financial inclusion. The results revealed that there was a significantly negative relationship between FinTech and income inequality. FinTech, and by extension financial inclusion, reduced income inequality at all quantiles. Estimated coefficients suggested that on average, a 1 per cent increase in FinTech adaptation had the potential to reduce income inequality by between 18 and 23 per cent, with the larger reduction in inequality at the upper quantiles (ibid.).

FinTech, women and youth

FinTech has the potential to help the most marginalised in society – including women and young people. Women have been key beneficiaries of developments in digital financial services and other FinTech innovations. Women's financial inclusion rates went from 51 per cent in 2014 to 59 per cent in 2017, coinciding with the growth of mobile money (World Bank 2017b). These improvements in financial inclusion rates are positive for women's economic empowerment. The ease of access to and use of financial services that FinTech enables can increase the formalisation of women's transactions, protecting and educating them against fraud and unfair transactions, and empowering them by making them agents of their own financial futures (Sioson and Kim 2019). In the Indian state of Madhya Pradesh, South Africa and Kenya studies have all shown that women whose wages were paid into their own mobile money accounts increased their labour force participation and control over their money and improved their ability to make business investments (GPFI 2020).

> FinTech has the potential to help the most marginalised in society – including women and young people.

According to the Organisation for Economic Co-operation and Development (OECD) almost half of the world's young adults (aged 15–24) are financially excluded (OECD 2020). FinTech offers ways to tackle some of the challenges of youth financial exclusion. Digitalisation and access to digital financial services may address obstacles like physical distance from a bank, or high transaction costs, by offering convenient, faster, secure and timely services. Furthermore, young people also positively influence FinTech adoption (Slazus and Bick 2022), as they tend to be early adopters and are more comfortable with the digital experience.

FinTech and the SDGs

FinTech serves as an enabler for accelerating the Sustainable Development Goals (SDGs) (see Box 1.1). FinTech offers an opportunity for collective action among citizens in their financial lives, ranging from crowdfunding platforms to shareholder action. FinTech supports the economic, environmental and social SDGs by: 1) providing more and better-quality data for decision-making; 2) reducing financial intermediation, thus reducing costs; and 3) encouraging development-friendly behaviour – for example, gamified 'green' consumption.

The World Food Programme currently uses Building Blocks, a type of blockchain technology, to digitise humanitarian aid distribution and enable refugees and vulnerable families to instantly spend aid received from a plethora of organisations. Using Building Blocks not only protects the data of the recipient, but also enables the donor to maintain accurate, real-time data records, preventing fraud and wasted resources, minimising the exclusion of participants most in need of aid. As a result, the World Food Programme has successfully transferred over US$325 million worth of cash transfers to 1 million refugees in Bangladesh and Jordan, evidencing the contribution of FinTech towards achieving zero hunger (SDG 2).

In Sierra-Leonne, bio-identity facial recognition technology was utilised by the government during the 2014 Ebola outbreaks. Using this technology allowed the government to make digital payments via mobile money to healthcare workers in remote areas in a non-contact,

instantaneous way, which cut payment times from over a month to around a week and produced cost savings of more than US$10 million due to the reduction in fraud, double-payment and travel costs. The utilisation of this technology prevented healthcare workers from leaving those who were most vulnerable and thus improved the capacity of the country to contain the disease, aiding progress towards SDG 3 (good health and well-being) (Bangura 2016).

In South Africa, Sun Exchange has taken advantage of cryptocurrency and blockchain peer-to-peer leasing to allow anyone to purchase solar cells and for schools, businesses and organisations to use the clean energy produced. After analysing the viability and responsibility of a proposed project in which an organisation wants to go solar, Sun Exchange then begins a crowd sale so that anyone can purchase the solar cells that will run the project. The school, business or organisation that requested the project can then lease clean energy from the solar cells, while the solar cell owners can start

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Box 1.1 FinTech and the Sustainable Development Goals

SDG 1: No poverty

Mobile money can improve the resilience of people on low incomes, particularly when experiencing environmental or economic shocks, by giving them available access to credit, facilities to save money, platforms to send and receive remittances at lower costs, and efficient, cheap and timely government social safety net payments to be made when needed, especially in rural hard-to-reach areas.

SDG 2: Zero hunger

Blockchain technology offers a safe and efficient way for institutions to distribute humanitarian assistance and allow beneficiaries to access and spend such aid to ensure food security. It can also prevent food shortages for consumers, by giving producers access to immediate credit to purchase production inputs in emergencies or when experiencing shocks such as droughts. Being able to sell directly to consumers through accessing online markets prevents the need for the expensive middle-person, providing opportunities for more affordable food.

SDG 3: Good health and well-being

Big data, AI and digitalisation bring new opportunities for the previously unbanked population to start building risk profiles and payment structures, to reach medical insurers and credit providers when urgent care is needed. Mobile money also enables government payments to be made on time, and without risk, to healthcare workers in the most remote, hard-to-reach areas.

SDG 4: Quality education

Mechanisms such as pay-as-you-go (PAYG), e-learning, self-sovereign digital identities and digital payments, help parents efficiently manage and pay educational fees, preventing child expulsion for missing school, allowing parents and schools to access results-based subsidies, and improving the reliability, cost-effectiveness and safety of payments made to teachers.

SDG 5: Gender equality

The ability for women to directly receive earnings or government transfers via mobile or digital cards assists with empowerment by giving them control over finances and creating opportunities to build credit scores, access finance and move away from laborious incomegenerating activities such as farming, to more stable jobs or to start and expand their own business.

SDG 6: Clean water and sanitation

Digital channels for metering, billing and borrowing such as smart meters, PAYG ATMs and digital wallets can not only make water collections for rural customers cheaper, quicker, secure and more accessible, but can also benefit utility companies by lowering the rate of late or no payments and reducing the transaction and operating costs associated with cash payments, creating opportunities to sustainably expand.

SDG 7: Affordable and clean energy

Blockchain, digital peer-to-peer leasing, digital wallets, cryptocurrency and digital microloans are all examples of FinTech technology that has allowed solar energy to dramatically increase its global reach, facilitating both worldwide investment and local consumption. As a result, these FinTech applications have improved the affordability and accessibility of clean energy, instead of dangerous non-renewable energy often used in low-income, rural areas.

SDG 8: Decent work and economic growth

The expansion of the FinTech industry can create a plethora of employment opportunities, while offering MSMEs better access to finance and government support in order to expand. Improved access to equity to start a business can also increase rates of entrepreneurship among young people and women in remote, rural areas. FinTech also directly increases GDP through the financial sector and indirectly by raising e-commerce turnover.

SDG 9: Industry, innovation and infrastructure

FinTech and FinTech start-ups have revolutionised the financial industry and are now paving the way for banks and other financial players. FinTech developments such as global online payment processing, open application programming interfaces (APIs), blockchain, cryptocurrency, artificial intelligence, automated financial advisers and online banking all contribute to reducing transaction costs, improving efficiency, integration into value chains, and increasing the reach and access of financial services such as affordable credit, creating opportunities for entrepreneurship and innovation. It is also a key element to progressing towards the Industrial Revolution 5.0.

SDG 10: Reduced inequalities

FinTech's role in reducing inequality is mainly played through improving financial inclusion. Digital tools such as mobile money, peer-to-peer lending and microcredit building can help connect those most vulnerable and underserved in society to economic opportunities, improve their incomes and financial resilience through reducing the costs of receiving remittances and humanitarian assistance, and improve access to loans and insurance for health and education. FinTech also expands opportunities for local SMEs to access credit to sustain and grow their business, while providing greater job security for low-paid workers.

SDG 11: Sustainable cities and communities

Containing over half the world's population and accounting for more than 80 per cent of global economic activity, cities are a large focal point for FinTech. Cities depend on the provision of public services, including transportation and affordable housing; however, with urban growth and many cities still mainly operating with cash, these services are becoming increasingly inefficient and costly. Yet, with the implementation of FinTech applications such as digitising payments, digital micro-mortgages and electronic toll payments, US$470 billion could be saved annually for 100 of the major cities, as well as making city living become more inclusive, safer, more affordable, cleaner and a less congested.

SDG 12: Responsible consumption and production

As seen with SDGs 7 and 13, FinTech can help millions of households that lack access to electric grids use mobile money accounts to finance pay-as-you-go solar-powered energy. This same concept can be used in production industries such as agribusiness, to improve efficiencies by using solar-powered monitoring tools such as ground sensors and mechanisation such as irrigation devices. Furthermore, 'agronomic advice' can reduce the information asymmetries between producers and credit/insurance providers, as such providers can extract information through mobile money platforms that are connected to the internet of things (IoT), which uploads data in real-time through products such as solar-powered sensors to a data analytics platform. This platform also employs AI and machine learning to provide a deeper understanding of crop conditions and can communicate prescriptive recommendations to fully automated mechanisms, such as irrigation systems that can ensure a reduction in the risk of crop failures.

SDG 13: Climate action

FinTech has numerous applications when it comes to impacting SDG 13 and green finance. First, distributed ledger technology and, in particular, blockchain application to sustainable development can improve supply chain transparency, identity and financial inclusion, and property rights. In addition, there are further blockchain use-cases within the renewable energy sector, such as decentralising the electricity market through peer-to-peer energy trading, climate finance opportunities and carbon credit trading. Finally, FinTech has spurred on the innovation and diversification of financial instruments – for example, green bonds, which have experienced recent rapid growth and popularity in order to raise capital to support environmental projects.

SDG 16: Peace, justice and strong institutions

FinTech, through its digital data trails, online IDs and ease of data collection and recording, can lead to a reduction in corruption, fraud and public fund leakages, particularly within government institutions. This traceability can help formalise economies, detect the financing of terrorism, and forces transparency and accountability within government and industry institutions that can ultimately lead to improved public trust and peace.

Sources: UNSGSA (2018); GSMA (2020).

to generate revenue into a digital wallet in the form of local currency or Bitcoin, with a choice to either extract this income or invest it into the next project – so that solar power can continue to reach every corner of the world. Sun Exchange has now reached over 1 million solar cells sold, totalling 5.2 GWh of clean energy, showing progress towards both SDG 7 (affordable and clean energy) and SDG 13 (climate action). Box 1.1 further demonstrates the interactions between FinTech applications and the SDGs.

Despite the array of benefits arising from its use, there are also some risks associated with FinTech that have the potential to negatively impact the achievement of the SDGs, as identified by Mills (2021). First, financial integrity and stability are exposed to vulnerability, as

FinTech opens up new opportunities for organised criminals, terrorists, fraudsters, tax evaders and the corrupt to exploit the new technology for their own gains (Keen 2017).

Second, FinTech providers face much lower compliance and operating costs than traditional financial providers such as banks (Finextra 2020). As a result, digital financial providers can offer much lower prices for financial services, such as mobile money reducing transactions costs on remittances. However, there is no guarantee that providers will pass on these costs savings to consumers. In fact, in the case of remittances, the attraction to quicker, simpler and more accessible services to remit could lead to higher prices if FinTech companies choose to exploit this, particularly if FinTech starts to push alternative competing traditional financial services out of this space.

Last, the rapid and prominent use of FinTech could lead to an increase in financial exclusion and discrimination, especially in the short term. Regardless of the promotion of FinTech, its uptake and use is limited only to those who have the digital literacy required to understand and embrace the technology (Hinsen et al. 2019). Therefore, in certain developing countries where there may be a lack of savvy and trust in and knowledge of the technology, citizens may experience further digital divides and financial inequality. Further to this, a lack of necessary infrastructure required to embrace the innovation of FinTech can also deepen the digital divide. This can leave many without the opportunity to benefit from improved financial services, reinforcing previous exclusion and discrimination (UNSDG 2020).

To ensure that FinTech contributes rather than poses risks to the achievement of the SDGs, it is vital that regulatory capacity remains constant with the speed of the advancement and evolvement of the FinTech industry and the digital revolution (ibid.). Such regulation and governance should be prioritised and managed effectively to ensure both the maintenance of stability and integrity of the industry, and also the protection of consumers. Furthermore, investment in infrastructure, digital literacy and other enablers of the industry is key to allow the advancement and adoption of FinTech among the most deserving and vulnerable populations.

Chapter 2
FinTech in the Commonwealth

FinTech in the Commonwealth

FinTech is crucially important for Commonwealth member countries, especially small states with inadequate and costly access to financial services. The benefits that member states can derive from adopting FinTech services have the potential to reduce inequality and promote economic growth. Member states recognise this, and the use of FinTech has been increasing across the Commonwealth. In fact, several member states are leading global trends on FinTech, including Kenya, Jamaica, The Bahamas, the Eastern Caribbean Currency Union, Nigeria and India, to name a few.

As outlined in Section 1.2, this report will focus on:

- mobile money and other digital payments;

- central bank digital currencies (CBDCs);

- enterprise technology provisioning;

- cryptocurrency; and

- alternative credit

as these appear to be the main FinTech activities being utilised across the membership. In this chapter, the report discusses each of these activities with an aim to understand the degree of their penetration and impact in Commonwealth member countries.
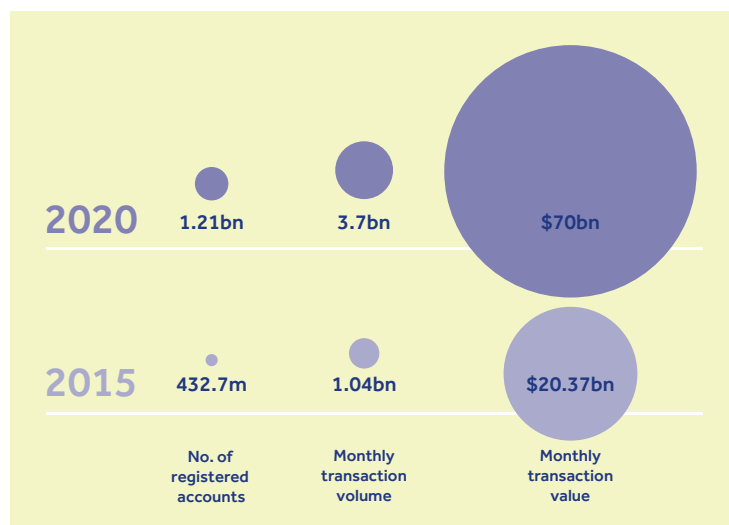
2.1 Mobile money

Mobile money is a FinTech application that facilitates digital payments. It is a digital medium of exchange and store of value using mobile-based accounts, facilitated by a network of mobile money agents through a mobile network operator, independent of the traditional banking system (IMF 2019). The broader term of 'mobile financial services' is often split into three components:

- mobile money transfer (MMT) – which allows customers to use their mobile phone to electronically send and receive monetary value from one person to another, both domestically and internationally;

- mobile payments – person-to-business payments made through the mobile phone; and

- mobile banking – which creates a connection between a person's mobile phone and their personal or business bank account, allowing them to use their mobile to channel their banking services such as deposits, withdrawals, transfers and bill payments.

With around 1.7 billion of the global population remaining unbanked (World Bank 2021), it is unsurprising that mobile money has been branded a key tool for improving financial access, particularly in areas that lack traditional financial service offerings (Donovan 2012). In fact, over the last five years, the use of mobile money has surged, with both transaction volumes and values increasing by around 250 per cent. In 2021, the total annual value of transactions through mobile money hit $1 trillion (GSMA 2022). This trend is predicted to continue. With permanent changes in consumer behaviour since the pandemic and advances in 5G rollouts, estimates state that the market compound annual growth for the mobile money industry from 2019 through 2025 will be around 39.72 per cent (Envision Intelligence, 2022).

Figure 2.1 Growth in mobile money.

	No. of registered accounts	Monthly transaction volume	Monthly transaction value
2020	1.21bn	3.7bn	$70bn
2015	432.7m	1.04bn	$20.37bn

Source: Commonwealth Secretariat (data from GSMA 2021).

Mobile money improves financial access through a variety of avenues that create further benefits, such as reducing poverty and spurring economic growth (IGC 2017). First, Mckay and Pickens (2010) found that branchless banks were 19 per cent cheaper than traditional services. Furthermore, mobile money has been attributed with lowering the cost of sending remittances, from an average of 7 per cent of the transaction to just 1.7 per cent. The improvement exceeds the Sustainable Development Goals target of less than 3 per cent of total remittance costs (Naghavi and Scharwatt 2018). These gains directly translate into higher retained income for poorer households, which can then be turned into safe and secure e-savings through mobile money platforms, to be used for investment or to build resilience in case of emergencies (Skogpvist 2019).

By using mobile money, customers also build up credit and transaction histories, something that would not be possible if they were to solely use cash. This financial history helps households access loans in case of emergencies or for business purposes. The impact holds true for businesses, where mobile money allows for easier access to larger amounts of trade credit, with the potential to promote higher production – which can have important macro-economic repercussions (Beck 2015). In many regions of the world, mobile money is ever more valuable for women as it allows them to access credit and savings without seeking permission or raising objection from their husbands, leading to empowerment of women through increased financial autonomy, altering bargaining power and the allocation of household spending (Jack and Suri 2011).

Mobile money also offers important lifelines to the most vulnerable members of society, often in remote areas, by facilitating government-to-person transactions or the delivery of development aid where cash deliveries are seldom timely, and often

expensive, unreliable and high risk. For example, the Government of Bangladesh used one of the country's four mobile financial services to provide US$30 a month to about 5 million impoverished families (Berger 2020).

In the wake of the COVID-19 pandemic, many governments have turned to the low cost and wide-reaching ability of mobile money to deliver direct cash transfers to protect vulnerable households (IMF 2020). Countries across sub-Saharan Africa, including Kenya, Lesotho, Malawi, Tanzania and Uganda, partnered with mobile money providers to temporarily lower or waive transaction fees for smaller payments and raise the daily transaction limits for SMEs and households, with the aim to increase mobile money flows, so reducing the risk of spreading the virus through the physical handling of cash (Bright 2020).

As seen in Table 2.1, there is quite some variation in the prevalence of mobile money across the Commonwealth. Factors affecting the penetration of mobile money in a country comprise the coverage and reliability of the mobile network and the agent network, access to phones, including

affordability and knowledge of how to operate them, and regulation (Ahmad, Green and Jiang 2020). Many of the countries in the 'Very high' and 'High' prevalence section are from sub-Saharan Africa.

In fact, as of 2021, the sub-Saharan African region was responsible for 70 per cent of the total global transaction value in mobile money, at US$697.7 billion of the total US$1.0 trillion (Table 2.2). The region also houses over half the total global live mobile money services, just under half the global number of registered accounts, at 605 million, and 68 per cent of the total transaction volume, at 36.6 billion (GSMA 2022).

The prevalence of mobile money in the African Commonwealth is partly explained by inadequate physical traditional financial infrastructure such as bank branches and ATMs, particularly in hard-to-reach areas when compared to global averages (IMF 2021). Additionally, the region holds large rural populations that often lack the documentation or funds required to open traditional financial accounts, thus resulting in exceptionally low levels of banked adults. On the other hand, these countries also have very high mobile subscription rates

Table 2.1 Mobile money prevalence index across the Commonwealth (2021)

Very high	High	Medium	Low	Very low
Eswatini	Bangladesh	Fiji	India	Jamaica
Ghana	Botswana	Malawi	Malaysia	Seychelles
Kenya	Mozambique	Nigeria	Maldives	Singapore
Lesotho		Pakistan	Mauritius	Sri Lanka
Rwanda		Tonga	Namibia	
Tanzania			Papua New Guinea	
Uganda			Samoa	
Cameroon			Vanuatu	
Sierra Leone			The Gambia	
Zambia			Guyana	
			South Africa	

Source: Commonwealth Secretariat (data from GSMA 2022).

Table 2.2 Mobile money: number of services and registered accounts, and transaction volume and value, globally and in sub-Saharan Africa (2021).

