



Financial Inclusion and Disruptive Innovation

Regulatory Implications

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List of Acronyms

AFI	Alliance for Financial Inclusion
AI	artificial intelligence
AML/CFT	anti-money laundering/combating the financing of terrorism
API	application programming interface
BCBS	Basel Committee on Banking Supervision
BaaS	banking-as-a-service
BIS	Bank for International Settlements
BNPL	buy now pay later
B2B	business-to-business
CBDC	central bank digital currency
CCAF	Cambridge Centre for Alternative Finance
CDD	customer due diligence
CFPB	Consumer Financial Protection Bureau
CPMI	Committee on Payments and Market Infrastructures
CSP	cloud services provider
DeFi	decentralized finance
DFS	digital financial services
DLT	distributed ledger technology
DORA	Digital Operational Resilience Act (European Union)
eKYC	electronic know your customer
e-money	electronic money
EMDEs	emerging markets and developing economies
EMI	e-money issuer
ESAs	European supervisory authorities
FCA	Financial Conduct Authority
FIGI	Financial Inclusion Global Initiative
FSB	Financial Stability Board
FSI	Financial Stability Institute
FSP	financial services provider
ICT	information and communication technology
IIF	Institute of International Finance
IMF	International Monetary Fund

IOSCO	International Organization of Securities Commissions
I-SIP	inclusion, stability, integrity, and protection
ITU	International Telecommunication Union
KYC	know your customer
MAS	Monetary Authority of Singapore
MiCA	Markets in Crypto Assets Regulation
ML	machine learning
MNO	mobile network operator
MoU	memorandum of understanding
MSEs	micro and small enterprises
MSMEs	micro, small, and medium enterprises
PSP	payment services provider
P2B	peer-to-business
P2P	peer-to-peer
RBI	Reserve Bank of India
RIA	regulatory impact assessment
SACCO	savings and credit cooperative
SCM	Securities Commission Malaysia
SSB	standard setting body
UNCDF	United Nations Capital Development Fund
WBG	World Bank Group
WEF	World Economic Forum

Executive Summary

INNOVATIONS IN DIGITAL FINANCIAL services (DFS) have driven strong advances in financial inclusion in emerging markets and developing economies (EMDEs). Past growth in DFS has benefited from basic regulatory enablers such as nonbanks gaining permission to issue electronic money (e-money), the use of agents as delivery channels, risk-based customer due diligence (CDD), and financial consumer protection tailored to the digital context.

The current wave of innovative business models, products and services, and technologies further disrupts financial services and creates new opportunities to meet the needs of underserved and low-income customers. Increasingly novel and complex innovations bring new risks and challenges for regulators and supervisors.

Global standard setting bodies (SSBs) and other experts are building a good foundation of literature and guidance on regulating new innovations. However, it mainly focuses on issues of stability and integrity, giving less attention to consumer risks and financial inclusion opportunities. It also tends to look at specific innovations in isolation rather than through a holistic approach that considers whether the legal framework, institutional structures, supervisory approach, and organizational culture are adequate and flexible enough to accommodate a range of current and future disruptive innovations, and counts financial inclusion among its primary policy objectives.

To help fill this gap, CGAP explored the latest wave of disruptive financial services innovations to better understand the regulatory changes that allow EMDEs to harness their financial inclusion potential while

containing consumer and financial sector risk. For our review, we segmented these innovations into three dimensions:

1. Business model innovations such as digital banking, fintech activities, and platform-based finance.
2. Product and service innovations, including digital credit, crowdfunding, crypto assets, and central bank digital currencies (CBDCs).
3. Innovative technologies that underpin these models and products, such as distributed ledger technology (DLT), artificial intelligence (AI), application programming interfaces (APIs), cloud computing, and biometrics.

Choices on how to regulate and supervise these innovations have important implications for financial inclusion. CGAP's initial research found three cross-cutting themes to be most relevant: defining the financial sector regulatory perimeter, managing relationships between different types of authorities, and balancing different policy objectives. This paper provides a synthesis of disruptive innovations in digital financial services and their regulatory implications for financial inclusion. Further, it recommends using these themes to frame a basic stocktaking exercise to identify areas for regulatory action.

The paper's intent is to encourage regulators to consider a more holistic approach in response to disruptive innovation, as opposed to one focused on individual innovations. Moreover, this working paper lays the foundation for ongoing CGAP work on recommendations for regulators on how to best harness innovation for inclusive finance.

Introduction

ACCOUNT OWNERSHIP AT A FINANCIAL institution or a mobile money provider increased from 42 percent of adults in developing economies in 2011 to 71 percent in 2021 (Demirgüç-Kunt et al. 2022). This progress is at least partially attributable to forward-looking regulators that have engaged with financial services providers (FSPs) to build enabling environments for inclusive finance, thereby reaching customers previously considered too poor, too remote, or not literate enough to benefit from formal financial services.

Previous advances in financial inclusion were mainly due to enabling early [DFS](#) such as electronic money (e-money) to evolve and expand. Today, financial sector authorities face a new array of innovations that seem more complex to navigate. These innovations disrupt the way financial services are delivered and consumed and bring new risks, yet hold the potential to further improve the lives and livelihoods of underserved consumers.

This paper explores some of the key disruptive innovations in DFS that impact financial inclusion in EMDEs and their implications for regulators and supervisors. For the purposes of this research, *disruptive innovation* is defined as changes in the way financial products and services are designed and offered through the use of technology that reshapes traditional business models and regulatory regimes while creating opportunities as well as risks to financial inclusion.¹ Authorities are grappling with innovations

that blur the lines of traditional regulatory and supervisory frameworks (e.g., ride hailing firms offering mobile payment wallets) as they juggle multiple—and sometimes competing—mandates.

Do traditional ways of responding to innovations still work? What are the regulatory and supervisory implications of these innovations?

These questions are particularly pertinent to authorities with limited regulatory and supervisory capacity. This is a persistent challenge for EMDEs with fewer resources to hire, train, and retain staff; produce regulatory guidance; collect data; and develop monitoring and supervision tools. The nature and pace of recent DFS innovations only amplifies the challenge. Authorities still building their legal, regulatory, and supervisory frameworks for traditional FSPs must now consider unfamiliar entrants such as [fintech firms](#) and [big techs](#), including those headquartered outside their jurisdictions. DFS consumer risks are also a growing challenge for regulators with nascent market conduct regulation and supervision.

Innovation brings both new opportunities and risks to the financial sector and low-income consumers, and a holistic approach may be needed to maintain a safe and competitive environment. A holistic approach considers whether the legal framework, institutional structures, supervisory approach, and organizational culture of the financial authorities are adequate and flexible enough to accommodate a range of current

¹ For a more expansive discussion of disruptive innovation, see Christensen et al. (2015).

and future disruptive innovations, with financial inclusion counted among the primary policy objectives. CGAP believes that such a holistic approach can help identify where traditional approaches to regulating innovations critical to financial inclusion need to evolve (e.g., bespoke licensing for new types of providers) so low-income customers in EMDEs—especially women—can benefit.

While this paper intends to frame the issues presented by financial services innovations relevant to EMDE authorities that consider financial inclusion among their primary policy priorities, many of the questions raised are of interest to regulators and supervisors everywhere. The paper includes emerging insights and practices based on a review of literature and other resources, plus interviews with authorities looking at different approaches to regulating innovations relevant to financial inclusion.

It builds on prior CGAP work on regulatory enablers (Staschen and Meagher 2018) and the I-SIP (inclusion, stability, integrity, and protection) framework (Tomilova and Valenzuela 2018). It also includes in-depth research on next-generation DFS regulatory and supervisory issues and their implications for financial inclusion. The paper aims to fill a gap CGAP identified in the literature, which mostly focuses on the impact of innovations on financial stability and integrity and gives less attention to financial inclusion.

The first section gives an overview of the rapidly changing landscape of disruptive innovations relevant to financial inclusion and emerging regulatory approaches for each innovation. Next, the paper describes the key cross-cutting regulatory and financial inclusion implications of the innovations and recommends a stocktaking exercise for regulators to better understand their issues and priorities. Lastly, the paper concludes and poses some questions for further research. The annex provides a glossary of key terms.

Disruptive innovations and financial inclusion

INNOVATIONS ARE PROFOUNDLY CHANGING

the financial sector and how financial services are produced and consumed around the globe.