	Live services	Registered accounts	Transaction volume	Transaction value
Global	316	1.35 billion	53.9 billion	US$1.0 trillion
Sub-Saharan Africa *(% of global total)*	161 *(51%)*	605 million *(45%)*	36.6 billion *(68%)*	US$697.7 billion *(70%)*

Source: Commonwealth Secretariat (data from GSMA 2022).

(World Bank 2021). As a result of this ready supply and high demand for mobile money, the region greatly outnumbers the global average number of mobile money transactions, although from 2019 the average value of these transactions has been falling behind the global average (IMF 2021).

Possibly the most prominent utiliser of mobile money within the Commonwealth African countries is Kenya. There, Safaricom launched one of Africa's most successful mobile-money providers – M-Pesa – after effective co-ordination between the public sector creating an enabling environment and the private sector investing in the needs of the population to address the lack of financial inclusion. Having gained huge traction with rural, less-educated, lower-income populations and women, the platform was estimated to have lifted more than 194,000 households out of extreme poverty (Jack & Suri 2016). Mobile money is also used for remittances and cross-border cash transfers across different Commonwealth African countries, and the use of M-Pesa is prominent for these types of transactions from, for example, Kenya to Tanzania. There are now several major mobile money providers across the sub-Saharan Africa region that are furthering the use of mobile money above just payments, into broader financial services such as credit, savings, insurance and pensions. Countries such as Nigeria, with 60 per cent of its population unbanked and 95 per cent of transactions carried out in cash, still provide ample opportunity for the untapped potentials of

mobile money, particularly since Nigeria's central bank has opened the market to non-bank providers (Ernst & Young 2020).

Mobile money use is also rising in Asia, with South Asia experiencing an average annual growth rate of 46 per cent in mobile money accounts, with particularly high growth in Bangladesh and Pakistan (Chhabra & Das 2019). Now, one-in-four globally registered mobile money accounts are in South Asia, with vast increases in mobile penetration, a large unbanked population and regulatory pushes towards digitisation acting as key contributing factors driving the industry. India has one of the largest mobile payments markets in the world. Since demonetisation in 2016 alone been attributed with increasing digital payments by 50–55 per cent, programmes such as Digital India and India Stack boosting digital infrastructure, and the launches of government mobile-based money transfer applications such as the Bharat Interface for Money, have created successful advances in the industry. In Bangladesh, the recent use of mobile money for savings was particularly important, with 15 per cent of mobile money users reporting that they started to save digitally due to COVID-19 (GSMA 2021). As many groups were unable to meet and follow procedures for granting loans to their in-person group members due to government lockdowns, the digitisation of savings groups has been more critical than ever.

In the Pacific region, Fiji, Samoa, Tonga and Solomon Islands have high levels of mobile

money registrations, at around 51 per cent of the population (GSMA 2019). However, less than 10 per cent of these accounts are currently active. In 2018, there were only nine live mobile money services available to the unbanked in six different countries across the Pacific region: two in Fiji, three in Papua New Guinea and one each in Samoa, Solomon Islands, Tonga and Vanuatu. However, continuous efforts have been made to embrace the benefits that mobile money can have on the region's low financial inclusion rates and the cost-savings it can offer on expensive remittance fees. The Pacific Financial Inclusion Programme has funded more than 44 projects with financial service providers, including the creation of Ezibank in Samoa that connects Digicel mobile money with individuals' National Bank of Samoa accounts (UNDP 2018).

Nonetheless, the issues of very low mobile internet penetration, digital infrastructure and digital financial literacy remain a real challenge to the potential scaling of mobile money. According to McCaffrey (2021) governments in the Pacific can take several strides to address this scaling-up challenge. First, they can encourage the use of mobile money to provide for welfare payments, tax payments, utility payments and for government salary payments. Second, complementary partnerships between banks and telecoms providers should be prioritised over increasing competition among providers who already face a small addressable market. Further to this, regionally aligned policies that enable companies to serve across borders and increase their consumer base may be even more important. Last, public resources should be used to help businesses understand how to adapt their models so that they can identify and target rural Pacific islanders.

Compared to the rest of the world, the Caribbean has not been at the forefront of payment innovation, despite a high mobile penetration rate and access to technology. As a result, retail payment services continue to be costly and inefficient, which further limits access to digital payments for a large part of the region. Interoperability across systems in the region is also limited. The Latin America and Caribbean region has one of the lowest interoperability rates in the world at 10 per cent, compared to 75 per cent in Asian emerging market economies and 25 per cent of sub-Saharan Africa. The lower interoperability is reinforced by the use of digital wallets (Alfonso et al. 2020). Although digital payments and transactions are on the rise, cash is still 'king' in the Caribbean (Marius 2021). Several explanations have been offered for this:

1. mobile money still has a high rate of unbanked and underbanked customers;

2. weak interoperability between digital payment systems;

3. weak point-of-sale infrastructure;

4. high transaction charges and maintenance fees; and

5. digital adoption by businesses remains low (ibid.).

Overall, most Commonwealth countries are experiencing a huge growth in mobile money usage, as per the global trend. Despite many countries with large rural populations or island states facing unique challenges when it comes to the adoption of mobile money, huge co-operative strides have been made by governments across the globe to facilitate the era of digitisation and cashless societies. In some ways, the pandemic has been a catalyst for regulatory changes and consumer behaviour, which had previously stalled individuals' ability or willingness to create mobile money accounts. However, further investment in digital infrastructure,

and co-ordination between governments and regulators to create enabling environments, is needed to ensure the growth and long-term sustainability of the industry and its benefits.

Digital only banks/neobanks

Digital banks, also known as 'neobanks' or 'challenger banks', offer banking and financial services completely online, without the need for traditional 'bricks-and-mortar' branches (Koty 2021). They are usually accessed via an application ('app') and are not backed by traditional banks. Besides allowing all banking activities to be completed online, digital banks offer innovative and accessible services that traditional banks generally do not, such as cheap rates on international money transfers and cashback for certain payments, often leveraging data on individual customers (ibid.).

The pandemic has highlighted how unnecessary it is that people risk their health just to visit a banking branch. The COVID-19 crisis made individuals aware of the digital solutions available to them when it comes to financial services, and this is set to grow exponentially in the coming years. However, the availability of digital banks varies across the Commonwealth, with some countries issuing limited digital banking licenses despite a large number of applications for licenses and others having limited regulation and demand for these licenses.

The rapid growth of smartphone users in Africa, combined with the low levels of banking coverage, has created a powerful leverage effect when it comes to digital banking solutions in the region (Laghmari 2020). Digital banks are helping to fill huge gaps in financial inclusion by providing access where it is most needed, with the potential to provide financial services to about 300 million potential underbanked and unbanked customers in Africa (Louahidi 2022). South

Africa is a clear frontrunner when it comes to digital banks, with its first digital-only bank launching in 2019. TymeBank was the first such digital bank and the first bank in South Africa to receive a full banking license in 20 years. Following its opening in February 2019, it onboarded an average of 100,000 customers per month (Mambu 2020) and was expected to reach 4 million customers by 2022 (FinTech News Africa 2021). In Nigeria, the digital bank Kuda has also started to garner attention as a key competitor in the region, with approximately 1.4 million registered users by August 2021. These two frontrunners have paved the way for digital banking in the African region by creating the space, buzz and pathway for other emerging digital banks. These include Prosper (Nigeria), Sparkle (Nigeria), Bank Zero (South Africa), Bettr Finance (South Africa), Telda (Egypt) and Dopay (Egypt) (ibid.). By catering to a variety of customers, digital banking across Africa continues to grow at a rapid pace.

In Commonwealth Asia, digital usage and evolving regulatory frameworks offer significant opportunities for digital banks. India's large population and young demographic presents a chance for digital banks to become established. At the time of writing, there were at least 13 digital banks established within the country, challenging traditional banks that had not invested significantly in digitalisation (FinTech Futures 2019). However, foreign players may find it difficult to enter the country, given the dispersed nature of the market and the regulatory rules in place that promote financial inclusion while also acting as barriers to outside players (BCG Global 2020).

In Malaysia, the government was set to issue its first digital banking licenses in early 2022, with the hope that it would position the country as one of Southeast Asia's leaders in FinTech, as well as helping to serve

Table 2.3   Neobanks' customer base.

	Target	Customer base
FairMoney	Underbanked people	5 million
TymeBank	Low-income customers	4 million
Kuda	Younger generation	1.4 million
Bank Zero	Individuals and businesses	100,000+
Sparkle	Individuals and SMEs	100,000+
Prospa	SMEs	27,000+
Telda	Underbanked people	N/A

Source: Louahidi (2022).

the underbanked and those without bank accounts (Koty 2021). The hope is also that this will be useful for businesses, especially small and medium-sized enterprises, as they will have greater access to loans, more competitive borrowing rates, and faster approvals and disbursements of funds (ibid.). In Pakistan, digital banks could have a profound effect on financial inclusion in a country where 70 per cent of adults don't have a bank account (Mangi 2021). One start-up, TAG, has been given a provisional electronic money institution license from the central bank that allows it to conduct basic banking, demonstrating the country's advanced regulations for digital financial interventions when compared to other emerging markets (Hussain 2021).

Across the Caribbean, a significant segment of the population who had not yet joined the growing global migration to digital financial services were caught off-guard by sudden branch closures due to COVID-19 and found themselves unable to access vital services – including cash withdrawals that they normally carried out face-to-face (Frederick 2020). In response, several countries, such as Barbados, have introduced new payments legislation in order to take the first steps towards eventually introducing digital banks (Central Bank Barbados 2020).

With a growing appetite for digital innovation, Canada's digital banks are poised for growth.

With 75 per cent of Canadians now using online and mobile banking to conduct most of their day-to-day banking transactions, there has been a significant growth in the number of neobanks available to consumers, with around 40 current players to choose from (Omololu 2022). They serve a range of different consumers and focus on different areas, such as SMEs, children or teen banking, with appealing reward systems and prepaid cards (Bhatti 2021). The rise in these challenger banks has also meant that traditional Canadian banks are establishing partnerships with FinTech to provide more digital banking capabilities to their customer base, as they fear they may be pushed out of the market in the long term (Hydrogen 2020).

Digital banks have been accessible to consumers since 2016 in the United Kingdom. This has revolutionised the way that consumers interact with the banking system, with around 12 million people in Britain having opened an account with a digital-only bank by 2020 (*Fintech Magazine* 2020). Seventy-one (71) per cent of customers are expected to use mobile apps for banking by 2024 and over the same period, the number of customers who bank in branches is expected to decline to 55 per cent (Jolly 2019). An increasing number of neobanks who have gained licenses to offer banking services has spurred this growth, with at least 21 options available for consumers to choose from (Volenik 2021).

> The COVID-19 pandemic has not only accelerated the shift toward digital and contactless payments, but has also led to a more mainstream acceptance of physical cash alternatives.

Neobanks have been around for a while in the UK and Asia, but the first neobank to be granted its licence in Australia was the start-up Volt in January 2019. This is likely because the Australian Prudential Regulation Authority (APRA) brought in new rules in 2018 that simplified the process of entering the deposit market, making it more feasible for neobanks to launch in the country (Waraker 2021).

Neobanks' popularity in Australia is due to several factors, including a lack of competition in the Australian banking sector, with the 'Big Four' banks holding around 80 per cent of the market share, and a rise in digital banking which facilitates the transition of consumers to neobanks. These factors have resulted in around 15 neobanks opening in the country to date. Despite this, because the large banks in Australia are more advanced than in other markets

such as the UK, the pressure is on challenger banks to create a value proposition that goes beyond just a sleek app (Crawley 2020).
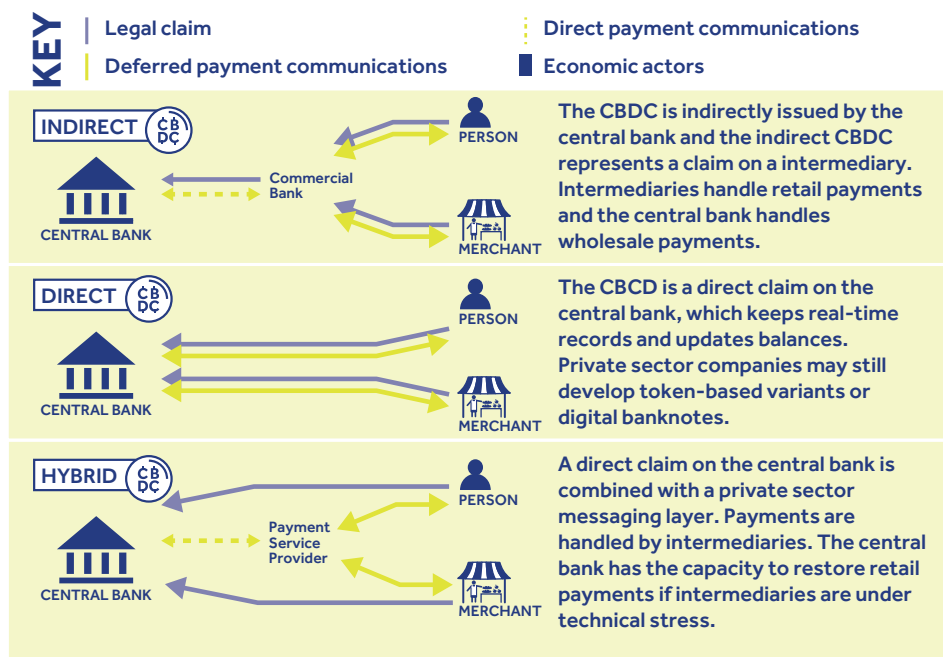
Overall, digital banks could address some of the financial inclusion issues certain Commonwealth states are facing, especially in more remote islands in the Pacific and the Caribbean. However, adequate vetting processes and regulation need to be put in place to ensure consumer data are not abused and that funds are kept safe, along with robust cyber-resilient policies, responses and measures to deal with the parallel growth in cybersecurity issues and threats.

2.2 Central bank digital currency

The COVID-19 pandemic has not only accelerated the shift toward digital and contactless payments, but has also led to a more mainstream acceptance of physical cash alternatives, including central bank digital currencies (CBDCs). CBDCs are a digital form of central bank-issued money and have been on the rise in recent years. They represent a legal tender where the liability rests with the central bank, similar to physical currency in circulation, and with potential wide use by households and businesses to store value and make payments (Deloitte 2021a) (Figure 2.3). A 2020 worldwide survey of central banks found that 86 per cent of them were engaged in investigating CBDCs, up from 65 per cent in 2017, while 60 per cent have progressed past conceptual research to experimenting and running pilots (Boar and Wehrli 2021).

Across the different Commonwealth regions, countries have had varying responses to CBDCs, with some pushing forward with their implementation and others 'waiting in the wings' and conducting proofs of concept before they decide to launch their own. At the time of writing, 27 out of 54 Commonwealth countries had either announced intentions to

Figure 2.2 How do CBDCs work?

KEY

| Legal claim | Direct payment communications |
| Deferred payment communications | Economic actors |

INDIRECT CBDC

CENTRAL BANK
Commercial Bank
PERSON
MERCHANT

The CBDC is indirectly issued by the central bank and the indirect CBDC represents a claim on a intermediary. Intermediaries handle retail payments and the central bank handles wholesale payments.

DIRECT CBDC

CENTRAL BANK
PERSON
MERCHANT

The CBCD is a direct claim on the central bank, which keeps real-time records and updates balances. Private sector companies may still develop token-based variants or digital banknotes.

HYBRID CBDC

CENTRAL BANK
Payment Service Provider
PERSON
MERCHANT

A direct claim on the central bank is combined with a private sector messaging layer. Payments are handled by intermediaries. The central bank has the capacity to restore retail payments if intermediaries are under technical stress.

Source: Bloomberg (2021).

research, develop, pilot or launch CBDCs (Cover-Kus, 2021).

Caribbean nations are globally recognised as pioneers in CBDCs, with the currency showing the potential to address their issues with regards to inadequate banking services and inefficient payments systems, which has resulted in slow electronic transfer and settlements (Boar and Wehrli 2021). The Bahamas is a case in point, having launched a prototype CBDC as an additional digital variant of the Bahamian dollar, with a view to improving financial inclusion by offering lower processing fees than traditional mechanisms and instant payments (Gross and Weisbrodt 2021; IMF 2019). The Eastern Caribbean Central Bank and the monetary authority for the Eastern Caribbean Currency Union are also working to replace physical dollars with digital dollars, and are currently in the pilot stage (ibid.).

Many challenges remain in implementing CBDCs in the Commonwealth Pacific islands, as in some countries digital payments were only introduced in 2019, with cash remaining the preferred payment method for most transactions (IFC 2019). In addition to this, the digital and financial infrastructure necessary to successfully implement CBDCs remains relatively undeveloped (Didenko and Buckley 2021). This may explain why the Reserve Bank of Tonga has advised that consideration of a CBDC is still at an exploratory phase, given their need to deduce whether a digital currency is suitable for a small island economy (RNZ 2021). Hence, it is clear that for countries to adequately prepare for safe, efficient and accessible CBDCs, developing the knowledge and expertise to understand the designs and issues this new type of currency can give rise to will be necessary in the coming years (Didenko and Buckley 2021).

Table 2.4 Status of CBDCs across the Commonwealth.

Region	Country	CBDC status
Africa	Eswatini	Research stage
	Ghana	CBDC in development
	Kenya	Research stage
	Mauritius	Research stage
	Nigeria	Launched
	Rwanda	Research stage
	South Africa	Research stage
Asia	India	Exploratory research
	Malaysia	Exploratory research
	Pakistan	Research stage
	Singapore	Research stage
The Caribbean and the Americas	Antigua and Barbuda	Pilot launched
	The Bahamas	Launched
	Canada	Exploratory research
	Dominica	Pilot launched
	Grenada	Pilot launched
	Jamaica	Exploratory research
	Saint Lucia	Pilot launched
	St Kitts and Nevis	Pilot launched
	St Vincent and the Grenadines	Pilot launched
	Trinidad and Tobago	Exploratory research
Europe	Cyprus	Research stage
	Malta	Research stage
	United Kingdom	Research stage
The Pacific	Australia	Research stage
	New Zealand	Research stage
	Tonga	Exploratory research

Source: National reporting media outlets (2022).

In Australia, research has been conducted into the implementation of a central bank digital currency as well, but the Reserve Bank of Australia does not believe a case for issuing one has yet emerged (Keller 2021). Despite this, research has also been undertaken for what the best regulatory approach should be if an Australian CBDC were ever to be issued, suggesting the country maybe taking its first steps towards issuing a CBDC (ibid.). Likewise, New Zealand's central bank is researching CBDCs and has been seeking input from the public on its potential use (Reuters 2021). They are however cautious, stating that operational risks – such as cybersecurity and the impact on the financial sector – would have to be considered before they moved ahead (ibid.).

Similarly in the United Kingdom, HM Treasury and the Bank of England are still in the exploratory phase when it comes to possible rollout of a UK CBDC. A consultation has been launched, which will set out the

assessment of the case for a UK CBDC, including the merits of further work to develop an operational and technology model for a UK digital currency (Bank of England 2021). Despite this, no decision has been made whether to introduce a CBDC in the UK, which would be a major national infrastructure project. Like the UK, the European Central Bank kicked off a 24-month investigation phase into a European CBDC. The hope is that this will eventually lead to the issuance of a CBDC in the Eurozone (Mason 2021).

Within Commonwealth Asia, the Monetary Authority of Singapore recently concluded its five-year digital currency project, which explored the experimental usage of distributed ledger technology and CBDCs

(MAS 2016). Through this, a payments network prototype was developed, and this will act as a test network for developing a next-generation cross-border payment infrastructure (ibid.). However, no indication has been given on when the country may have a digital currency available for broad use.

In addition to this, several Commonwealth member countries' institutions, such as the Reserve Bank of Australia, Bank Negara Malaysia, the Monetary Authority of Singapore and South African Reserve Bank, formed part of a project in partnership with the BIS Innovation Hub ('Project Dunbar'), to create a shared CBDC platform for international settlements (Bank Negara Malaysia 2022).

Figure 2.3   Commonwealth African countries that are assessing the viability or have launched CBDCs.
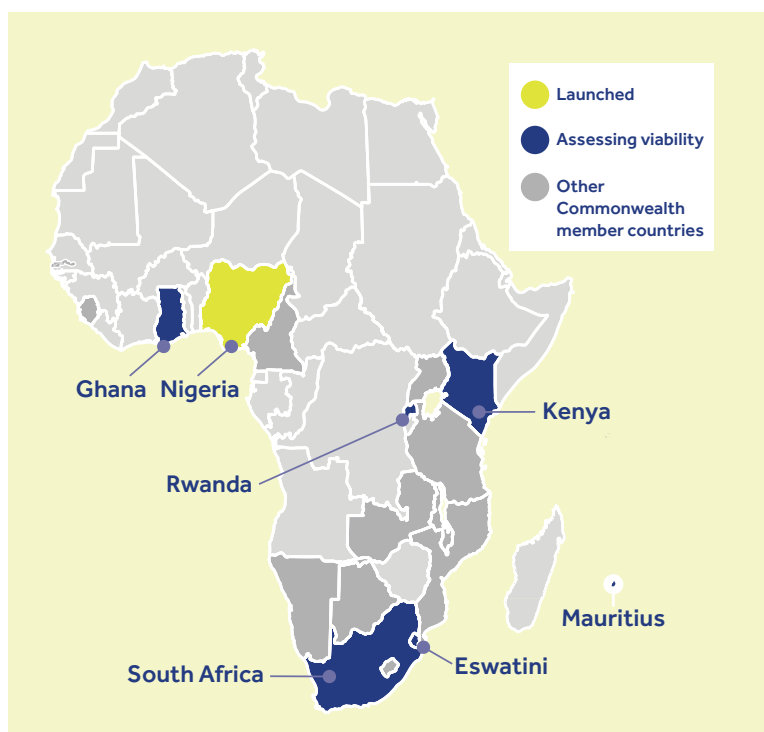
Source: Atlantic Council (2021).

Across the African continent, seven Commonwealth countries are currently looking at the viability of CBDC technology (Figure 2.3), with most at the research stage and one (in Nigeria) already having been launched, according to a tracker by the Atlantic Council think tank (Atlantic Council 2022). Pilot schemes are being progressed in Ghana and South Africa, while in Kenya and Rwanda studies are also under way (Casteleijn et al. 2021). In the region, CBDCs could play a major role in the continent's huge remittance market, by reducing transaction costs as well as helping to solve the challenge of the inconvertibility of African currencies. Furthermore, CBDCs could help intraregional trade, which so far has been challenging to achieve across the continent (Salami 2021).

Nigeria has been spearheading the process with the recent launch of its digital currency, the eNaira. Since its launch in late October 2021, the eNaira platform has received more than 2.5 million daily visits, with 33 banks integrated on the platform and more than 2,000 customers onboarded. The hope is that the currency will help financial inclusion, make transactions more efficient, as well as improve monetary policy (Onu 2021).

However, CBDCs are not without problems. The biggest concern is around security, in particular, cybersecurity. To prevent it becoming a target for criminal organisations and nation states, a CBDC platform must protect a user's mobile data, the application that it is using to manage its digital currency, and the connection between the mobile application and backend server (Finextra 2021). CBDC platforms will therefore need to be proactive and pre-empt fraud before it affects users or central banks (ibid.).

Furthermore, lessons learnt can be drawn from a peer review undertaken by the

Central Bank Digital Currencies Working Group, focusing on CBDCs launched in The Bahamas, Uruguay and Sweden (CBDC WG 2020). The working group emphasised the idea that central banks should address domestic concerns ex-ante, including reviewing market structure, ensuring industry dialogue, and making sure that safe and efficient payments are underpinned by an appropriate policy framework (ibid.). In addition to this, central banks need to understand exactly how a CBDC could fill the gaps both in normal times and in extreme situations (for example, during the COVID-19 pandemic) and they should set the highest technological and operational requirements to deliver a solution that is likely to become scalable, interoperable and trustable (ibid.).

Both the risks and advantages of CBDCs will need to be carefully weighed up by Commonwealth countries moving forward. Furthermore, they will need to ascertain that adequate infrastructure is in place to launch these new currencies and sustain their growth.

2.3 Enterprise technology provisioning

Through enterprise technology provisioning (ETP), organisations can ensure that they have the best available technologies to help their businesses grow and meet customer needs. When this is applied to the financial services sector, the use of API management, cloud computing, artificial intelligence, machine learning, enterprise blockchain, financial management, and business intelligence and digital accounting can be used to support financial service efficiency. This allows for increased operational efficiency, the ability to offer new products to customers and improved, user-friendly, interfaces for customers.

Artificial intelligence (AI), a technology that leverages computers and machines to mimic the problem-solving and decision-making capabilities of the human mind, is one way in which financial service efficiency can be improved. With an expanding number of ways AI is used in the financial sector, it is crucial to understand how this technology can help banks and customers improve security and save time. For example, AI allows for increased security when it comes to banking, as banks can offer apps that can be accessed only with facial or fingerprint recognition (Landyshev 2021). Chatbots and AI-powered personalised banking apps offer improved customer service (ibid.). Deciding on someone's creditworthiness is also feasible, as banks are able to look at their own customer data and draw conclusions from there.

Furthermore, machine learning, which is a subfield of artificial intelligence, can be used for fraud detection and prevention. By using algorithms and statistical models to analyse and draw inferences from patterns in data, the technology can react to the data it is presented with in real-time, finding patterns and relationships, so helping to recognise fraudulent activity (Harrison 2021). The use of application programming interfaces (APIs), a software intermediary that allows two applications to talk to each other, also helps to streamline business processes, enable swift data sharing and allows for companies to experiment with new product concepts without the expense of bringing them to the market first (England 2021).

Finally, cloud computing, which involves delivering hosted services over the internet, allows FinTech companies to store, manage and access huge volumes of data securely, cost-effectively and autonomously, from anywhere and at any time, which is crucial as working with data is a top priority within

these organisations (Dolgorukov 2021). Additionally, through data encryption to zero trust verification and access control, cloud computing has mitigated many of the risks that traditional on-premises IT infrastructures present (ibid.).

However, the use of enterprise technology provisioning in FinTech will ultimately be driven by how much financial services organisations invest into upskilling their workforce, which is what has caused disparities in how this technology has progressed in the Commonwealth FinTech landscape.

In Commonwealth Africa, and in Nigeria specifically, API FinTech start-ups have made a tremendous impact in the FinTech space, helping to build Africa's API infrastructure for institutions and third-party companies. Mono, a Nigerian start-up, builds APIs and infrastructure that make it easy for developers and businesses to create better experiences for their users. In the country, lots of companies have products that require their customers' financial data to function; however, banks don't have public APIs for businesses and developers to consume. Through Mono's APIs, people can securely link their financial accounts, sharing their bank data – such as statements, transactions and balances – in seconds with other businesses. In turn, businesses are also able to verify the identity and account information of their users, helping to mitigate fraud.

Several FinTech companies have also been using AI to improve financial literacy across the region, by helping customers keep track of their expenditure and create financial goals. In 2020, Tanzanian FinTech start-up Mipango launched an AI-based app that provides users with free financial advice, helping them to manage their income,

expenses, savings, financial targets and budgets, and access relevant investment opportunities (Jackson 2020).

In Asia, the use of AI technologies is becoming more widespread across the financial sector. In 2021, The prime minister of Singapore announced the launch of a National Artificial Intelligence Programme in Finance, with the aim of building deep AI capabilities within Singapore's financial sector, to strengthen customer service, risk management and business competitiveness. The hope is that policies and regulations will become attuned to and supportive of these new technologies and that the country will be a leader in the field by 2030 (ibid.).

At the time of writing, several FinTech firms had already displayed the benefits of combining AI and machine learning algorithms in Singapore. CrediLinq.Ai, a Singaporean FinTech start-up, has used this technology to disrupt how credit is underwritten to SMEs, using innovative technological solutions through its lending platform (Finextra 2021). As banks and credit asset management companies often face problems with scaling due to a traditional underwriting approach and a lack of automation and technology within the sector, this means that SMEs continue to struggle to access credit as we emerge from the COVID-19 pandemic (ibid.). Through machine learning, this start-up therefore aims to create a more inclusive, accessible and frictionless customer journey where businesses can get quicker access to growth capital.

In India, using AI applications alongside other technologies is becoming popular among FinTech start-ups, and analysis suggests they will play a key role in transforming the future of Indian financial services. Their use spans from reducing fraud in e-commerce,

to helping financial institutions to automate and digitise analytical processes and help with credit evaluations, improving access to working capital finance (Agarwal 2019).

The extent to which ETP is being used across the Caribbean remains unclear, with little evidence of FinTech start-ups using these technologies in their operations. However, some interest has been shown with, for example, the FinTech, Jefa, which hopes to build a FinTech start-up offering digital accounts, with a product specifically designed for women living in Latin America and the Caribbean (Dillet 2021). The aim would be to reduce the problems that women face when opening a bank account and managing it, such as being able to hold a minimum balance (Dillet 2020).

Analysis has also shown that the introduction of regulation in this respect would encourage the use of ETP in the Caribbean, by providing certainty of the regulatory framework within which the different technologies are being used (Legal500, 2021). Furthermore, the creation of technology zones to attract information technology companies in countries such as Barbados, could encourage the development of ETP technologies (Business Barbados 2019).

Like the Caribbean, there is little evidence of Pacific small states leveraging ETP in order to advance their FinTech sector. Evidence of countries using these technologies in the region comes mainly from Australia. In the country, the government has pledged to invest US$800 million of funding to help support the tech sector as part of the Digital Economy Strategy, with the establishment of a national AI centre planned (Wood 2021). So far, AI technology in the country has already been used by FinTech companies in order to help them make loan application decisions (ibid.).

COVID-19 has forced Canadian banks to invest in remote channels, as customers have been unable to visit physical branches. This has led to several leading banks in the country using ETP technologies to a greater degree, helping them to strengthen cybersecurity, prevent financial crime and enhance their risk management (Verdict Staff 2021). Top banks are also competing for customers by using AI personalisation and enhanced customer experiences, leveraging customer data and analytics through machine learning to more accurately assess customers' financial needs and provide them with relevant offers (ibid).

In the UK, ETP in financial services has been on the government radar since 2019, when it announced plans to set up a forum looking at the impact of AI and machine learning on financial services and published a report titled, *Machine Learning in UK Financial Services* (Bank of England 2021). So far, UK FinTech companies have used AI for a wide range of applications, such as combatting fraud, creating AI-managed funds, giving robo-advice and investment research (Carey 2019).

Cloud computing has also allowed for start-ups and industry disruptors to compete with traditional banks, helping them to transform customer experiences, simplify regulatory compliance and utilise cloud resources to scale their services quickly and efficiently according to demand (Microsoft 2021). For example, Capital on Tap, a FinTech business focused on helping smaller businesses thrive, uses cloud computing to help offer SMEs business-focused credit cards that allow for higher limits than regular consumer options, while still being more accessible than larger corporate offerings (ibid.). By using this technology, around 90 per cent

of applicants get an instant application decision within a minute, whereas traditional applications can see customers waiting a week or more for a decision (ibid.).
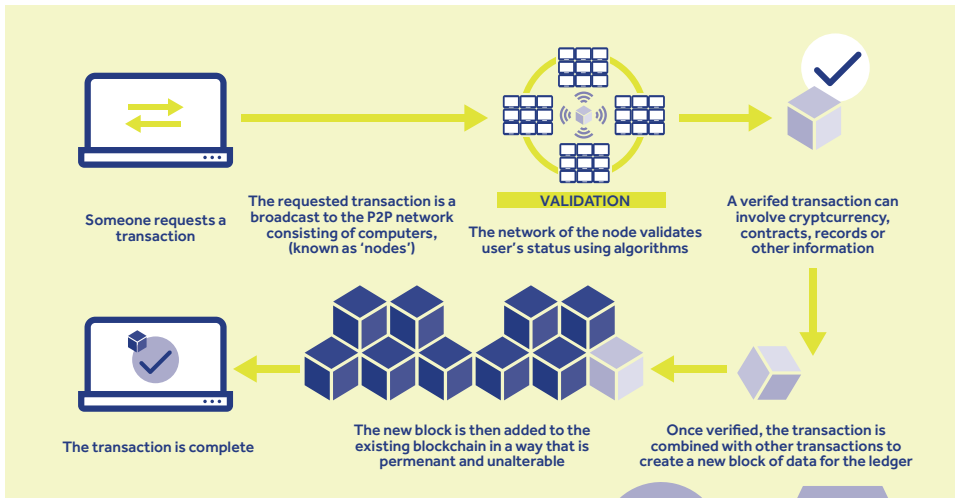
Across Commonwealth countries, the use of enterprise technology provisioning in FinTech varies greatly. Some companies are already at an advanced stage of using the emerging technology within their everyday operations, whereas others have not yet been able to profit from the benefits ETP can provide. Going forward, ensuring a regulatory framework is in place when it comes to ETPs is necessary, as it will help guide FinTech companies and provide them with certainty on what activities they are able to carry out.

2.4 Cryptocurrency

It is difficult to talk about FinTech without discussing cryptocurrency, as more than 300 million people worldwide are estimated to own cryptocurrency. Cryptocurrency is a digital currency that takes the form of 'tokens' or 'coins'. It relies on blockchain technology to create secure encrypted online transactions. Blockchain is a type of peer-to-peer (P2P) database that uses data 'blocks', all of which update one another automatically as they grow, to build an immutable (permanent) record. It is both more secure than other forms of database (because it is harder to insert bad data) and more user-friendly (because it makes it easier to access that data). The security of blockchain is part of the appeal of cryptocurrency.

Bitcoin started operating in 2009 and was the first decentralised cryptocurrency. It took two more years for another cryptocurrency, Namecoin, to emerge. While Bitcoin remains the most popular, there are now more than 10,000 cryptocurrencies in existence.

Figure 2.4 How cryptocurrency works.

Someone requests a transaction

The requested transaction is a broadcast to the P2P network consisting of computers, (known as 'nodes')

VALIDATION

The network of the node validates user's status using algorithms

A verifed transaction can involve cryptcurrency, contracts, records or other information

The transaction is complete

The new block is then added to the existing blockchain in a way that is permenant and unalterable

Once verified, the transaction is combined with other transactions to create a new block of data for the ledger
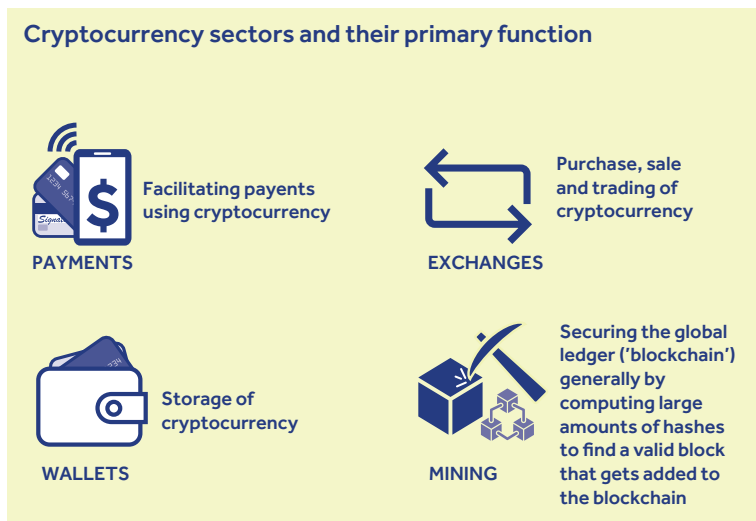
CRYPTOCURRENCY

Cryptocurrency is a medium of exchange, created and stored electronically in the blockchain, using encryption techniques to control the creation of monetary units and to verify the transfer of funds. Bitcoin is the best-known example.
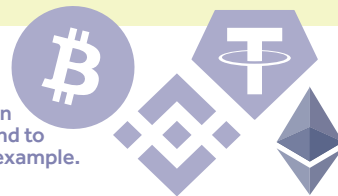
Source: intelligent.com (2021).

Figure 2.5 Cryptocurrency sectors.

Cryptocurrency sectors and their primary function

Facilitating payents using cryptocurrency

PAYMENTS

Purchase, sale and trading of cryptocurrency

EXCHANGES

Storage of cryptocurrency

WALLETS

Securing the global ledger ('blockchain') generally by computing large amounts of hashes to find a valid block that gets added to the blockchain

MINING

Source: Hileman and Rauchs (2017).

Hileman and Rauchs (2017) divide the cryptocurrency industry into four key sectors.

- Exchanges – purchase, sale and trading of cryptocurrency.

- Wallets – storage of cryptocurrency.

- Payments – facilitating payments using cryptocurrency.

- Mining – securing the global ledger (blockchain) generally by computing large amounts of hashes (functions that meet the encrypted demands needed to solve for a blockchain computation) to find a valid block that gets added to the blockchain.

They found that an increasing number of cryptocurrency companies operated across at least two industry sectors, leading to several universal cryptocurrency companies.

Because the value of the currency fluctuates so widely, cryptocurrency tends to be used mainly for speculation. Exchanges are the most important and widely used sector of cryptocurrency, accounting for 90 per cent of all funds sent by cryptoasset services. In the first half of 2019, exchanges sent nearly US$64 billion worth of cryptocurrency (Chainalysis 2020).

While discussion of crypto in this report will focus mainly on cryptocurrency or digital asset exchanges, where most of the activity lies, it is worth briefly mentioning other uses of crypto. Recently more and more retailers and service providers are accepting cryptocurrency for payment, particularly in advanced economies. Some companies even pay their employees in cryptocurrency – a practice seen in tech companies and increasingly in professional sports (Lightman 2021). Cryptocurrencies are not primarily being used as a medium of exchange for daily purchases. However, they are used in online 'darknet' marketplaces to trade illegal goods and services. Foley et al. (2018) 'estimate that around $76 billion of illegal activity per year involves bitcoin (46 per cent of bitcoin transactions), which is close to the scale of the US and European markets for illegal drugs'. Naturally, the illegal share of Bitcoin activity will decline with mainstream interest in Bitcoin and with the emergence of more other cryptocurrencies.

Crypto around the Commonwealth
Countries around the world have taken very different approaches to cryptocurrency adoption and regulation (see Table 2.5). El Salvador made headlines in September 2021 by becoming the first country in the world to accept Bitcoin as legal tender. The move has been met with celebration by cryptocurrency enthusiasts and scepticism by many regulators. While no others have gone as far as making cryptocurrency legal tender, other countries, including the US, UK, Canada, Singapore, Australia and much of Europe, are generally 'cryptocurrency friendly'.

As shown in Figure 2.6, with 9.4 per cent of its population owning cryptocurrency, Singapore has the highest number of crypto owners per capita in the Commonwealth. The country is at the forefront of technology adoption and advancement and is generally considered to be welcoming to cryptocurrency businesses. However, the Monetary Authority of Singapore is well aware of crypto's potential risks for retail investors. It has been slow to approve businesses that have applied for 'digital payment token services', with only three licences currently granted at the time of writing (along with 103 applications rejected and 70 pending an outcome). India is another big crypto player in Commonwealth Asia. However, despite having the highest absolute number of cryptocurrency owners in the Commonwealth (more than 100

Box 2.1 Cryptocurrency regulation in selected Commonwealth countries.