These developments challenge EMDE regulators and supervisors to regulate and supervise innovations in ways that enable financial inclusion while protecting customers, financial integrity, financial system stability, and healthy competition.

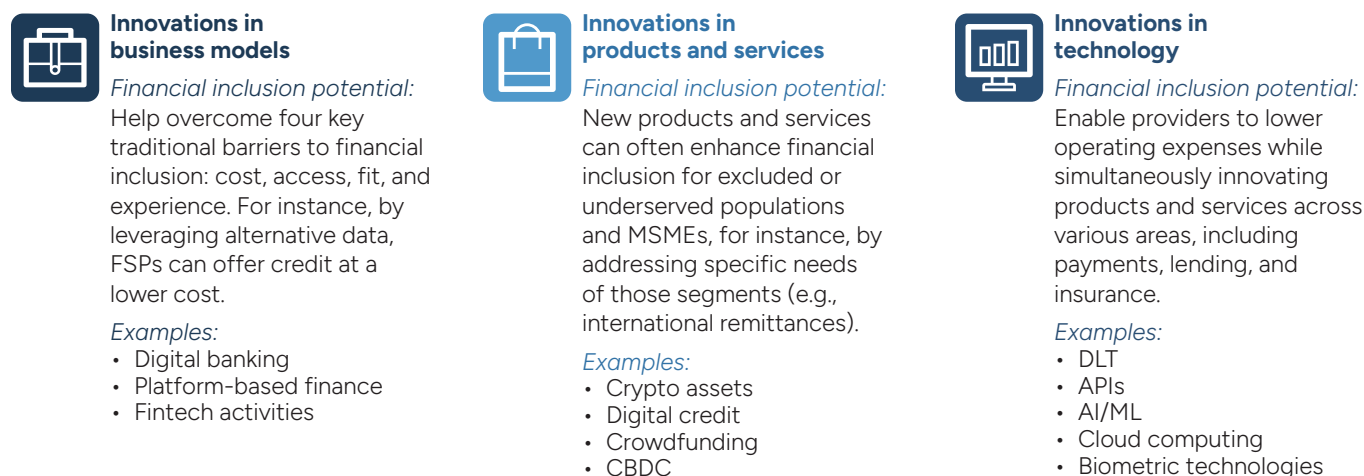
Financial sector innovations that financial regulators and supervisors should consider take place in multiple dimensions. This paper highlights three main dimensions of innovation often found in combination: (i) innovations in business models, (ii) innovations in products and services, and (iii) innovations in technology. Figure 1 describes the most important types of innovation for each dimension.

Innovations in business models

CGAP has identified three types of new business models relevant to financial inclusion: digital banking, fintech activities, and platform-based finance (Jeník and Zetterli 2020; Murthy et al. 2019; Fernandez Vidal 2020). Further discussed below, these models are often adopted by new types of FSPs.

Existing FSPs may also prefer to change their current models to these new types. When new actors heavily leverage digital technologies such as artificial intelligence (AI), [big data analytics](#), and contactless technologies, they can advance financial inclusion by offering underserved customers more affordable and accessible services and better products than traditional competitors. These new players may help overcome

FIGURE 1. **The three key dimensions of innovation**



the traditional barriers to financial inclusion: cost, access, fit, and experience (Zetterli 2021). Providers with these types of business models often have lower operational costs, leverage new technologies to offer better products, and onboard customers more efficiently through innovative approaches to CDD.

DIGITAL BANKING

Digital banking refers to banks that adopt new technologies in all operations and offer banking products and services through digital channels. Jeník and Zetterli (2020) identify three distinct digital banking business models that are particularly promising in advancing financial inclusion: fully digital retail banking, marketplace banking, and banking-as-a-service (BaaS).²

Digital banks may offer a greater variety of products and services, bring more competition, and push incumbents to improve their offerings through lower prices, greater choice, and improved quality of services that better meet customer needs. Various approaches to global regulation of digital banks could accommodate digital banking as a new business model with the potential to positively impact financial inclusion. A key question is whether to regulate digital banking activities under a traditional banking license or a bespoke digital banking license (Kerse and Staschen 2021). Creating a bespoke licensing regime can signal to the industry a willingness to grant new licenses and admit additional players into the banking sector. It may also serve as an invitation to players with innovative business models to apply. However, there is less of a need to create a separate licensing category for digital banks where traditional and digital banks offer a similar range of financial services with similar risks. TymeBank in South Africa is one example of a digital bank with a traditional banking license. It offers digital products that cater to low-income rural customers, such as low-cost transactional accounts and

FIGURE 2. **New digital banking business models**



Fully digital retail banking

A traditional banking business model improved with the latest digital technologies to offer a better banking experience at lower cost.