United Kingdom

In the United Kingdom, the Financial Conduct Authority (FCA) requires all cryptoasset businesses to be registered and to comply with Money Laundering Regulations.

Australia

Cryptocurrency is subject to anti-money laundering and counter-terrorism financing laws and capital gains tax (CGT). Crypto exchanges must also be registered with the Australian Transaction Reports and Analysis Centre. Australia is updating its payments regulations and will require firms that buy and sell cryptocurrencies to be licensed.

Canada

Crypto transactions are legal in Canada and are treated as a commodity, and is therefore classified as business income. They are regulated primarily under securities laws. Firms dealing with cryptocurrencies are supposed to register themselves with the Financial Transactions and Reports Analysis Centre of Canada (FINTRAC).

Singapore

Singapore has been at the forefront of technology adoption and advancement and is considered to have a friendly regulatory environment for cryptocurrency. Crypto exchanges are regulated under the Payment Services Act and must comply with anti-money laundering (AML)/countering financing of terrorism (CFT) laws.

South Africa

While South Africa does not have specific laws governing cryptocurrencies, the Financial Sector Conduct Authority is set to release new cryptocurrency regulations in 2022.

Malta

Malta is considered a leader in crypto regulation. It was the first country to enact a trio of digital assets-related acts (the Malta Digital Innovation Authority Act, the Innovative Technology Arrangements and Services Act and the Virtual Financial Assets Act), along with blockchain legislation. The cryptocurrency legislation is a new regulatory framework launched by the government in 2018 that regulates crypto exchanges. Further, the Malta Digital Innovation Authority was set up to review crypto policy and ensure ethical use of crypto.

Nigeria

The Central Bank of Nigeria has argued that cryptocurrency is illegal and has advised banks to close the accounts of individuals or entities operating in cryptocurrency exchanges in Nigeria. However, Nigeria's Securities Exchange Commission (SEC) asserts that cryptoassets are securities and, as such, fall under its regulatory responsibility.

India

While a previous ban on the use of cryptocurrency was reversed by the Supreme Court, the Indian parliament was due to consider a Cryptocurrency and Regulation of Official Digital Currency Bill 2021. The bill seeks to prohibit all 'private cryptocurrencies' in India. However, it allows for certain exceptions to promote the underlying technology of cryptocurrency and its uses.

Source: Various national reporting agencies.

million), regulators in India have taken a tentative approach to crypto. The Reserve Bank of India (RBI) has cautioned banks and financial institutions in India, asking them to be wary of doing business with crypto exchanges. RBI's earlier directive banning banks from supporting crypto transactions was overturned by the Supreme Court

Figure 2.6 Cryptocurrency use by region.*
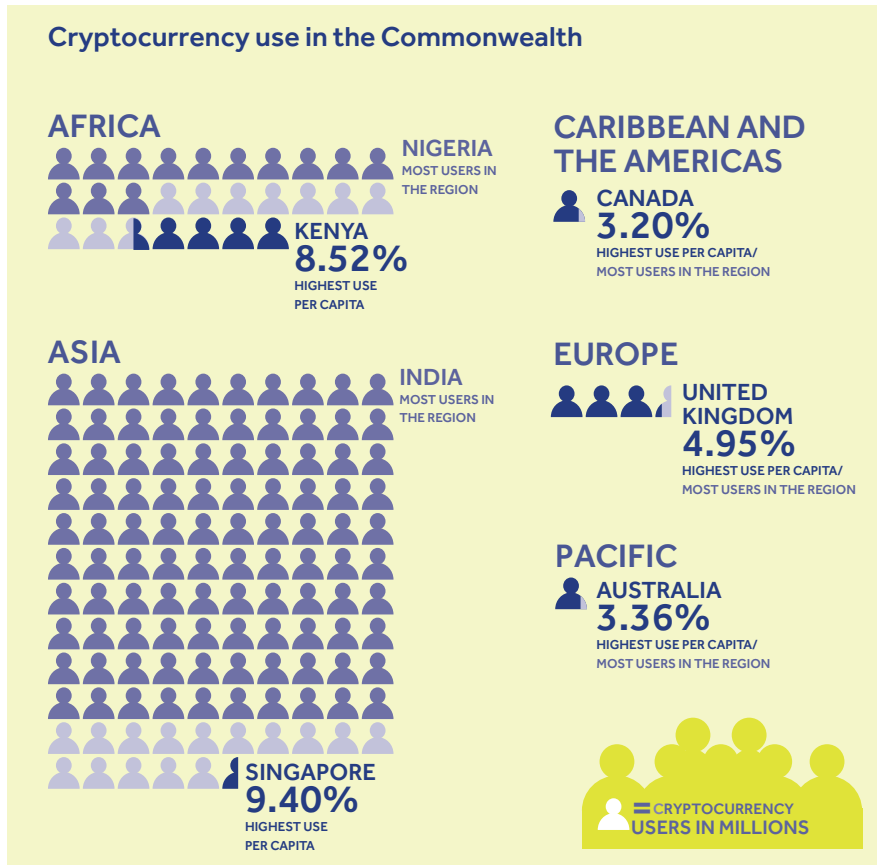
in 2020. At the time of this research, the government was proposing to introduce the Cryptocurrency and Regulation of Official Digital Currency Bill 2021, which seeks to prohibit all 'private cryptocurrencies' in India. However, it allows for certain exceptions to promote the underlying technology of cryptocurrency and its uses.

African countries have among the highest rates of crypto ownership in the Commonwealth (Figure 2.6). Kenya leads the region with 8.52 per cent of its population owning crypto, followed by South Africa with 7.11 per cent. Chainalysis also ranked Kenya as number one in the world for peer-to-peer

crypto trading in 2021. Nigeria has the highest absolute number of crypto owners in Commonwealth Africa with 13 million people – 6.31 per cent of the population. Perhaps somewhat surprisingly, Nigeria is second only to the US in terms of Bitcoin trading. The dollar volume of crypto received by users in Nigeria more than tripled in 6 months, rising from US$684 million in December 2020 to US$2.4 billion in May 2021. The growth of cryptocurrencies has persisted, despite the Central Bank of Nigeria barring their use in local banks. Nigerians continue to engage in peer-to-peer trades or sending payments directly to each other. Ohuocha and George (2021) suggest that, 'Nigerians are turning

to crypto business to protect their savings … and to send payments abroad because it is often hard to obtain US dollars'. This prevalence of crypto has likely accelerated the development of Nigeria's central bank digital currency, the eNaira, which was launched in October 2021.

In the Caribbean, crypto ownership rates are low, averaging around 1 per cent. Notwithstanding these figures, crypto is set to grow in the region. In September 2021, FTX, the world's third largest cryptocurrency exchange, relocated from Hong Kong to The Bahamas – citing The Bahamas' proactive stance on cryptocurrency regulation as the primary driver behind the move.

Cryptocurrency is viewed as an opportunity for advancing development in some Pacific island countries. In Tonga, Member of Parliament (MP) Lord Fusitu'a is drafting a bill to follow El Salvador's lead and make Bitcoin a legal tender in the country. As 40 per cent of Tonga's GDP comes from remittances, using cryptocurrency could prove cheaper and faster. Marshall Islands is also considering the adoption of a CBDC. However, some countries in the region, like Vanuatu, have legally prohibited crypto trading.

2.5 Alternative credit

Credit markets around the world are undergoing a transformation fuelled by the rise of 'alternative credit', which is facilitated by online platforms rather than traditional banks or lending companies (Cornelli et al. 2020). This change is driven by a big data movement, where financial services are now able to utilise copious quantities of information from a wider range of sources. They turn this data into digestible and actionable formats to create innovate credit scoring systems and quickly identify risk associated with loan applicants (GDS Link 2017). Through this landscape transition and FinTech platform

growth within the lending industry, potential borrowers with low credit scores and short credit histories have a much higher acceptance probability, adjoined with lower interest rates on loans, in comparison to the traditional lending model (Di Maggio et al. 2021). Furthermore, not only does funding loans to these types of borrowers lead to better economic outcomes for them, but also to higher returns for the FinTech platform (ibid.).

So, what is big data?

'Big data' consist of all data gathered by electronic devices that can be processed with certain algorithms and analysis methods, namely machine learning (ML) and artificial intelligence (AI), to manage and extract valuable pieces of information that can predict consumer behaviour and help develop strategies. It is often expressed in terms of its five V's – that is, its volume, velocity, variety, value and veracity.

1. **Volume:** how big the dataset is. Total global data stood at 64.2 zettabytes in 2020, and is expected to increase to 181 zettabytes by 2025.

2. **Velocity:** the speed of data collection and analysis. There are five types of data velocity:

    a.   real-time

    b.   near real-time

    c.   batch

    d.   custom

    e.   analytical.

3. **Variety:** forms, structure and sources of data.

    •   Structured data: numeric, financial transactions and so on.

    •   Unstructured data: audio, tweets, texts and so on.

4. **Value:** the insight gained from exploiting the data. Is the data relevant and complete, or is it a distraction or misleading?

5. **Veracity:** the accuracy, reliability and quality of the data. Can the insights from the data be trusted, and the discrepancies identified?
    (Cornelli et al. 2020; Khan et al. 2014)

Why is big data important?

In 2011, there was approximately 5 zettabytes of data consumed globally; in just ten years, this has increased more than 15-fold, standing at 79 zettabytes in 2021 (Statista 2021a). Per minute, google receives 5.7 million searches, 6 million people make purchases online, Venmo users send US$304,000 and social media outlets such as Twitter have 575,000 tweets (Domo 2021). Therefore, as big data fuels AI, with data analytics using machine learning to find meaningful patterns in the data, this expected exponential growth in the volume and availability of alternative data provides ample opportunity for both FinTech firms to develop aggressive strategies and FinTech consumers to receive products and services that would otherwise be inaccessible in the traditional marketplace. For example, the McKinsey Global Institute (2011) estimated that a retailer using big data could increase its operating margin by more than 60 per cent. For unbanked consumers who lack credit histories, big data offers ways for them to access alternative credit, through utilising innovate credit risk scoring methods.

Big data has a myriad of applicable uses within FinTech, including personalised market and customer segmentation, regulatory compliance and fraud detection, customer service, and credit assessment (Pathak 2021). According to the Cambridge Centre for Alternative Finance (CCAF),

World Bank and World Economic Forum (2020), credit assessment activities using big data, within the alternative data and data analytics segment of FinTech market offerings, received the most focus in 2020. FinTech verticals within this segment saw an increase in transaction volumes of 14 per cent between 2019 and 2020. KPMG (2020) further stated that the identified trend to watch globally was data analytics in financial services, as FIs (financial institutions) looked to gain access to alternative sources of data to enrich their understanding of customers and their risk exposure. The major focus on alternative data and data analytics comes from their ability to shift credit lending away from the outdated traditional model to a new sophisticated alternative credit decision model that utilises and analyses unconventional multidimensional data sources to support credit decisions, as shown in Table 2.5. The information advantage here is that more real-time financial data is consistently being analysed, which does a better job of assessing borrowers' capacity to repay loans in comparison to traditional models using lagging financial histories. Furthermore, behavioural information better captures borrowers' willingness to repay (Huang et al. 2020). This has enabled FIs to enhance the accuracy, scalability and efficiency of their credit decisioning processes (PWC 2021).

Due to the technologies involved and urgent need for support mechanisms of faster authorisations and admission to a regulatory sandbox for alternative credit and data analytic firms (CCAF et al. 2020), this FinTech segment, although potentially globally beneficial, is only excelling in certain regions, while the challenges still withhold progress in others. It has been shown that this FinTech segment is mostly employed

Table 2.5 Traditional and new credit risk model.

Traditional credit risk model	New credit risk model using data analytics
• Payment history	• Social media activities
• Length of credit history	• Transaction history through mobile money
• Outstanding debt	• Mobile phone usage patterns
• Debt-to-credit ratio	• Utility bill payment history
• Pursuit of new credit	• Physical locations of activities
• On-time payments	• Identity verifications
• Collateral assets	

Sources: insideBigData 2020; Hurley and Adebayo 2016; Bazarbash 2019; Sirignano, Sadhwani and Giesecke 2018.

in developed countries with higher GDP per capita, higher banking sector mark-ups, less stringent banking regulation, greater ease of doing business, advanced judicial systems, developed bond and equity markets, lower bank credit-to-deposit ratios, and fewer bank branches per capita (Cornelli et al. 2020).

This holds true when identifying regional interest in alternative credit and data analytics. KPMG (2020) state that there is a strong focus on alternative credit models and lending among Australia's FinTech. In Southeast Asia, there is a significant growth opportunity, although regulatory requirements in this segment are still largely under development. Having said that, Singapore is successfully implementing regulatory frameworks, due to the high adoption rate of AI/ML in alternative credit and data analytics (PWC 2021). This includes details on how to responsibly use AI and data analytics in the financial sector, as described by the Monetary Authority of Singapore (MAS), and a model AI governance framework that was developed by the Infocomm Media Development Authority in order improve understanding of, and trust in, AI (ibid.). Attempting to mainstream the use of AI by including it in the development of a national framework has also been undertaken in Malaysia.

In the UK, big data and data analytics in financial services are already well established, with expected prolific growth in the coming years (Analytics Insight 2021). Similarly for Canada, the general big data and analytics market is expected to grow at a compound annual growth rate (CAGR) of 9.4 per cent by 2022, with big data technologies becoming one of the top software investment priorities to derive meaningful insights and to drive the future adoption of AI (ibid.).

Despite being more prevalent in developed countries, the application of big data in alternative credit has substantial benefits for developing countries, with findings showing that alternate credit scoring based on mobile and social footprints can expand credit access for individuals who lack credit scores without adversely impacting the default outcomes (Agarwal et al. 2021). Furthermore, for low-income borrowers residing in areas facing high financial exclusion, the use of alternative data to inform credit determination will hold a much larger marginal benefit (ibid.). This is because households in lower-income economies may lack records of past borrowing behaviour, while their wages are often paid in cash and they may not have any registered savings or assets that could be used as collateral.

When traditional lenders cannot access such information, populations in these environments are often left without credit options, or with exceedingly high interest rates or continuous microcredit lending cycles (McKinsey&Co. 2013).

By utilising new credit risk models based on data and information on mobile phone usage patterns, utility bill payment history, transaction history through mobile money for those who do not have traditional financial accounts, social media profile data, identity verifications for fraud reduction, and willingness to repay based on consumer history, providers can move beyond simple lending to help customers make good financial decisions, offer the right non-credit products and conduct marketing in ways that are more likely to resonate for distinct segments (ibid.). For example, in India, a report has shown that more than 129 million people within the category labelled as potential mass adopters for consumer credit have been deprived of credit due to a lack of credit history (Agarwal et al, 2021). However, this same population were active mobile phone users, who shop online and have a good social media presence. In this case, it was found that the mobile and social footprint has significantly more predictive power than the traditional credit score used by banks, underscoring the importance and opportunity for using alternative data for credit scoring.

According to a recent survey by the CCAF, World Bank and WEF (2020), in sub-Saharan Africa, only 2 per cent of respondents claimed to be a FinTech vertical in the alternative credit and data analytics segment, while the payments sector still dominates. This may be the case, but there is growing interest in the potential of AI and machine learning credit scoring, particularly due to the region's remarkably high mobile

penetration and usage rate (Statista 2021b). With low access to relevant traditional data making it difficult for banks and lenders to make decisions regarding potential borrowers, the use of AI fuelled by big data to offer alternative credit scoring can fill a large gap within the largely unbanked population (Santosdiaz 2021). An example of a FinTech company taking initiative on this is Credolab. It is present in South Africa, Nigeria, Kenya and Ghana and has embedded a mobile software development kit (SDK) into lenders' banking apps to collect privacy-consented micro-behavioural data points, such as the percentage of 'selfies' on a customer's phone, the number of games installed, videos created per month, if a virtual private network (VPN) is used, and even the speed at which they type – all collected once one applies for a loan.

However, overall, across Commonwealth Africa, the region is still in the early stages, with AI credit scoring, using digital footprints instead of financial footprints for unbanked customers, taking relatively small steps due to ongoing concerns about metric reliability and customer privacy. Nonetheless, with changes to Basel III and IV, a global regulatory framework for the financial sector that will allow for more sophisticated credit scoring methods, it is possible that the African region, although still catching up, has the potential to 'leapfrog' into this phenomenon, as it has done with mobile money (Nieburg 2021).

There is also a lot of scope for alternative credit risk models for the large unbanked population in the Pacific region, who struggle to access credit due to lack of a credit history and large reliance on cash transactions. However, this region has also reported very low rates of FinTech use within the alternative credit and data analytics

Figure 2.7 Landscape of FinTech technologies across the Commonwealth.
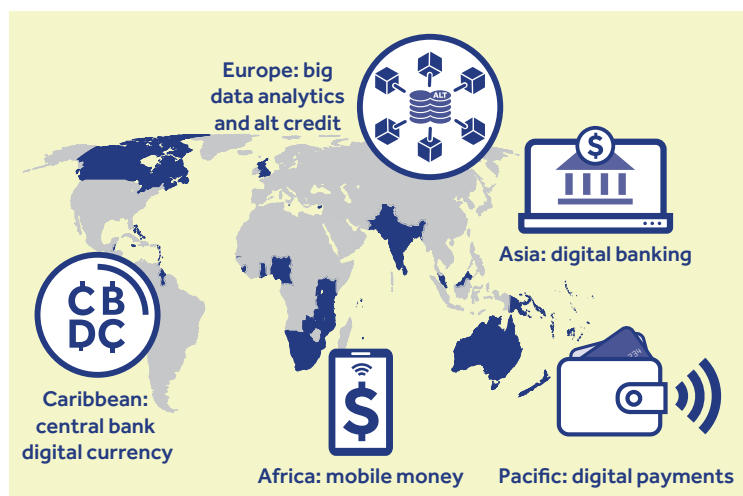
Source: Commonwealth Secretariat.

segment (CCAF et al. 2020). This can be partly explained as the region has one of the lowest mobile internet penetration rates in the world, limiting the capacity for big data collection (GSMA 2019). This is important, as although ML innovation can improve access to funding for borrowers with a good digital footprint, it can actually reduce it for those with poor digital footprints (Berg et al. 2020). This highlights the prerequisite conditions that need to be in place, so that big data can be collected and efficiently processed to allow for alternative credit to achieve its potential among those previously without access to finance.

2.6 The FinTech landscape in the Commonwealth

So far, this report has examined the most common FinTech applications in the Commonwealth. However, these applications are not equally prevalent across the regions. In fact, a review of the key literature on major FinTech issues reveals great regional diversity in the types of market and FinTech business models and technologies developed

throughout the Commonwealth.[1] As shown in Figure 2.7, African nations are pioneers in mobile money, e-wallets and innovation in payment systems. Meanwhile, Caribbean nations are pioneers in central bank digital countries and the development of national payment systems. In Asia, digital banking is dominant, while digital payments are growing in the Pacific and Europe uses big data analytics and alternative credit more than other regions. Naturally, there are differences within regions as well. Singapore, the UK and Canada are each among the world's largest FinTech markets, characterised by very high levels of investment, market competition and a diversity of business models.

These differing trends beg the question: why are some applications more popular in some countries than others? It can be argued that FinTech applications are being employed to respond to country-specific contexts.

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1 See the Appendix for further information on the literature review.

As such, central bank digital currencies are a better fit to tackle the challenges of small island countries in the Caribbean than those of Asian Commonwealth countries. Similarly, mobile money seems to better resonate with the developing economies of Africa than the advanced economies in Europe. This section explores why the applications listed in Figure 2.7 are prevalent in the regions by looking at both the features of the application and the contexts of the countries.

Mobile money in Africa

As mentioned in Section 2.1, the sub-Saharan African region was responsible for 70 per cent of the total global transaction value in mobile money, at US$697.7 billion of the total US$1.0 trillion (Table 2.2). The region also houses more than half of the total global live mobile money services, just under half the global number of registered accounts, at 605 million, and 68 per cent of the total transaction volume, at 36.6 billion transactions (GSMA 2022).

Africa's mobile money dominance began with the rollout of M-Pesa in Kenya in 2007. A review of M-Pesa's origins shows that mobile money took shape to address a particular need for financial services in villages and rural parts of the country. The Vodafone group initiated the project in 2003 to look into whether or not mobile technology could be used to increase financial inclusion through the provision of microcredit (FinTech Journeys: Mobile Money in Kenya, 2020). However, early trials showed that participants were not using M-Pesa to repay microloans as intended, but rather for person-to-person money transfers. In an interview for the Commonwealth's 'FinTech Journeys' podcast, Nick Hughes, then Head of Social Innovation and Mobile Payment Solutions at Vodafone, noted:

We observed some interesting features, like one loan customer would regularly load money into their wallet, and then take it all out again, back in Nairobi, a couple of hours later. What they were doing was, they didn't want to carry cash on the public transport system, they wanted to securely lock it away in electronic format in their wallet and then cash in later. ... it became very clear to us during that process was actually there's a person-to-person money transfer opportunity here that's much bigger, and potentially much more relevant than the microfinance and loan repayment proposition. And so we turned off all that complexity, we simplified the products user interface.

M-Pesa's growth in Kenya was the result of four main factors. First, there was a large unbanked population with a need for financial transactions. In 2006, 73.6 per cent of the adult population in Kenya had no access to formal financial services. Second, there was high mobile phone penetration in the country. Safricom – M-Pesa's mobile operator – had more than 50 per cent of the market share in Kenya in 2007, while 60 per cent of the population had mobile phone network coverage. Third, a key feature of mobile money is that is does not require a bank account for transactions, but rather operates on a system of agents which have far greater reach than ATMs or banks.

Finally, M-Pesa was able to develop and thrive because of the Central Bank of Kenya's supportive approach to the concept. Although the idea of mobile money was still new, the central bank was progressive and allowed 'regulation to follow innovation', while still maintaining oversight. It agreed that mobile money agents needed only limited requirements to enter the business, as they were not providing banking services;

meanwhile, the operator behaved as if it was regulated and periodically reported financial and usage data, as banks do.

Digital banking in Asia

The FinTech landscape across Commonwealth Asia presents a mixed picture. Singapore is a noted FinTech global leader and is among the top five global hubs for FinTech start-ups (Findexable 2021). India is also a notable player for FinTech and is home to two global hubs – Bangalore and Mumbai-Pune. However, India is also challenged with low financial inclusion rates and poor digital connectivity in rural areas. In the region, Pakistan and Bangladesh have particularly low rates of financial inclusion, with 2017 figures at 50 per cent and 21 per cent respectively (Demirgüç-Kunt et al. 2017).

Despite these differences across countries, digital transformation is taking hold in the region. The main market trends relate digital banks and financial and digital inclusion. The launch of the Unified Payments Interface (UPI) in India in 2016 has helped to boost and accelerate digital payments and digital banking. UPI is a system that powers multiple bank accounts into a single mobile application, merging several banking features, seamless fund routing and merchant payments under one umbrella. The system now accounts for 60 per cent of total digital payments by volume, with the value of digital payments growing from US$61 billion in financial year 2016 to US$300 billion in financial year 2021. The boom in UPI and digital payments is credited to cheap internet data, high smartphone penetration and India's biometric identity card (Aadhaar), which was introduced in 2010 (Chadha 2021). This rise in digital banking and digital payments has supported the rise in financial inclusion in India, with rates growing from 53.1 per cent in 2014 to 79.9 per cent in 2017 (Global Financial Inclusion database 2018).

CBDCs in the Caribbean

With The Bahamas being the first country in the world to fully launch a CBDC, followed a few months later by four of the seven countries in the Organisation of Eastern Caribbean States, the Caribbean is generally considered to be a pioneer in CBDCs. Cover-Kus (2021) posits that the characteristics of small states make them more likely to benefit from CBDCs and less likely to suffer the risks. Specifically, five features of Commonwealth Caribbean countries make CBDCs a good fit for responding to their challenges.

- **Varying financial inclusion rates:** In countries like The Bahamas, whose populations are spread unevenly across many islands, the more remote places do not have easy access to banks. Furthermore, should a natural disaster strike, even those islands with bank branches may find themselves unable to access services. In fact, the Central Bank of The Bahamas has stated that increasing financial inclusion was a key motivation for implementing the Sand Dollar.

- **Threat of de-risking:** Since the 2008 global financial crisis, several banks in the Caribbean have lost correspondent banking relationships, which has negatively affected their economies. This de-risking practice further incentivises the need for alternative payment options. Ramachandran and Rehermann (2017) assert that blockchain technology, in particular, can help with de-risking by reducing the regulatory compliance costs associated with 'know your customer' (KYC) requirements and by increasing the transparency of transactions.

More specifically, IMD (2020) argues that adopting CBDCs serves to minimise risk in the financial system, as authorities can take the role of monitoring the flow of funds (in this case CBDCs) away from banks.

• **Costly domestic financial markets:** Many countries in the region have small domestic markets, with relatively modest financial sectors serviced by few banks and other financial institutions. With small populations, narrow production bases and a high dependence on imports, there are often high transaction costs for banking. These high costs restrict access to credit for both households and businesses. Additionally, high vulnerability to natural disasters increases the perceived risk premium associated with doing business in these economies and further raises costs. These conditions make the region receptive to low-cost banking solutions.

• **Small private sector:** On balance, there is little incentive for incumbent traditional banks in the region to increase financial inclusion, particularly for residents in sparsely populated islands. Likewise, it is also difficult for FinTech start-ups to break into the domestic market to address the issue and the start-up costs to serve a small consumer base are likely to be prohibitive. Thus, public sector intervention is required to help small states capitalise on the benefits of FinTech. Regulator-driven CBDCs are likely the only way for small states to use FinTech solutions to address the problems of financial exclusion and de-risking.

• **Geographic advantage:** Finally, the island nature of Caribbean countries

allows them to conduct controlled self-contained pilots to safely test the risks of CBDC adoption. The Bahamas tested the Sand Dollar for several months on two different islands before it was rolled out nationally. Similarly, the Eastern Caribbean Central Bank is testing its digital currency, DCash, in four of the seven countries in its jurisdiction.

Big data and alternative credit in Europe
The Commonwealth member states in Europe, particularly the UK, are world leaders on many aspects of FinTech. *The Kalifa Review*, an independent report on the UK's FinTech sector, shows that the UK is a magnet for global FinTechs and investors, making up around 10 per cent of the global market (HM Treasury 2021). It also notes that the UK is especially strong in WealthTech (including personal finance management and cryptocurrencies), payment technology and banking.

With all these areas of strength, it is natural to wonder why big data and alternative credit have been identified as the dominant feature for Commonwealth Europe. Section 2.6 notes that big data has a variety of applicable uses within FinTech, including personalised market and customer segmentation, regulatory compliance and fraud detection, customer service, and credit assessment. In particular, its use in credit assessment and customer segmentation has the potential to boost financial inclusion – an issue that continues to challenge many developing countries. However, the research shows that big data and data analytics are more widely used in advanced economies. In the UK, big data and data analytics in financial services are already well established, with expected prolific growth in coming years (Analytics Insight 2021).

As noted above, Cornelli and others (2020) assert that big data and data analytics

have mostly been employed in developed countries with higher GDP per capita, higher banking sector mark-ups, less stringent banking regulation, greater ease of doing business, advanced judicial systems, developed bond and equity markets, lower bank credit-to-deposit ratios, and fewer bank branches per capita.

The UK's regulatory environment has played a big role in allowing it to capitalise on big data and data analytics in FinTech. The Financial Conduct Authority pioneered the introduction of regulatory sandboxes in 2014 as part of Project Innovate, a programme aimed at removing unnecessary barriers to innovation for businesses involved in banking and finance in the United Kingdom. Regulatory sandboxes have been hailed as key components of progressive and innovation-friendly jurisdictions. Moreover, the UK implemented open banking regulations in 2018, which further facilitates financial innovation. Open banking grants certain types of access to customers' personal and financial data to third-party financial service providers through open application programming interfaces (API), subject to appropriate customer consent. Open banking enables big data use and can facilitate account aggregation, credit risk checking and the setting up bank accounts.

Digital payments in the Pacific
In many ways, the challenges of the Pacific are like those of the Caribbean. The small island developing states (SIDS) in both regions struggle with financial inclusion for populations on remote islands, have costly domestic financial markets, have suffered from de-risking and have small private sectors. Given these similarities, it is natural to wonder why the Pacific SIDS are not also making progress on CBDCs.

A closer look at the literature shows that financial inclusion problems and digital infrastructure challenges loom larger in the Pacific. The adoption of financial and digital inclusion strategies is a key topic for the Pacific islands, and the literature emphasises how FinTech firms can play a pivotal role in solving financial inclusion challenges in the region. Most of the reports reviewed emphasised the need for financial and digital literacy in the population as a critical area of concern across the region.

Another critical difference between the Caribbean and the Pacific is the role of remittances in the economy. The Pacific depends more heavily on remittances, with personal remittances received among Commonwealth members averaging 12.1 per cent of GDP in 2020, with rates as high as 38.9 per cent in Samoa. By contrast, the average among Commonwealth members in the Caribbean in 2020 was 7.1 per cent of GDP, with Jamaica having the highest rate at 22.2 per cent of GDP. As CBDCs are not suitable for cross-border payments, they do not fit the needs of Pacific SIDS as well as digital payments do.

Despite a large dependency on remittances, the transaction costs of sending remittances are high, at around 12 per cent of the total transaction value. To address this issue, new online channels have been promoted by regulators and development partners in the Pacific. Additionally, FinTech firms have helped to lower the average transaction cost of sending remittances through digital channels. As a result, there has been a substantial shift to digital remittances, a move accelerated by the COVID-19 pandemic (UNCDF 2021).

Considering this context, digital payments, wallets and e-money are frequently discussed

in the literature. These innovations have been impacted by the growth in mobile phone use by the population, mainly for money remittances in places like Fiji, Samoa and Tonga. The literature on the region highlights the importance of digital transformation, digital banks, crypto/digital assets, the promotion of a cashless society and the need to develop the digital financial sector in islands such as Nauru, Kiribati and Tuvalu.

Chapter 3

Understanding the FinTech Drivers

Understanding the FinTech Drivers

As the previous section shows, country context is very important to the growth and development of FinTech. In particular, the reason why specific FinTech applications have grown more in some countries or regions than others is due to specific demand and supply drivers. Demand-side drivers increase the need for technology-enabled financial services, while supply-side drivers provide an environment that facilitates FinTech growth. Appreciating the demand and supply factors in more depth allows governments to understand the opportunities and challenges for FinTech across Commonwealth countries. This section of the report reviews the demand- and supply-side drivers that have influenced FinTech development and growth.

3.1 Demand-side drivers

On the demand side, there are drivers led by consumers which serve to either push or restrict the development and use of FinTech. To enable the well-functioning use of FinTech, it is crucial that its consumers are listened to if both applications and technologies are to take hold. Analysis by Harasim (2021) asserts that demand-side drivers can be classified into five main categories: unmet customer demand, customer preferences, changing demographics, trust in technology, and changes in customer values. This report adds a sixth factor – financial literacy.

Unmet customer demand

With significant unbanked and underbanked populations, there is notable unmet demand in emerging markets and developing economies. FinTech adoption has therefore been propelled by an unmet demand for financial services and mobile payments have offered a platform for basic banking services. It has also become important by making cross-border transfers of remittances cheaper. It is no surprise then that FinTechs have sprung up in

Figure 3.1 Demand-side drivers of FinTech.
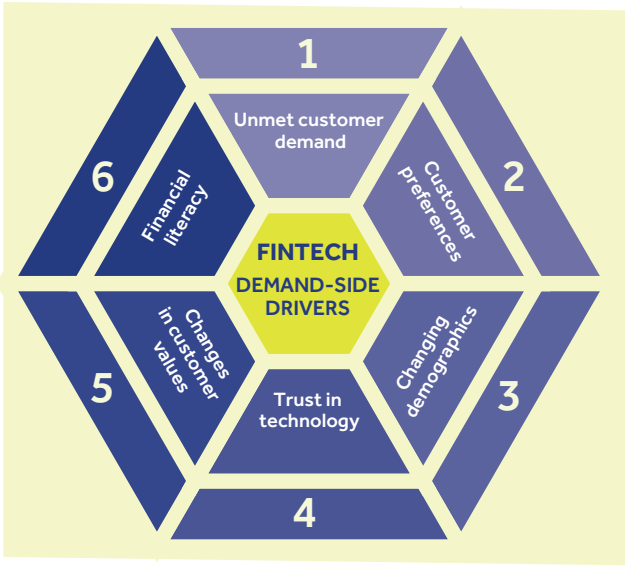
Source: Harasim (2021), as adapted by Commonwealth Secretariat.

those countries to fill the gaps in the financial system left by traditional institutions for banking services and financial products. This has been the case in several Commonwealth countries, for example in Kenya with M-Pesa, the mobile money transfer system. Unmet demand for basic banking and methods of payment meant that M-Pesa was able to fill that gap and successfully build across the African region (Frost 2020).

Customer preferences

The increase in people doing things online has also given rise to the 'anything, anytime, anywhere' on-demand consumer, while the bar of expectation is higher than ever. Consumers strive for convenient solutions across all aspects of their lives, and retailers will have to adapt if they want to remain relevant. This has manifested in financial services, with more customers requesting on-demand high-quality and personalised services, as evidenced with the growth of online banking apps. Consumers no longer want to go into 'brick-and-mortar' banks to complete transactions, preferring to have access to their banking on their laptop or smartphone. COVID-19 has also significantly boosted online financial services, as lockdowns forced banks to temporarily close their branches. The pandemic has changed consumers' attitudes towards conducting business online and made individuals more open to cashless transactions. This preference for online banking has been reflected and tapped into by UK financial institutions with the growth of mobile banking in the UK. There has also been evidence that mobile banking will outpace physical stores in the UK by 2024, demonstrating that UK banks are adapting to their consumers' demands (GBO 2020).

Changing demographics

Several studies have also shown that FinTech usage is higher in regions or countries with younger populations (EY 2017). Throughout the Commonwealth, this demographic factor is visible in countries like South Africa, Nigeria and Kenya, which have young populations and are also hubs when it comes to FinTech innovations. Figures for 2020 show that venture capital funding for African FinTech start-ups had risen by 51 per cent, with funding being generated for virtual banking projects, consumer credit checks and finance apps (England 2021). Furthermore, Nigeria, which received almost two-thirds of Africa's FinTech investments in 2021, has a young and entrepreneurial population. With these younger cohorts entering the market, FinTech adoption will most likely grow, since these customers' preferences and expectations differ significantly from those of older generations (Harasim 2021).

Trust in technology and changing customer values

Trust in technology is also crucial when it comes to FinTech adoption. We have seen that many young people are highly trusting of this nascent technology. However, in older populations, such as in the Caribbean, the adoption of digital financial services for personal use has been slower when compared to other regions, because of a lack of trust. In addition to this, consumers have not been as exposed to what might be considered more innovative offers and services, and so are unlikely to develop the acumen that would allow them to understand, and thereafter consider, the growing FinTech offerings. Caribbean governments also appear to be apprehensive about the technology, therefore making it less likely to be adopted by the wider population.

Furthermore, recent customer behaviour seems to be increasingly driven by ethical belief and there is some evidence that

consumers are more likely to adopt FinTech products as these are seen as more socially responsible (ibid.). For example, we have seen the rise of sustainable FinTech businesses, which have progressive environmental and human rights policies. In the UK, FinTech start-up TreeCard has been put forward as an alternative to traditional debit cards, the goal being reforesting the planet – with 80 per cent of its profits paid to reforestation projects (TreeCard 2022). This demonstrates shifting customer values, as individuals wish to have real impact when it comes to where and how they spend their money.

Financial literacy

Financial literacy affects many other demand-side factors, with limited financial literacy serving as a significant barrier to demand for services. If individuals are not familiar or comfortable with products, they will not demand them. Financial literacy can be defined as, 'equipping people with the know-how to make informed decisions about their personal finances, promoting financial well-being and a more assured participation in financial markets' (European Commission, 2022). Therefore, increased levels of financial literacy make individuals more likely to be aware of and engage with digital financial services, increasing their trust in different products.

Several studies show that financial literacy is positively correlated with both FinTech awareness and use (Yoshino et al. 2020; Morgan and Trinh 2020; Morgan et al. 2019). More financially literate consumers increase the demand for, and responsible use of, digital financial services, helping to underpin financial market stability, improve financial inclusion, and contribute to wider economic growth and development. Improving financial literacy in general, and digital financial literacy in particular, is explored as a key policy recommendation in Section 4.1.

3.2 Supply-side drivers

On the supply-side, there are drivers which serve to either facilitate or restrict the development and use of FinTech. To enable the well-functioning use of FinTech, supply-side intervention may be necessary to create opportunities and address challenges. This intervention includes legislation and regulatory reforms, as well as adequate digital infrastructure. According to Schindler (2017), factors such as technology, regulation and the financial landscape influence the supply of innovative financial products. Frost (2020) proposed similar factors that are driving the supply of FinTech, (see Figure 3.2).

High cost of traditional finance, existing banking infrastructure and level of competition in the financial sector

The high cost of traditional finance is a key supply-side driver of FinTech. Traditional finance has large, fixed investment costs for the creation and maintenance of physical systems and distribution networks. With back and middle offices being revamped or eliminated, some processing costs are being reduced or eliminated. The use of FinTech can spread fixed costs over a larger number of customers, allowing for economies of scale (Feyen et al. 2021). As the scale of operations increases, it leads to better diversification opportunities, reduced liquidity and credit risk, and lower marginal cost of risk management (Mester 2010). Using FinTech to enable the automation of business processes, such as customer due diligence, know your customer, onboarding and data analysis, can also reduce costs, resulting in low value transactions becoming economically viable (Pazarbasioglu et al. 2020).

Furthermore, where interdependent financial services are offered, intermediaries can take advantage of economies of scope,

Figure 3.2 Supply drivers of FinTech.
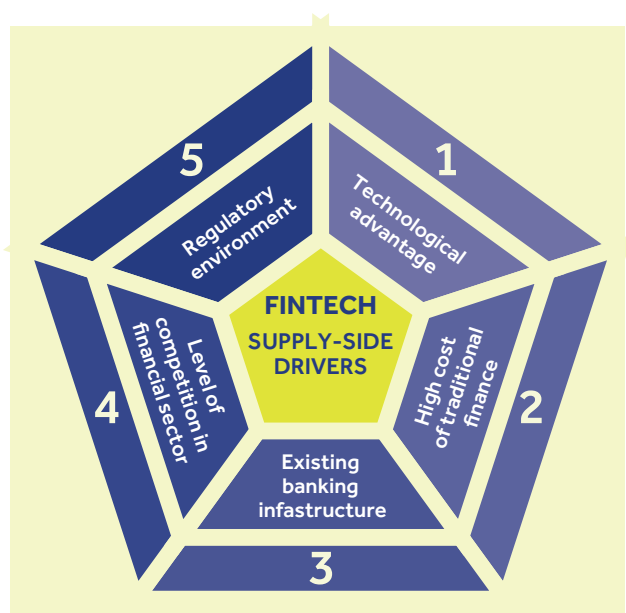
where synergies can be created to reduce costs (Feyen et al. 2021). Despite the increasing use of technology by financial intermediaries to enhance productivity over the past century, it did not translate to a cost reduction for consumers – largely due to the absence of competition in the financial system. As such, FinTech players are encouraged to enter the industry to increase competition and efficiency in the provision of financial services (Philippon 2017; Bazot 2014; BIS 2020). Empirical research by Khera (2021) found that FinTech supply will fill the gap caused by inefficiencies and lack of competition in the traditional financial system.