Examples: TymeBank (South Africa), Mox Bank (Hong Kong)



Marketplace banking

A banking response to e-commerce and fintech competitors in the form of a one-stop shop for financial services run by a bank, offering easy access to a variety of products and services.

Examples: Starling Bank (UK), WeBank (China)



Banking as a service

An entirely new business model that enables a nonbank to offer banking services under its own brand, seamlessly embedded into its digital offering.

Examples: Solarisbank (Europe), Banco Original (Brazil), Vodeno (Poland)

Source: Adapted from Jeník and Zetterli (2020).

high-yield savings accounts (Jeník 2022). Whichever approach is taken, it is important to keep in mind that certain traditional banks are also adopting new digital banking business models. Thus, these models are not limited to new entrants.

FINTECH ACTIVITIES

Fintech combines technology and data access to deliver new financial services. As fintech activities proliferate in EMDEs, they lead providers to offer products and services to underserved, low-income, and remote customers. This shift can be seen in different financial services such as payments, credits, deposits, insurance, and remittances. As fintech firms innovate financial services provision along different parts of the value chain, they test ways to improve customer experience and deliver more flexible financial services at lower costs. For example, Amarnya, a peer-to-peer (P2P) lending fintech firm in Indonesia, offers access to working capital for rural women microentrepreneurs.

² For an expanded discussion of the business models of TymeBank in South Africa, Starling Bank in the UK, and Solarisbank in Europe, see Jeník (2022), Jeník and Zetterli (2020), and Mdluli et al. (2022), respectively.

Amartha uses a psychometric [credit scoring](#) model to assess a borrower's creditworthiness and risk. In addition to its digital platform, the firm employs field officers to educate women and disburse loans (Murthy and Faz 2021).

Fintech activities are often operated by firms outside the regulatory perimeter. Not only are their business models and risk profiles different from banks, but fintech firms may be unaccustomed to operating in a regulated financial services environment and unwilling to come under the regulatory umbrella since getting a banking license entails significant capital and technical requirements.

As an alternative, many fintech firms (e.g., [e-money issuers \[EMIs\]](#), [payment services providers \[PSPs\]](#)) offer products and services with a lower tier license, which usually does not enable them to intermediate funds from the public. They may also partner with a licensed bank to provide a wider range of financial services only banks can offer (e.g., the BaaS model) and rely on the partner bank's license. Sometimes fintech firms obtain a license by acquiring a bank. In Mexico, for instance, Credijusto acquired Banco Finterra (Businesswire 2021).

PLATFORM-BASED FINANCE

Platform-based financial services are an example of [modularization](#) and [embedded finance](#). With their technology-enabled business models, [platforms](#) create value by facilitating exchange between two or more participant groups. They do not make or own goods or services but rather host markets that allow people with goods and services and those who want them to find and interact with each other (Fernandez Vidal 2020). Platforms include big tech giants in the United States and China as well as local goods and services platforms in EMDEs. These firms embed financial services into their core nonfinancial activities. Unlike banks, platforms have low marginal costs once they achieve scale, which makes serving low-income customers

viable even though the return on each transaction is very small. They also benefit from network effects.

In EMDEs, platforms can enhance economic and financial inclusion and strengthen the resilience of poor households. For example, the ride-hailing/food delivery firm Grab, active in Indonesia and many other Asian countries, offers insurance policies at affordable rates. Underwritten by Grab's partner FSP and tailored to the needs of platform workers, these policies improve worker protection (Fernandez Vidal 2020).

The information generated on platforms can also be leveraged to extend payment services or loans to new customers with little or no financial data and those deemed high-risk by traditional credit providers (BIS 2019). For example, ride-hailing platforms offer instant loans to millions of their drivers and help them purchase assets, while e-commerce sites reach low-income entrepreneurs with financial products tailored to their working capital needs and enable them to capture more opportunities to grow their business (Fernandez Vidal 2020).

Some platforms provide financial services by partnering with existing FSPs (e.g., banks, EMIs). For instance, Grab partnered with the insurance company, Chubb, to offer various insurance products in several countries in Southeast Asia.

Other platforms secure FSP licenses of their own. In Mexico, Mercado Pago, an entity owned by the e-commerce platform Mercado Libre, uses its EMI license to provide Mercado Libre users with an electronic wallet that enables them to make payments on the platform. Similarly, Grab-owned GPay has EMI licenses in Malaysia and the Philippines. Grab (with Singtel) also received a digital banking license in Singapore.

However, regulators around the globe question whether the current regulatory architecture accurately captures risks pertaining to platforms, particularly

those related to data privacy, consumer protection, and market concentration—and whether the architecture addresses the complexity of supervising firms that offer both financial and nonfinancial services across multiple sectors (Staschen and Meagher 2022a).³

Some platforms also employ below-cost pricing strategies and cross-subsidize their financial offerings to scale their nonfinancial businesses and gain market dominance. Once a platform controls the market it can buttress its position by raising barriers to competition, which eventually allows it to increase prices and restrict customer choices. For example, based on discounts and rewards, Amazon and Google offered credit and payment services in India at zero or negative cost to customers (Soursourian and Plaitakis 2019).

Innovations in products and services

New business models often support the introduction of products and services by new entrants and incumbents alike. Regulators must respond to both the financial inclusion opportunities and new risks these products and services bring. The following section summarizes the innovative products and services that have come to market in recent years.

CRYPTO ASSETS

Consumer use of various [crypto assets](#) is rapidly growing in EMDEs. Crypto assets generally are not backed by any government or public authority, nor are they any entity's liability. El Salvador and the Central African Republic are the only countries that have recognized crypto assets as legal tender, but the Central African Republic has since discontinued this recognition. Consumer interest and activity are increasing, with newly emerging crypto asset products,

decentralized finance (DeFi) applications providing financial services that use them, and a growing number of crypto asset trading platforms in EMDEs. For instance, India, Nigeria, and Vietnam were the top three countries in terms of crypto adoption in 2023. Additionally, 16 of the top 20 countries were in the developing world (Chainalysis 2023).

Crypto asset use has perceived benefits for low-income and other underserved people in EMDEs if properly regulated and subject to sound risk management and controls. Crypto assets can serve as an alternative means to remit funds, make payments, manage cash transfer programs, and store funds. Some providers (e.g., money transfer operators) use certain crypto assets as a bridge between fiat currencies for cross-border transactions. This could reduce the number of intermediaries involved in cross-border transactions and reduce the time, fees, and costs involved (Nelson 2021).

In countries with high inflation (e.g., Lebanon), crypto assets could serve as an alternative store of value. In some cases, a stablecoin as a crypto asset pegged to a foreign currency (e.g., US\$) is more stable than the domestic currency. Crypto assets could also facilitate payments, including humanitarian payments, in fragile or conflict-affected zones where the banking and payments infrastructure is weak or severely disrupted. Ukraine, for example, received more than US\$200 million in crypto asset donations for humanitarian relief and defense (WEF 2023; The Economist 2022).

While many crypto asset exchanges advertise high potential returns, users often do not fully understand the risks and issues around these products and have lost considerable amounts of money due to extreme price volatility and fraudulent activities, including those facilitated by cybercriminals. Following its peak

³ Some of these issues are of interest to regulators and supervisors in the context of the provision of e-money services by nonfinancial firms (e.g., mobile network operators [MNOs]). The Basel Committee on Banking Supervision (BCBS 2016) discusses this topic and highlights the potential need to establish a separate legal entity to offer e-money.

FIGURE 3. Total value of cryptocurrencies



Source: CoinMarketCap (2024).

on November 9, 2021, where it reached approximately US\$2.93 trillion, the total value, or market cap, of cryptocurrencies experienced a significant decline of 73 percent, dropping to about US\$782 billion by November 21, 2022. Also, it has recently risen to a new peak in March 2024 (CoinMarketCap 2024). See Figure 3.