Allen et al. (2021) used a variety of robust econometric techniques, including principal component analysis, probit estimation, data envelopment and stochastic cost frontier analyses, on 1,502 FinTech companies to test the hypothesis that the integration of FinTech as measured by a FinTech score reduces the unit cost of financial intermediation. The results concluded that intermediates with a higher FinTech score had greater operational efficiency. To address any endogeneity issues in their estimation, they went on to estimate an instrumental variable model to analyse the causality of FinTech adoption and found a positive relationship between the FinTech score and operational efficiency.

The cost of traditional banking in Latin America and the Caribbean, as measured by the ratio of overheads to total assets, is the highest in the world (Rousset et al. 2021). Across the Caribbean, the use of financial technology in the form of CBDCs promises to lower transactions and processing fees, improve efficiency and promote economic growth. The Caribbean region recognises the benefits from CBDCs will result in

Box 3.1 Kenya's Equity Bank: FinTech innovation is reducing costs and increasing revenue

It is expected that financial institutions will innovate under pressure to control and reduce costs and increase revenue and market share. This was the case for Equity Bank in Kenya. Equity Bank was historically a building society that was failing due to its traditional structure. Equity Bank transformed into an innovative and full-service bank by moving beyond a 'bricks-and-mortar' institution, utilising financial technology to create mobile branches that tapped into the previously unbanked population in Kenya. Equity Bank also improved on its service quality by offering financial services in several other minority languages in Kenya. This approach allowed the once-failing building society to grow and transform itself into a financial institution with the largest clientele in Kenya

Sources: Allen et al. 2020; Beck 2020.

the region increasing its traction in such currencies relative to much larger global players. As has been demonstrated by the Eastern Caribbean Central Bank (ECCB) and The Bahamas, cost reductions can be achieved from using CBDCs instead of transferring cash (Electronic Payments International, 2021).

While branch fixed costs may be eliminated by direct connectivity to customers, the technology fixed cost has been variable at

Box 3.2 Digital Eastern Caribbean Currency Dollar: Digital currencies are enhancing operational efficiencies

In 2019, the ECCB launched its pilot for the Digital Eastern Caribbean Currency Dollar (DXCD), as it provided an opportunity to address perennial problems that affected the region, including payment inefficiencies and the high cost of conducting business. Among other benefits, DXCD's transformative potential in the supply of financial technology related to enhanced operational efficiencies, specifically:

• heightened responsiveness;

• lower administrative burden;

• reduced expenses, losses and risk;

• enhanced customer onboarding; and

• seamless treasury operations.

Source: ECCB 2019

Box 3.3 Pakistan, digital financial services and RAAST: Extending financial services to rural communities

In 2008, the State Bank of Pakistan pushed for digital financial services providers to create networks to move towards branchless banking, which resulted in financial services reaching rural communities for the first time in Pakistan. The cost of traditional 'bricks-and-mortar' institutions was too high to cater to these areas, while the cost of the digital infrastructure was approximately 90 per cent lower. This drove its expansion. Recognising the efficiencies facilitated by financial technology, more than ten players entered the digital financial space, with providers such as EasyPaisa and JazzCash serving 70 per cent of digital financial users (Karandaaz 2021). Pakistan launched its first person-to-person instant payment system, RAAST, which used financial technology to enable end-to-end payments for digital users instantaneously from 2021. The system is currently being used to settle small value retail payments in real time and provides cheap and universal access to all players in the financial sector, including commercial banks and FinTech start-ups.

Source: SBP 2021a.

the level of the financial services provider – but remains a high fixed-cost offering from the technology providers. The relevant market for technology infrastructure shifts from financial services to IT/cloud services. The main challenge for traditional finance and other incumbents is that they are restricted by legacy systems. Traditional and high fixed-cost infrastructure cannot be easily adjusted or scaled back (Feyen et al. 2021). As such, not all legacy systems and financial service providers will be able to overcome these challenges and increase the supply of FinTech. In some instances, given the limited competition in several financial systems, incumbents are less interested in innovation and the use of financial technology to reduce costs and are therefore not willing to adapt (ADBI 2020).

Furthermore, in developing countries with shallow capital markets or limited access to venture capital, micro, small and medium size FinTech start-ups will have to face small, costly bank loans with lengthy approval processes, which can further hinder FinTech start-ups (World Bank 2020a).

Digital infrastructure and technological advantage

Another key supply-side driver of FinTech is well-developed financial market and digital infrastructure, which facilitates the easy implementation of FinTech-related projects. FinTech business models are in fact driven by a large network of users through digital platforms (Cornelli et al. 2021). One of the fundamentals to 'leapfrog' to the forefront of a rapidly evolving digital economy is innovation and investment in new technology to promote the development of the information and communication network (Kearney 2015).

Financial sector infrastructure connects the individual participants who collectively comprise of the financial system. Increased connectivity, internet and mobile technology improves the efficiency of the delivery channels for financial services. Until recently, players in the financial system, including non-banks, could not directly access payment and settlement systems and so relied on banks. Infrastructure connectivity and operations through a digital space will allow companies from other sectors to offer financial services

(Feyen et al. 2021), thereby increasing the supply of FinTech. Khera (2021) conducted an empirical analysis of 52 developing countries and found that technological innovation in the payments landscape could address the low access and fill the gap in the traditional banking system. For example, in India, where deep digital infrastructure exists, this enables the modularisation of finance, which allows FinTech providers to innovate (Chugh 2021). The FinTech revolution in India has in fact been enabled on the supply side by digital infrastructure components, including exponentially growing computing power and higher-quality, widespread internet penetration. This allows for faster, safer and more reliable FinTech services (Bhardwaj 2021).

Like the physical infrastructure that promoted the industrial economy, digital infrastructure will accelerate the growth of the digital economy (Monetary Authority of Singapore 2021). In a study conducted by the London School of Economics Capstone Team (2020), a hypothesis of innovation and a well-developed technological infrastructure and driving FinTech formation concluded that there was a positive and statistically significant relationship for a panel dataset of EU member countries between 2000 and 2017. Haddad and Hornuf (2018) conducted research on the US and the EU-27 countries, based on the

premise that FinTech is heavily reliant on new technologies, aiming to test the hypothesis that better supporting infrastructure would increase the supply of FinTech start-up formations. They found a positive and statistically significant relationship between digital infrastructure in the form of mobile telephone subscriptions and secure internet servers and FinTech start-ups, and therefore could not reject the hypothesis that FinTech start-up formations occurred more frequently where supporting digital infrastructure was available.

Digital infrastructure allows new entrants and incumbents to build or rent software platforms and technology operations to grow in tandem with their customer base, while avoiding traditional costs. It also has internationalised back-office functions, such as call centres, to lower-cost environments (Feyen et al. 2021). Technology and innovation are essential to FinTech development, as they promote disruptive business models in financial services as technology becomes more advanced and innovative (McKinsey 2021). For example, digital infrastructure, emerging technologies and innovation such as IndiaStack are the backbone of the FinTech ecosystem in India (PWC 2020). Digital infrastructure will accelerate the supply of cutting-edge FinTech companies and is crucial to financial infrastructure and for digital financial

Box 3.4 Nigeria's FinTech ecosystem: Government support is crucial
The government also plays a significant role in the development and supply of FinTech start-ups as well as their success. Several governments across Africa are providing funding and infrastructural support in an attempt to grow and enhance the digital economy and drive the growth of FinTech companies. To drive the development and growth in technology and digital infrastructure in Nigeria, the federal government proposed six innovation hubs across the country. At the state government level, Lagos formed a public–private partnership to promote community FinTech start-ups by providing uncapped internet and electricity. For the long-term

development of digital infrastructure, the Nigerian Ministry of Science and Technology and the Lagos state government launched a computer programming initiative in 2016, to facilitate the training of more than one million people. If the FinTech ecosystem in Nigeria is to be successful, government support towards the growth of digital infrastructure towards mobile penetration, high-speed broadband and other internet of things (IoT) should continue.

Source: KPMG 2016

Box 3.5   India's digital infrastructure: Strong digital infrastructure allows FinTech to flourish

There are over 2,100 FinTech companies in India, with approximately 1,400 of them being established in the last five years. India's industry cumulative, which is currently valued at approximately US$27 billion, is expected to increase in value to more than US$150 billion in 2025 (Bhardwaj 2021). In 2021, there were 187 FinTech **unicorns** (a FinTech start-up valued at over US$1 billion) globally, of which 18 were from India. A key enabler of the state and growth of FinTech in India is technological advancements and innovations, such as artificial intelligence, blockchain, and machine learning, which blur and remove barriers – thereby facilitating the use of FinTech by well-established institutions, as well as financial intermediaries. Access to internet and smartphone penetration in India has further encouraged the wide and deep dissemination of FinTech start-ups. The backbone of India's FinTech infrastructure continues to drive industries and sectors to embrace FinTech, as start-ups leverage this digital infrastructure to address customer challenges through new or additional offerings (Bhat 2022). Digital infrastructure, **such as the United Payment Interface**, have allowed the ecosystem of payment systems in India to flourish, recording over 3.5 billion transactions in October 2021.

Sources: Kant 2021; Bhat 2022.

services providers to provide better and tailored products (Pazarbasioglu et al. 2020). Platform technologies and big data, coupled with algorithms, continue to increase transparency and efficiency in the offering of FinTech service providers (Carmona et al. 2018).

However, insufficient infrastructure can restrict the growth in the supply of FinTech companies. Economies within the Commonwealth operate at different levels of digital infrastructure. For example, a large percentage Africa's population lack basic infrastructure such as electricity,

internet bandwidth, telecommunications and secure servers to support the digital economy. Infrastructure that is lagging also exists in Pacific Commonwealth countries such as Papua New Guinea, Tonga and Vanuatu, with low network coverage and limited effectiveness of cellular companies to transmit data. The absence of or poor infrastructure can restrict the growth and use of FinTech, while other countries such as Australia and New Zealand have better network coverage, internet speeds and spectrum allocation to facilitate and promote the growth of FinTech (Kumar and Strazdin 2021).

One of the major challenges to the supply of FinTech is the IT infrastructure requirements and the risks inherent in dealing with sensitive information such as credit card numbers, social security and the like. Information protection continues to be essential, while concerns about lack of physical checkpoints on infrastructure and endpoint company devices grow in tandem with FinTech (Tatvasoft 2022). FinTech development in many countries is hindered by underdeveloped ICT infrastructure and a shortage of workers in the technological space (World Bank 2020a).

Regulatory environment

It is vital that regulators and policy-makers ensure continuous protection of both the financial industry and consumers from the potential risks that FinTech poses, as well as overcome any market failures facing the industry, such as informational asymmetries and moral hazard. However, an overbearing and excessive regulatory approach, often common in developing countries to install trust in risk-averse users, can stifle the growth of the FinTech industry and the innovative services it can provide (Acrosights 2021). CCAF (2021) provides support for this by finding that countries with adequate, rather than overbearing or insufficient, regulation had much higher levels of alternative finance per capita. This is partly because excessive regulation can dramatically ramp up the cost of compliance, particularly for start-ups. This can further stifle FinTech growth, as well as prevent existing FinTechs from advancing their product offerings, as they may risk non-compliance (Acrosights 2021).

Frost (2020) provides further insight into several studies that reflect how policy interventions and certain regulatory approaches can both further, and handicap, the development of FinTech. First, it was

stated that higher-quality regulation strongly correlated with increased levels of FinTech credit as a provision of alternative finance (Rau 2019). This demonstrates how consistent, thoroughly established and clear regulation, in comparison to messy or over complicated regulation, can allow FinTechs to understand and easily comply with industry standards. As such, high compliance costs and risks to non-compliance are lowered, enabling FinTechs to operate more freely in the market and enter with no confusion.

Second, Navaretti et al. (2018) find a strong negative correlation between FinTech investment and the stringency of regulation. That is, countries with stricter regulations on the financial sector receive lesser amounts of investment into FinTech. This demonstrates how FinTechs distance themselves as far as possible from over-compliance and high-cost regulation or attempt to solely operate in unregulated sectors, opening up a whole new risk. Claessens et al. (2018) went further on this by demonstrating that although stricter regulation could have a positive effect on trust with new FinTech services, it did hinder the entrance of FinTech start-ups and their innovation, with more stringent banking regulation being negatively associated with the size of the country's FinTech credit market.

If governments treat FinTech as a financially lucrative income source, and as such force high tax upon FinTech companies, then this could prevent existing companies from expanding and start-ups from initiating activity, as they will be driven to relocate where operating costs may be lower or reduce expenditure on innovation. If financial innovations and experimentations are hindered, then consumers will not receive the specific services they require, such as

those wanted in developing countries. As such, the supply of FinTech will not meet demand, and demand for services that are in a ready supply may dwindle (Frost 2020).

With this evidence in mind, it is clear that a priority for policy-makers should be to establish the balance between creating a protective environment for the financial industry and consumers, while giving ample space and facilitation of innovation for FinTechs to expand and supply the services that will provide vast gains for many populations. For example, according to lessons learnt in West Africa for FinTech technologies such as mobile money, it has been noted that a 'laissez-faire' approach

to regulating the industry would most effectively enable the FinTech sector to grow successfully (IGC 2016). This would mean that regulations would in no way act as a barrier or cost, but would still ensure security to the industry and consumers. Furthermore, the regulations should scale and develop in unison with the growth of the sector, keeping up-to-date with evolving requirements and remaining relevant to new technological advances (ibid.). Options for how regulators can reach the optimal balance and choose the most appropriate innovation facilitators, such as sandboxes or innovation hubs, based on the goals, context and environment of a country, are further discussed in section 4.3.

Chapter 4
Filling the Gap:
Tackling Challenges
in FinTech Adoption
and the Way Forward

Filling the Gap: Tackling Challenges in FinTech Adoption and the Way Forward

Over the last decade, it is clear that FinTech has brought about many opportunities for Commonwealth member countries. It is also apparent that FinTech adoption faces several challenges. This chapter discusses recommendations for how to deal with the challenges faced by Commonwealth member countries in this area. These recommendations will focus on three areas: 1) fostering financial literacy; 2) improving digital infrastructure; and 3) facilitating effective FinTech regulation, which can provide guidance for FinTech service providers moving forward.

4.1 Improving financial literacy and financial inclusion

The socioeconomic benefits of good financial literacy have been well documented, with research showing that it can help to improve financial inclusion and contribute to economic growth, financial stability and sustainable development (Widdowson et al. 2007; Lusardi and Mitchell 2014; Grohmann et al. 2017).

Across the Commonwealth, levels of financial literacy vary greatly. Although data were not available for all Commonwealth nations, Standard and Poor's Global Financial Literacy Survey for 2014 (GFLEC 2015) gives an overview of adults who are financially literate as a percentage of total populations across different regions (Table 4.1). Generally, levels of financial literacy for more developed nations were high, with countries such as the United Kingdom and Canada scoring 67 and 68 per cent, respectively. In the African Commonwealth, however, scores were lower, ranging from around 52 per cent in Botswana to 21 per cent in Sierra Leone. Only two Caribbean countries

were represented in the survey, Belize and Jamaica, which both scored 33 per cent. Countries in Commonwealth Asia recorded particularly low levels of financial literacy on

Table 4.1 Levels of financial literacy in selected Commonwealth countries.

Country	Adults who are financially literate (%)
Australia	64
Bangladesh	19
Belize	33
Botswana	52
Cameroon	38
Canada	68
Cyprus	35
Ghana	32
India	24
Jamaica	33
Kenya	38
Malawi	35
Malaysia	36
Malta	44
Mauritius	39
Namibia	27
New Zealand	61
Nigeria	26
Pakistan	26
Rwanda	26
Sierra Leone	21
Singapore	59
South Africa	42
Sri Lanka	35
Tanzania	40
Uganda	34
United Kingdom	67
Zambia	40

Source: GFLEC (2015).

the survey, with Bangladesh scoring 19 per cent and India scoring 24 per cent.

Despite alarmingly low levels of financial literacy in certain countries, we have seen efforts to improve proficiency across all Commonwealth regions. This is essential, as women and those living in rural settings have traditionally been excluded from participating in digital finance.

> Research shows that financial literacy can help improve financial inclusion and contribute to economic growth, financial stability and sustainable development.

South Africa has been particularly active in its financial literacy strategy. Despite work on financial literacy by stakeholders of different financial institutions already taking place, the launch of its National Consumer Financial Education Strategy in 2013 solidified the country's prioritisation of consumer financial education. The strategy aims to provide a framework that will enhance the joint commitment of financial sector policy-makers in consumer financial literacy education and improve consumers'

knowledge of financial management and decisions on product choices, as well as helping them to know where to look for information, objective advice or access to recourse facilities (South Africa National Treasury 2013).

One vehicle that has been particularly successful in delivering financial literacy in the country is television – and specifically the Scandal! soap opera. Findings have shown that viewers of the show in South Africa had greater financial knowledge and were more likely to engage in responsible financial behaviours, such as borrowing from formal sources and avoiding gambling (Calderone 2014). Banks are also required by the regulator to run financial literacy programmes for the financially excluded. These initiatives have allowed South Africa to increase financial literacy to levels higher than in most emerging economies. Nonetheless, large differences in financial literacy by household income remain. Increased levels of financial literacy within these lower-income groups would allow for increased FinTech adoption, as the population is already relatively digitally savvy.

Like South Africa, the Government of Pakistan adopted a National Financial Inclusion Strategy (NFIS) in 2015. Pakistan displayed low levels of financial literacy in the last decade; therefore, making sure this strategy reached several segments of the population was essential. Accordingly, in 2020, the government decided to segment the programme into two components, the National Financial Literacy Program for Adults (NFLP-A) and the National Financial Literacy Program for Youth (NFLP-Y). The NFLP-Y targets three age groups (school-going children, aged 9–12 years; adolescents, aged 13–17 years; and youth,

aged 18–29 years) across 45 selected districts of Pakistan and aims to strengthen young people's money management skills and enhance their understanding of financial matters (State Bank of Pakistan 2020).

More recently, the government has also introduced a 'Banking on Equality – Gender Financial inclusion' policy to encourage women to participate in the financial system. Research has found that the Government of Pakistan's interventions have been implemented successfully, helping to ensure underserved communities are able to participate in the financial system of the country (State Bank of Pakistan 2021b). The hope is also that increasing the levels of financial literacy in the country will increase trust in digital financial services, which has previously been low, with a strong reliance on cash, and in turn help with the adoption of FinTech (Karandaaz 2021).

Canada has some of the highest levels of financial literacy in the world. The country has had a robust approach to financial literacy since 2005, when the Financial Consumer Agency of Canada (FCAC) first began to focus on the topic. Since then, the country has organised a series of national conferences on financial literacy, highlighting existing research, policies and practices in the area of financial capability, and where participants are able to discuss what could be done to improve the situation in Canada. The Canadian government also created a Task Force on Financial Literacy that travelled across Canada to meet with stakeholders, listening to what they had to say about financial literacy and learning from their experience. More recently, certain provinces in the country have also announced that they will be changing their curricula for 6–13-year-olds and increasing the focus on financial management (Financial Consumer Agency Canada 2022).

One area which has been particularly successful is the government's Financial Literacy Month, where every November the Financial Consumer Agency of Canada and organisations across the country work together to raise awareness and spread the word about the importance of financial literacy. Through engagement via both traditional means and social media channels, they invite Canadians to take action to strengthen their financial knowledge. A specific focus to target minority communities has also been undertaken, with the creation of a Financial Literacy Working Group for Indigenous Peoples. This working group works directly with indigenous organisations to develop effective strategies and to respond to the financial literacy needs of indigenous peoples, reporting them to the National Steering Committee on Financial Literacy.

Although some countries have been able to carry out a large number of financial literacy strategies in recent years, challenges in terms of implementation remain. Overall, there are still obstacles to convincing governments and financial institutions to attach high importance to the development of the financial literacy of their citizens and to design policy, in collaboration with social partners and other stakeholders, to promote basic financial literacy education (OECD 2015). Although many governments are aware and agree that in order to reach financial stability within their countries they should raise the financial literacy level of their citizens and create strategies to do this, these strategies are sometimes not implemented fully, or at all.

Once strategies are implemented, challenges are still present, with a wide range of actors usually engaged in the design and delivery of financial education

training. This can sometimes mean that financial literacy efforts are not well co-ordinated, causing fragmentation and a duplication of efforts. For example, financial education curricula in schools are usually implemented in collaborative partnerships to increase outreach; however, a standardisation of the financial education curricula could help avoid duplication issues.

Finally, monitoring the effectiveness and impact of different programmes needs to take place more frequently, as this is not currently the case. Such monitoring would help clarify which programmes lead to greater financial capability or changes in financial behaviour. The Commonwealth Consultative Workshop on Digital Financial Literacy, to be held in 2022, hopes to address some of these issues by leveraging the knowledge of experts in FinTech and financial literacy and to help determine appropriate content and delivery mechanisms for a digital financial literacy programme in developing countries.

Financial literacy is viewed by scholars and international organisations working in development finance as one of the pillars in financial inclusion (Chibba 2009; Center for Financial Inclusion Action 2013). Financial literacy increases the likelihood of using digital financial products and services to improve financial access, whereas poor knowledge of how products work and their likely costs reduces the likelihood of inclusion (Hassan et al. 2020). However, financial education and literacy will not work in isolation. Adequate digital infrastructure and well-designed regulation, as well as incentive mechanisms to encourage behaviour change, should all be considered important parts of the overall policy toolkit to improve digital financial inclusion.

> "The key pillar in developing the digital FinTech ecosystem is identifying the inputs and digital infrastructure that will fuel the FinTech of the future."

4.2 Building digital infrastructure and technological advantage
Building digital infrastructure
It is no secret that digital supporting infrastructure, such as electricity, internet bandwidth, telecommunications and secure servers, is unevenly distributed across Commonwealth member countries, especially in some African and Pacific member countries (Kumar and Strazdin 2021). COVID-19 has further exposed digital inequities and the digital divide, and it is estimated that a third of the world (2.9 billion people) are still offline due to the cost of connection (WEF 2021). As countries continue to 'build back better' and 'build forward better', a national infrastructure plan including physical and digital infrastructure should be a key element. The development of a fit-for-purpose digital infrastructure framework that will enable the scalability of the provision of FinTech services is fundamental to FinTech innovation. Digital economy infrastructural development should therefore be cross industry and society wide, and include stakeholder

groups such as the government, technology providers and technology users in the digital financial ecosystem (ibid.). This digital infrastructure approach advocates modernising regulatory infrastructure and processes through streamlining and harmonising procedures to drive FinTech innovation and data-driven compliance (Chatterjee 2017).

The key pillar in developing the digital FinTech ecosystem is identifying the inputs and digital infrastructure that will fuel the FinTech of the future (Tech Nation 2021). Investment in the digital infrastructure also requires long-term commitments and a continuous cycle of investment, especially when faced with communications networks that depreciate rapidly (WEF 2017). To build better digital infrastructure, three key ingredients are required.

- **Regulatory and industry policies to encourage infrastructure investment:** Create a healthier spectrum allocation mechanism and a more standardised spectrum utilisation to foster global network harmonisation.

- **More efficient and less costly network infrastructure:** Movement away from hardware-driven to software-driven networks can help reduce cost and increase efficiency. This can be amplified with cross-industry collaboration and industry sharing.

- **Enhanced collaboration both within ICT and across industries:** Stakeholders such as vendors and operators should intensify co-operation to maximise synergy and sufficiently develop the industry value chain (WEF 2014).

These facets of building better digital infrastructure help to reduce digital inequality by encouraging an environment that promotes standardisation of digital infrastructure, which results in greater efficiency and cost reduction. This addresses one of the largest causes of digital inequality, the cost of connection. Additionally, countries should develop and implement a digital economy blueprint or framework. For example, the Malaysia Digital Economy Blueprint (Government of Malaysia 2021) recommends the following thrusts:

- drive digital transformation in the public sector

- boost economic competitiveness through digitalisation

- build enabling digital infrastructure

- build agile and competent digital talent

- create an inclusive digital society

- build trusted, secure and ethical digital environment.

These thrusts contribute to promoting and building digital infrastructure. Similarly, the Kenya Digital Economy Blueprint (Republic of Kenya 2019) continues to power Kenya's transformation. The development of the digital economy framework should be followed by key performance indicators and measurables to assess the progress of implementation over time. The Commonwealth Connectivity Agenda Action Plan (2018) and Repository of Digital Policies and Regulations provide a frame of reference for Commonwealth members wanting to devise and implement appropriate policies to support digital transformation and harness the benefits of digital transformation (Commonwealth Secretariat 2018).

Figure 4.1 Enhancing cyber resilience.
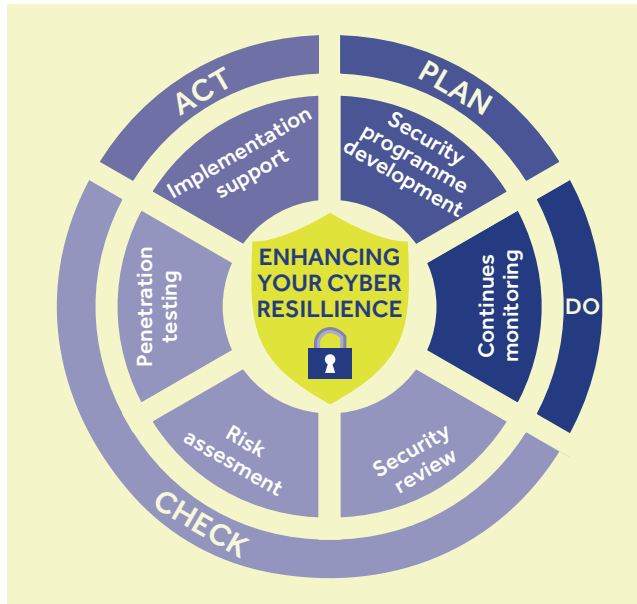
Figure 4.2 Cybersecurity controls.

Cybersecurity risk management

Cybersecurity risks and threats can compromise and impact the entire FinTech ecosystem and adversely affect economic infrastructure, endangering sensitive data and impacting FinTech services (Kaur and Lashkari 2021). Even though cybersecurity risks are now regarded as the 'new normal' due to increased digitisation, COVID-19 has exacerbated such risks. In fact, in a

survey of financial regulators from advanced economies, nine out of ten respondents viewed cybersecurity risk as one of the top three risks related to FinTech activities, with an average 15 per cent increase in cybersecurity breaches during the pandemic (CCAF 2020).

If FinTech companies are to avoid or mitigate cybersecurity risks, they must prepare a robust cybersecurity programme. This programme involves a continuous cycle of 'Plan, Do, Check and Review', with the aim of enhancing cyber resilience (Cynance 2020).

Building cyber-resilient controls for the FinTech ecosystem is crucial to minimise the adverse impact of cybersecurity risks and its associated financial, operational and reputational costs. The tiered approach to cybersecurity controls is a control framework that evolves and matures with cyber-risk, threat and compliance landscapes. Initially, a single, global, industry-wide standard is created, which can then be adapted to specified FinTech cybersecurity risks (WEF 2020).

With the tiered framework, minimum standard cyber-resilient measures and controls should be established as part of the FinTech regulatory environment. This should be followed by minimum standards and controls across market activities and then granular controls and standards for specific activities.

To further understand cybersecurity management for FinTech, Kaur and Lashkari (2021) proposed the following characteristics for a robust cyber-resilient policy for FinTech institutions.

1. **Cyber hygiene:** This involves educating cyber users on updating and patching flaws that may occur.

2. **Timing of cyber incidents:** That is, continuously monitoring advanced persistent threats and avoiding a false sense of security.

3. **Operational impact:** The policy must consider cyber resilience, while designing and implementing business strategies and policies (ibid.).

Threat modelling can also be used by financial institutions to mitigate cybersecurity threats. This involves taking a structural approach in identifying, categorising and analysing cyber threats, with the aim of identifying anything that can compromise and exploit the vulnerabilities of financial institutions. A proactive rather than reactive approach based on predicting threats can be used as an early warning indicator to foresee some threats before they occur, which will allow for resources and contingencies to be put in place beforehand (ibid.).

4.3 Regulating FinTech

The need for effective FinTech regulation
While the expansion of the FinTech industry around the globe, through its innovations, creates an abundance of benefits and opportunities for other industries and consumers, it does not come without a number of risks. These risks range from financial consumer protection risks, arising from new products and business models, cybersecurity risks, AML/CFT risks, data protection risks, potential financial stability risks from cryptoasset activities, market concentration by incumbents, and currency risks (World Bank 2020a).

These FinTech risks leave policymakers with the difficulty of competing policy priorities. On the one hand, regulators are aware of the need to capture the potential of FinTech

to address barriers to financial sector deepening, inclusion and development (IMF and World Bank 2019). On the other, is the desire to maintain financial stability and integrity and avoid arbitrage opportunities, while lack of expertise and risk averseness of central banks and regulators, create opposing priorities (IMF 2019).

In addition to the competing policy priority challenge, regulators face three other difficulties in regulating FinTech innovations, as identified by UNSGSA and CCAF (2019). First, regulators tend not to be technology experts, creating difficulty in understanding and assessing innovative business models and practices. FinTech innovative businesses may also not necessarily fall under the traditionally defined financial services providers and, as such, may not fall under regulatory oversight. Third, regulators often face capacity constraints, making it tricky to divert sufficient resources to regulate a resource-intensive technology-led innovative sector.

The common approaches to setting regulations in this sector often fall into one of four categories: wait and see, test and learn, innovation facilitators such as sandboxes, and regulatory laws and reform. Potential interventions could be viewed as applying existing regulatory frameworks to new business models, tweaking existing frameworks to accommodate re-engineering of existing processes, creating whole new regulations for the new ecosystem, or exploring new frameworks to promotive innovations (FSB 2017). The approach of countries should depend on several considerations. First, authorities should review the environment in which they operate, and specifically consider what their objectives are, whether it is to increase competition, foster an environment for innovation or increase financial inclusion. The other key considerations are to identify

how FinTech will play into the strategy of the country, critical success factors, and country circumstance and context.

As well as finding a balance between putting in place enabling regulations to encourage FinTech innovation, and maintaining financial stability and consumer protection, government authorities, regardless of their approach, should ensure that the constraints regulators face are addressed – so that they can effectively monitor and regulate the industry and maintain an up-to-date set of guidelines that remain relevant to the ever-evolving technological advancements within FinTech (World Bank 2020a).

Overview of the Commonwealth regulatory landscape and presence of sandboxes
According to the World Bank Global Fintech-enabling Regulations Database, 23 of the 54 Commonwealth member countries (at the time of writing) have some sort of innovation facilitator, whether that be a sandbox, innovation hub/office or accelerator such as Regtech (Figure 4.6). This is slightly above the global average, with 43 per cent of Commonwealth countries having an innovation facilitator compared to 38 per cent for the entire globe (World Bank 2021).

Figure 4.3 and Table 4.2 clearly illustrate that the overwhelming choice for a primary regulatory FinTech accelerator is a sandbox. However, countries with a sandbox also often have an innovation hub. It is frequently the case that the sandbox came after the innovation hub as the FinTech landscape evolved, or that the sandbox is just considered the primary innovation facilitator. For example, the three Commonwealth countries that rank within the top ten FinTech countries in the world according to the Findexable Global Fintech Index, all have a sandbox and an innovation hub. The UK, ranked number 2, has FCA Innovate as well

Figure 4.3 Identified innovation facilitators among Commonwealth countries.
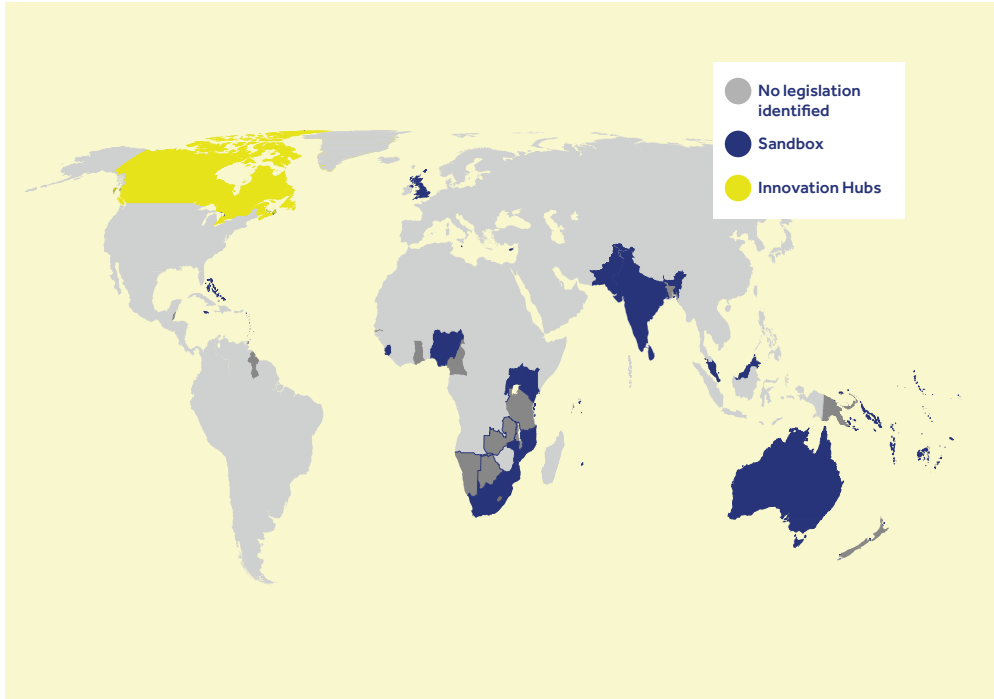
Source: Commonwealth Secretariat (data from World Bank Fintech-Enabling Regulations Database (2021).

as a sandbox; Singapore, ranked number 4, has the MAS Financial Technology and Innovation Group; and Australia, ranked number 6, has the Australian Securities and Investments Commission (ASIC) Innovation Hub. In additional, Canada, ranked just outside the top ten, at number 12, has the Ontario Securities Commission (OSC) Launchpad. Malaysia and South Africa are also examples of countries with a sandbox as their primary innovation facilitator, but with the addition of innovation hubs, the Financial Technology Enabler Group and the Intergovernmental Fintech Working Group.

Table 4.2 Countries with sandboxes.

Africa	Asia	Caribbean and Americas	Europe and Pacific
Eswatini	Brunei Darussalam	Barbados	Australia
Kenya	India	Canada	Fiji
Mauritius	Malaysia	Jamaica	Malta
Mozambique	Pakistan		United Kingdom
Nigeria	Singapore		
Rwanda	Sri Lanka		
Sierra Leone			
South Africa			
Uganda			

Source: Commonwealth Secretariat (data from World Bank Fintech-Enabling Regulations Database 2021).

Furthermore, the regulations database provided by the World Bank is not exhaustive, as the innovation facilitators within its database are defined by the countries' legislation. Further to this, other countries may have drafted or proposed frameworks for new regulatory innovation facilitators, some maybe even implemented, and are therefore not yet presented in this list. For example, Ghana is not recognised as having a legislative innovation facilitator within this record; however, it released a regulatory and innovation sandbox pilot in early 2021.

Sandboxes

A 'FinTech sandbox' is a live testing environment for financial services and business models under a special framework for oversight and regulation (World Bank 2020e). It allows start-ups to test out their products in a small-scale, supervised environment, without exposing consumers to products that haven't been comprehensively tested, while allowing regulators to understand the business. There are four broad types of sandboxes, namely, those that are policy, innovation, thematic or cross-border focused. The focus of a country's sandbox depends on the country's contextual challenges and objectives; that is, whether identifying if current regulations are fit for purpose, attempting to foster competition in the market, boosting development in a specific sector (commonly financial inclusion), or encouraging cross-border movement of firms and harmonisation of regulations. The general benefits and negatives/risks of implementing a regulatory sandbox are as listed in Table 4.3.

An example of an often-cited thematic sandbox testing that resulted in meaningful policy change, and thus saw the benefits of implementing a sandbox outweigh the

Table 4.3 Benefits and drawbacks of regulatory sandboxes.

Benefits	Drawbacks
• Helps regulators gain a better understanding of FinTech and develop evidence-based regulations that promote inclusive FinTech.	• Complex to set up, very time and skill demanding, and costly to run.
• Reduces regulatory uncertainty, such as that new technologies and business models will be prohibited.	• Neither necessary nor sufficient for promoting financial inclusion.
• Ensures that consumers aren't exposed to products that haven't been comprehensively tested.	• Can create a 'race to the bottom' for soft regulatory frameworks, creating consumer risk and negative public perception.
• Signals commitment to innovation and learning and reduces time-to-market by streamlining the authorisation process.	• Often used as a 'stamp of approval' to get investor trust, with risks still unknown.
• Promotes introduction of new and potentially safer products, while increasing access to financial products and services.	• Known to distract regulators from pursuing other potentially more optimal avenues and tools.
• May enable cultural change within a regulator, by providing a focal point for formal and informal interactions with market participants.	• Although generating substantial interest and enthusiasm, sandbox effectiveness can be stifled if regulatory reform has not yet addressed regulatory inflexibility and incompatibility.

Source: Minsky (2019); Kelly (2018); Centre for Regulatory Strategy (2018); FCA (2015); Radostina PARENTI (2020); Wechsler, Perlman, and Gurung (2018).

negatives, comes from WorldRemit in Malaysia (Alam et al. 2019). At the time, much of the rural population faced significant barriers to opening online financial accounts, due to institutions being forced to carry out their 'know you customer' (KYC) checks in person. However, the sandbox that was then implemented and supervised by Bank Negara Malaysia created a controlled environment for WorldRemit to test its innovative electronic KYC service. The testing of the new e-KYC service provided evidence to the bank of the efficiency gains that the new technology could offer, so much so that the bank altered its KYC regulations to allow consumers to verify themselves to remittance providers via remote identifiers such as via a 'selfie' (ibid.). Following on from the success Malaysia has had with regulatory sandboxes, the country was looking to implement the first IoT sandbox in 2022 (ibid.).

Another example of a thematic sandbox experience comes from Sierra Leone (Box 4.1). This example shows how a sandbox targeted at a specific sector objective can achieve great success. In Sierra Leone's case, increased financial inclusion was the goal and, by taking into account lessons learnt and applying these to its continuous design evolution, the country now provides examples of what challenges to expect, how to deal with them, and prior necessities for setting up a sandbox for similar countries.

Due to the borderless nature of FinTech, the considerations and implementations of regional sandboxes has also been on the rise. These are known as 'multijurisdictional sandboxes' and are used to harmonise regulations across borders, enable information to be exchanged and improve the safe scalability of FinTechs, both regionally and globally (IMF 2019). An example of such a regional sandbox comes from the Pacific Islands Regional Initiative (Piri), launched in early 2020. This regional sandbox encouraged

members to act in unison rather than as competing individual markets, removing barriers to innovation between different countries within the same region. As a result, FinTechs could expand their consumer base to all Pacific member countries, while facing lower regulatory barriers and improved confidence in the viability of their business model (World Bank 2020c). Despite it being too early to gather lessons learnt or to evaluate the complete success of this regional sandbox, it has been complimented for highlighting critical components that are needed for effective cross-border sandboxes. These include the need for close geographic proximity of the participants, similarity in macroeconomic conditions and presence of shared priorities (ibid.).