Since crypto assets often fall outside existing consumer/investor protection regulations, crypto asset consumers/investors do not benefit from traditional financial services rights and protections such as transparent disclosures, complaints handling functions, and dispute resolution mechanisms (Newbury and Kerse 2023). For example:

- Some [crypto asset service providers](#) have suspended customer withdrawals on their platforms and filed for bankruptcy (e.g., Celsius, FTX, Terra, Voyager). Customers face the risk of not recovering their funds when no rules prohibit providers from commingling customer funds with their other assets or using them for lending, risky investments, or other purposes without explicit customer consent (Gordon 2022). The failure of FTX, primarily due

to fraud and poor management, resulted in an approximately US\$8 billion deficit in customers' accounts in an environment of inadequate regulation. Customers are still awaiting the return of their funds (Yahoo Finance 2024).

- Several crypto asset service providers have experienced cyberattacks and severe operational problems. In 2023, US\$1.7 billion worth of crypto assets were stolen from centralized exchanges, DeFi platforms, and others across 231 hacking incidents (Chainalysis 2024). Crypto hackers also stole over US\$600 million from a network that runs the popular game, Axie Infinity, one of the largest hacks in crypto history (BBC 2022). In most of these incidents, customers were unable to recover all or part of their funds as crypto assets are not regulated and lack adequate consumer protection measures.

Many jurisdictions are closely looking into how to approach regulation of crypto assets and their issuers and service providers, and taking first steps in that direction.⁴ For example, in South Africa, the Financial Advisory and Financial Intermediary Services Act was

4 For discussions on crypto asset regulation, see Bains et al. (2022a and 2022b), FSB (2022), and Aquilina et al. (2023).

amended in 2022 to include a definition of crypto assets as financial products. A new act has been introduced in Brazil, which authorizes the Central Bank of Brazil to regulate and supervise crypto providers. The act also ensures that certain crypto assets qualify as securities and continue to fall under the purview of the Brazilian Securities and Exchange Commission (Atlantic Council 2023). The Markets in Crypto Assets Regulation (MiCA) of the European Union (EU), which brings crypto assets and their issuers and service providers under a common regulatory framework, entered into force in June 2023 (EU 2023).

DIGITAL CREDIT

Digital credit refers to credit products fully delivered via digital channels such as mobile phones and the internet. Three key attributes distinguish it from traditional credit products. It is (i) instant, (ii) automated, and (iii) remote (see Table 1).⁵ Digital credit is growing rapidly in EMDEs, driven by lower operating costs, strong consumer demand, and broad outreach to potential customers. Providers can also scale more rapidly since it is fully delivered via digital channels and does not rely on traditional underwriting models (e.g., traditional credit history data).

Digital credit is promising from a financial inclusion perspective as it potentially fills an important gap for

TABLE 1. **Attributes of digital credit**

Instant, Automated, and Remote	
Instant: Leverages customer data and digital channels	Decisions can be made in seconds and loan terms can be very short
Automated: Automates decisions from registration to application to repayment	Automated processes enable services to move and scale quickly
Remote: Moves away from bank visits	Digitally-enabled transactions greatly reduce geographical or infrastructure barriers

Source: Adapted from Chen and Mazer (2016).

low-income consumers and micro, small, and medium enterprises (MSMEs) that have no formal credit history, low access to formal credit, and limited options for informal financing. From a gender perspective, the instant, uncollateralized, and relatively hassle-free nature of obtaining digital credit may help women manage income-related emergencies and gain easier access to vital funding. Digital credit also allows them to overcome barriers of mobility, time, and poverty they may face in accessing loans.

Digital credit also poses growing consumer risks, particularly in jurisdictions with little or no regulation and supervision (Chalwe-Mulenga and Duflos 2021). Common issues include credit providers collecting more information than necessary for the purpose authorized by the customer; use of credit-screening [algorithms](#) that lead to discrimination against or exclude certain groups (e.g., women); and shaming delinquent borrowers by informing or pressuring their digital contacts.