Beyond regional sandboxes lie global ones, and the Global Financial Innovation Network (GFIN) is an example of this. Originally proposed as a global sandbox in 2018 by the FCA, it was then formally launched in 2019 by an international group of financial regulators, including the FCA, and is now made up of a network of over 70 organisations. The primary aim of GFIN was to encourage knowledge transfer and learning across stakeholders from a range of jurisdictions, with the intent of advancing areas of financial integrity, stability, inclusion, competition and consumer wellbeing and stability by promoting innovation in financial services (GFIN, 2018). When it was originally set up, GFIN consisted of three main complimentary functions.

• Creating a joint open network of regulators who would mutually promote knowledge and experience-sharing on financial innovations within their own jurisdiction.

• Enabling joint policy work and collaborative regulatory trials among regulators.

Box 4.1   Sierra Leone: A financial-inclusion themed sandbox.

Background
The sandbox in Sierra Leone can be identified as a financial inclusion-themed sandbox, aiming to promote and encourage innovation that focuses on accomplishing policy priorities, such as financial inclusion for products and services and business models that are designed to advance financial inclusion. Applicants were required to demonstrate how their proposed innovation can advance the country's financial inclusion strategy by improving accessibility, efficiency, security and/or quality in the provision of financial services to consumers in Sierra Leone. It is also mandatory that the underserved are to be included in sandbox testing or to be a direct beneficiary of the proposed innovation after deployment. In addition, applicants must have been a registered business in Sierra Leone with at least 10 per cent ownership by a citizen of Sierra Leone, and were faced with a entry charge of SLL 100,000.

Lesson 1
Unlike many developed countries that are the predominant utilisers of sandboxes, Sierra Leone experienced capacity challenges after finding the implementation, application and test design process to be more time consuming and resource intensive than anticipated. In addition, the team had to spend ample time engaging with firms to refine regulatory hypothesis, testing and reporting methodology. The effect of this has been minimised though, with a large number of internal resources targeted to a dedicated, cross-functional sandbox team, something that remains uncommon outside of developed countries. Having this well-resourced team allowed for focus to remain on activities such as market outreach, participant selection, and supervision.

Lesson 2
Another risk of implementing a sandbox without due diligence can be a lack of FinTech demand. This can lead to large financial and capacity opportunity costs outweighing the potential benefits of the sandbox. At first, Sierra Leone experienced this; however, after engagement with the central bank's full-time marketing team, it was able to create effective outreach to its FinTech ecosystem. Therefore, both demand assessment and market outreach are core elements to address when considering a sandbox. In addition, having strong institutional commitment and leadership remains obvious but key when considering a sandbox initiative, with engagement and support from institutions such as the Office of the Governor from the very get-go being identified as a vital enabler in the success of Sierra Leones Sandbox.

Lesson 3
The sandbox design, particularly regarding intake models, should be flexible to evolution and adaptability. Due to changing market conditions, the sandbox in Sierra Leone evolved to include a cohort-based process for start-ups and an 'open admission' process for incumbents wanting to gather regulatory input on inclusion-oriented products and services. Furthermore, Sierra Leone's sandbox pilot programme required review and reauthorisation after the first year, demonstrating awareness of the need to be open to learning and experimenting in their approach to regulating the industry.

Sources: UNSGSA and CCAF (2019), Massally and Duff (2018), Wechsler, Perlman, and Gurung (2018).

• Supporting FinTech companies in conducting cross-border trials to help them navigate multi-jurisdictional regulatory issues (ibid).

As was the case for regional and domestic sandboxes, several findings arose from GFIN's pilot phases that needed to be addressed to ensure that the full potential of the global initiative was realised. These findings included failing to attract applications from large international companies partly due to a lack of understanding about the value-add of participating, issues within the process for both firms and regulators, needing to become more adaptive and flexible in their style of approach, and negative user-experiences of cross-border testing for firms (GFIN 2020). However, in addition to these internally identified lessons learned, it has been noted that the inclusion of emerging and developing jurisdictions as members at an early stage would be vital in the success of the GFIN initiative (and that of future global sandboxes), mutually beneficial to all stakeholders, and crucial in achieving the inclusive approach to global FinTech innovation (Wechsler, Perlman, and Gurung 2018).

While a sandbox, if implemented and designed properly, does offer an array of benefits to consumers, innovators and regulators alike, it is important to remember that they are but one of several regulatory frameworks. This is particularly important for countries whose regulators are resource constrained or whose FinTech industry is limited in advancement, as a sandbox in this case may be harder to establish and maintain and, as such, may be a less appropriate approach (World Bank 2020c). In addition, if a sandbox is not appropriate for a country, then it may experience chronic under-use, resulting in a substantial waste of resources. For example, it was stated that FinTech firms in Rwanda failed to see the point in participating in the sandbox that had been set up; as a result, in 2019, only one FinTech firm enrolled (Acrosights 2021). Further to this, the sandbox can pose several risks, while providing no guarantee for promoting financial inclusion (UNSGSA and CCAF 2019).

With that said, to prevent regulators from pursuing other less appropriate regulatory avenues and tools, it is key that they ask themselves several questions, as outlined by UNSGSA and CCAF (2019) (Table 4.4).

If the answers to these questions do not paint a picture for a necessary sandbox, then another innovation offer may be

Table 4.4 Questions to ask when considering a sandbox.

If the goal is to...		....then it is important to consider...
1) Engage with the local innovation community...	>>	• the value of the sandbox; • the relation of the sandbox to other market programmes; and • whether an innovation hub can achieve this with lower required resources.
2) Reduce regulatory barriers for innovators...	>>	whether market-wide regulations or risk-based licensing can achieve this.
3) Deepen regulatory understanding of technologies to inform regulation and guidance...	>>	whether a sandbox, driven on an application basis, provides the most effective foundation to achieve this insight.

Source: UNSGSA and CCAF (2019).

more appropriate. UNSGSA and CCAF (2019) point out an analysis of the FinTech industry in Kenya, carried out by the Capital Markets Authority, which concluded that an innovation office would be perfectly adequate to address any regulatory issues that FinTech start-ups would face, and thus would be more appropriate than a sandbox. Further to this, the Monetary Authority of Singapore found that the live testing environment that a sandbox offered was not necessarily required, as the questions that arose in relation to a sandbox and regulations could be solved through the open dialogue that an innovation office would enable (ibid.). In the case of Singapore, after offering information to 140 organisations about the regulatory sandbox, 30 of the 40 organisations that went on to apply for the sandbox were either withdrawn or allowed to proceed without the need for the sandbox.

Innovation hubs
While a sandbox is specifically targeted at companies who want to live-test their products before taking them to market, an innovation hub instead targets a much broader base of industry participants who may want to start a formal dialogue with the relevant authority on their technology or innovation, so that they can receive regulatory guidance, but are not yet at the stage to test a developed concept.

Sometimes a two-step process, starting at an innovation hub and then moving on to a sandbox, if necessary, is an appropriate structure for a country to have. This is the case in Bermuda. After realising there was demand for start-ups and companies to test new technologies or business models, but that they were still developing their proof of concept and thus were not ready to enter a sandbox, the Bermuda Monetary Authority (BMA) launched two parallel innovation tracks: a sandbox and an innovation hub. The

hub allowed both Bermudian and foreign companies to start receiving regulatory guidance for free, without a testable concept, before eventually applying to the sandbox (BMA 2021). This demonstration of adjusted policy shows the importance of accounting for different needs and implementing the necessary models to help FinTech start-ups with their challenges, which can often be done via an innovation hub rather than a sandbox.

In the case of Bermuda, a parallel two-step model was most appropriate. However, often an innovation hub by itself is more than suffice. This is because, innovation hubs provide support and guidance, and sometimes physical space, to help firms innovate, identify opportunities for growth, and navigate the regulatory environment. The support and dialogue that the innovation office offers can be done on a one-to-one basis or grouped, and does not require the setup for a live testing environment (IMF 2019). Innovation offices can reduce barriers to entry for innovators, by helping them to understand regulatory frameworks and consumer protection requirements quickly and easily, while reducing regulatory uncertainty. Thus, they can save innovators from costly processes and spark competition, which feeds through to lower prices for end consumers (ibid).

For capacity-constrained regulations in emerging and developing economies, innovation offices offer a much more compelling option, as they are often easier and less costly to establish then a sandbox and do not require prior legislative or regulatory change. In this setup, regulators can start small, simply educating innovators on the regulatory environment in which they operate, and iteratively expand based on demand. Innovation offices can then provide insight into whether further innovative regulatory

initiatives, such as a sandbox, are necessary (UNSGSA and CCAF 2019). Yet there are still challenges around finding appropriate expertise for innovation offices, due to the specific regulatory knowledge and niche understanding of technological innovation in financial services that is required.

The most successful innovation offices are the ones that benefit from co-ordinating with each other and facilitate peer learning. This is because of the borderless nature of technology-enabled financial services, allowing regulators to learn and adapt from the successes and failings around the globe of other regulatory initiatives explored in this context. An example of this comes from MAS and the Dubai Financial Services Authority, which successfully reached an agreement to facilitate information sharing, a two-way referral of FinTech companies, and joint work on projects such as digital payments, blockchain, distributed ledger technology (DLT) and big data (CrowdFund Insider 2018).

A case study on the UK's Financial Conduct Authority (FCA) innovation office suggests further key enablers for a successful office from its lessons learnt (UNSGSA and CCAF 2019). Now known as 'Innovate', the innovation office created by the FCA was one of the first of its kind, starting as a small team to represent consumer interests by promoting competition in the industry. The impact of Innovate was substantial, supporting over 500 firms, but it is the FCA's early experiences that provide a number of key lessons learnt for prospective innovation offices. First, it was identified that the primary key for success was that regulators should approach the industry with a goal to learn first and to enable adoption through open engagement with FinTech entrants. Second, a key criterion is that the proposed innovation must benefit the consumer, and not pose a

potential risk. As such, an eligibility criterion was identified as one way to ensure this and remove any innovations that would not be deemed beneficial (ibid.). Third, during the early stages, it may be hard for FinTech start-ups to identify what support is required and where to seek this support, as there can be confusion as to what the difference is between services offered by a sandbox and an innovation office. Therefore, this early stage can underline the importance of an innovation office providing firms with a primary understanding of the regulatory framework in which they must operate, before a sandbox is even considered. Last, the promotion of international regulatory engagement on innovation within the financial services industry is key. In the case of the FCA, signed co-operation agreements exist between the authority and Australia, Canada, China, Hong Kong, Japan, Korea, Singapore and the US. As was the case of the agreement between the MAS and Dubai FSA, both information sharing and referrals between innovation offices were core components for these co-operation agreements, in order to facilitate a shared learning approach to regulations and to reduce regulatory barriers preventing the movement of FinTechs across bordering markets (ibid.).

The regulatory path forward
As mentioned previously, it is vital that the right approach to regulating FinTech is taken. This includes choosing both the appropriate innovation facilitator, as well as supporting regulations and industry guidance. The array of approaches leaves regulators conflicted between balancing encouragement of the innovation in FinTech to achieve objectives such as financial inclusion on the one hand, and mitigating or reducing the risks that FinTech can pose to consumers or the financial industry such as data privacy, customer protection and systemic risk on the other.

Even after considering the balance between these two factors, regulators still must consider what approach to take depending on their objectives. But even once all these have been considered, contextual challenges may still warrant or prevent the country's implementation of its desired approach. These challenges may be financial, with many countries facing limited resources and funding to set up and maintain an effective regulatory approach (EBRD 2020). It may be a technical capacity challenge, due to the necessity of relevant expertise, knowledge and capacity to supervise the new technology. Or it could be a challenge of co-ordinating the various policymakers, supervisory bodies and industry players that all have an active role within the FinTech landscape (ibid.).

> "There cannot be a 'one size fits all' approach to regulating FinTech. Countries will want to contextualise their objectives, challenges and environment to build upon an evolving framework to shape an optimal approach."

With these challenges in mind, it is apparent that there cannot be a 'one size fits all' approach to regulating FinTech. Instead, countries will want to contextualise their objectives, challenges and environment to build upon an evolving framework to shape an optimal approach. For example, if the FinTech innovation is at an early development stage, where there are visible potential benefits to consumers and the market from its offering, it is recommended that a 'principle-based' approach would be most appropriate to capture the benefits while still providing mitigation from any risks (EBRD 2020). This would remove the need for costly and technical, detailed, prescriptive rules, moving to a broader, high-level set of standards and guidelines (CFTC 2019). This first step could be framed as foundational legislation adjoined with guiding principles covering data protection, e-KYC and cybersecurity, to name a few (Gill 2021). The idea is to enable as much innovation as possible, while ensuring protection. As the FinTech innovation matures, regulators and policymakers can then begin to apply what they have learnt and analysed to a more advanced set of rules and guidance, blending the roles of all supervisory actors into a unified approach that can effectively encourage best practices within the industry (EBRD 2020).

In addition to the importance of FinTech policy including a live-testing environment, as well as clear, quality regulation, it is also vital that FinTech is identified as a key strategic priority within development plans, and that regional and international co-operation on this front is aggressively pursued (Acrosights 2021). It has been identified that agility is fundamental within the FinTech space, with regulators needing to be reactive to continuous rapid changes, while ensuring constant reviews of regulatory approaches. As

such, international co-operation can provide much-needed insight and support for countries struggling to adapt. This is something that remains prominent within the 2018 Bali Fintech Agenda, throughout which greater international co-operation is considered a core objective, as it can ensure effective regulation and prevent negative premature policy responses or a 'race to the bottom' approach (IMF 2018).

Although a 'one size fits all' approach is not recommended, there are cross-global commonalities among FinTech activities. Therefore, increased international co-operation can lead to integrated regulatory frameworks across countries, allowing ease in the dissemination of innovative services from one country to another (EBRD 2020). Further to this, continuous regional and collaborative approaches can open up the necessary scope for lessons learnt. By learning from country-specific cases, regulators can adapt their approach, ensuring that regulations complement their innovation facilitator, whether that be a sandbox or innovation hub, and vice versa. Regardless of what approach is taken, countries should be open to sharing experiences and success stories, while being transparent about the context-specific details of their existing challenges, industry environment and structure so as not to promote only a singular regulatory approach to copy, but rather one that can be adapted to a country's traits.

Conclusion

Since the last financial crisis of 2008/09, investments in FinTech have been growing. This has been mainly due to deficiencies and shortcomings in the traditional banking and financial services sector (Deloitte 2020), especially in small states and developing countries where large percentages of the population are unbanked or underbanked. The onset of the coronavirus pandemic in 2020 has served to further speed up digitisation and accelerate FinTech adoption. In the face of COVID-19 challenges, FinTech innovations have been resilient for the most part and even grown in some areas, rising to meet the obstacles presented by the pandemic. Given the exponential growth of FinTech, it is crucial to understand how FinTech is impacting Commonwealth member countries and how they can learn and partner with each other, as well as the rest of the world.

Across the Commonwealth we have seen the rise of FinTech, with several countries becoming world leaders in different technologies and applications. Furthermore, this report has shown that the utilisation of FinTech has been diverse across Commonwealth countries, while its applications are widespread, including mobile money and other digital payments, CBDCs, cryptocurrencies and alternative credit. Moreover, its use is country or region specific, filling the gaps that currently exist. For example, CBDCs are prevalent in the Caribbean region to aid de-risking, while mobile money is dominant in Africa due to the large amount of unbanked and underbanked customers in hard-to-reach areas.

The report also highlights the importance of the regulatory landscapes and the presence of sandboxes. Having a fertile regulatory framework has proved important to managing and mitigating risks, as well as creating an environment that promotes FinTech innovation. Two key pillars of the regulatory environment are sandboxes and innovation hubs. Sandboxes create a live-testing environment for financial services and business models under a special framework for oversight and regulation, while innovation hubs allow industry participants who may want to start a formal dialogue with the relevant authority on their technology or innovation to receive regulatory guidance before testing or development.

Albeit unevenly, the evidence in this report suggests that FinTech enables the attainment of the Sustainable Development Goals and other areas of development across Commonwealth member countries. It is a pivotal factor for supporting economic growth, reducing income and gender inequality, and promoting financial inclusion. The report also identifies key demand and supply drivers, including financial inclusion, digital infrastructure and regulatory frameworks, which have contributed to the growth of FinTech. Commonwealth countries that want to replicate the successes experienced by other member states can nurture FinTech by capitalising on existing demand and supply drivers, as well as enhancing factors to promote the supply of FinTech services to fill identified gaps. To do this, Commonwealth members will need to understand the status of demand factors in their country, as well as enhancing supply factors through partnerships within their region. There is also an opportunity for member states to learn from the difficulties and challenges faced by other Commonwealth

countries in order to appropriately advance FinTech within their jurisdiction.

Overall, this report captures evidence of FinTech innovation and services by member countries over the past decade. In fact, many Commonwealth countries, such as Kenya, Nigeria, The Bahamas and the Eastern Caribbean countries, to name a few, are at the forefront of FinTech innovation. This evidence suggests that opportunities are ripe for learning, partnering and sharing, and the Commonwealth Secretariat is in an opportune position to support Commonwealth countries as they continue to ride the FinTech wave. Going forward, the Commonwealth Secretariat hopes to capitalise on the progress it has made with its various FinTech programmes and bring member states together to develop FinTech ecosystems, in order to help countries to reach their Sustainable Development Goals.

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Appendix

Table A.1 Cryptocurrency ownership by region and country.

Region	Country	Number of cryptocurrency owners	% of population
Africa	Botswana	21,010	1.06%
	Cameroon	499,423	1.88%
	Ghana	934,482	3.01%
	Kenya	4,580,760	8.52%
	Malawi	176,240	0.92%
	Mauritius	20,007	1.57%
	Mozambique	499,115	1.60%
	Namibia	28,529	1.12%
	Nigeria	13,016,341	6.31%
	Rwanda	188,410	1.45%
	South Africa	4,580,760	7.11%
	Uganda	828,022	1.81%
	Tanzania	1,095,494	1.83%
	Zambia	271,781	1.48%
Asia	Bangladesh	3,742,571	2.27%
	Brunei Darussalam	3,979	0.91%
	India	100,740,320	7.30%
	Malaysia	1,019,405	3.15%
	Maldives	5,108	0.94%
	Pakistan	9,051,827	4.10%
	Singapore	549,903	9.40%
	Sri Lanka	321,641	1.50%
Caribbean and the Americas	Bahamas	3,576	0.91%
	Barbados	3,022	1.05%
	Belize	3,569	0.90%
	Canada	1,206,627	3.20%
	Jamaica	39,214	1.32%
	Trinidad and Tobago	16,377	1.17%
Europe	Cyprus	20,139	1.67%
	Malta	6,371	1.44%
	United Kingdom	3,360,591	4.95%
Pacific	Australia	857,553	3.36%
	New Zealand	85,008	1.86%
	Papua New Guinea	79,245	0.89%

Source: Triple A, January 2022, available at: https://triple-a.io/crypto-ownership/

A.1 Literature review by region and country

In February 2021 the Commonwealth Secretariat, through the Cambridge Centre for Alternative Finance, reviewed the landscape of regional and global FinTech issues and trends as a precursor to this report. The overall aim of this exercise was to determine the status and focus of FinTech innovations across Commonwealth member countries. A systematic approach to gathering data was used to identify economic, policy and academic reports from and about member countries. The database of summarised literature is provided as a spreadsheet at https://www.thecommonwealth-ilibrary.org/index.php/comsec/catalog/book/1070.

The Commonwealth