A lack of transparency in digital credit terms and conditions is another key issue. It appears to be one factor that contributed to high rates of late repayment and default in Kenya and Tanzania. In a 2017 digital credit survey, a significant percentage of digital borrowers in Kenya (19 percent) and Tanzania (27 percent) reported that they had not fully understood the costs and fees associated with their loans, incurred unexpected fees, or had a lender unexpectedly withdraw money from their accounts. Lack of transparency makes it harder for customers to make informed borrowing decisions, thus impacting their ability to repay debts. The survey data also show that roughly 50 percent of digital borrowers in Kenya and 56 percent in Tanzania reported repaying loans late. About 12 percent and 31 percent, respectively, said they had defaulted. Additional supply-side data on digital credit transactions from Tanzania show that 17 percent of loans granted between 2016 and 2017 were in default and 85 percent of active loans had not

⁵ For an expanded discussion of digital credit and the three attributes mentioned here, see Chen and Mazer (2016).

BOX 1. **Slipping through the cracks: The case of buy now pay later**

While there is no single definition of BNPL, most BNPL providers allow customers to pay for retail purchases and split the cost into smaller payments to a third party—without the interest and service charges normally associated with credit cards and short-term installment loans. BNPL is mainly accessed via apps and e-commerce sites and has existed in its current form for at least a decade. It has thrived in a regulatory gray area due to terms and conditions that fall short of the existing legal definitions of credit in many countries, leaving BNPL providers subject to little or no oversight.

As a result, users do not have the usual consumer protections, such as transparency, suitability assessment, and recourse. Surveys show that many BNPL users do not fully understand how the product works, for example, the consequences of defaulting on an installment or fees for missed payments (Barclays 2021). Several countries are now looking at how to regulate BNPL, including the UK, Australia, and the United States. The UK government, for example, plans to bring unregulated BNPL into the regulatory perimeter and require lenders to ensure that loans are affordable for borrowers. According to a consultation paper, financial promotion rules would also be amended in the UK to ensure that BNPL advertisements are fair, clear, and not misleading. Lenders would need Financial Conduct Authority (FCA) approval, and borrowers would be able to file complaints with the Financial Ombudsman Service (UK Treasury 2023).

been paid within 90 days (Izaguirre et al. 2018; Izaguirre and Mazer 2018; Kaffenberger et al. 2018).

From a regulatory perspective, while EMDEs such as Kenya and India have created dedicated regulations for nonbank digital credit, in many jurisdictions, the choice of how to regulate digital credit remains an open question.

Buy now pay later (BNPL) is another relevant product known to most users by brand names such as Klarna, Afterpay, or PayPal. While the concept of buying merchandise and paying for it over time is not new, BNPL is primarily offered by fintech firms. It specifically appeals to online shoppers who do not qualify for or prefer not to use other deferred payment instruments such as credit cards. While BNPL functions similarly to other forms of retail credit, in many countries it operates outside the regulatory perimeter and is increasingly coming under regulatory scrutiny (see Box 1).

CROWDFUNDING

Crowdfunding in its original form can be described by its three main characteristics: (i) raising funds in small amounts, (ii) many people raising funds to finance many other individuals and projects, and (iii) using digital technology. Table 2 summarizes the different crowdfunding models (Jeník et al. 2017).

Crowdfunding has the potential to advance financial inclusion by improving access to finance for excluded or underserved individuals and MSMEs, serving low-income customers by allowing innovations on existing models in sectors such as microfinance and DFS, and opening access to more complex investment products for resilience and asset-building, among other examples (Jeník et al. 2017). However, crowdfunding gives rise to risks for both fundraisers and funders. On the debt-based crowdfunding side, for example, fundraisers may be steered into borrowing beyond their financial means without perceiving the risk of over-indebtedness while funders may face the risk of financial loss.

There are limited examples of crowdfunding being addressed in regulation and of how to bring products and their providers within the regulatory perimeter in EMDEs. Various crowdfunding models may fall under different regulatory and supervisory regimes, and often there is no guidance on how to identify and apply the relevant regime. In the absence of regulatory clarity, products may remain underdeveloped. The Securities Commission Malaysia (SCM) introduced a regulatory

TABLE 2. **Crowdfunding models**

Models	Description
Debt-based	Debt-based crowdfunding is a model where funders (lenders) directly lend to fundraisers (borrowers) or invest in debt obligations issued through a platform. Various types of debt crowdfunding exist, for example, P2P lending, peer-to-business (P2B) lending, and business-to-business (B2B) lending. P2P lending enables individuals to lend money to individual fundraisers and entrepreneurs. Instead of being seen as an entirely new financial product, debt-based crowdfunding should be understood as a new approach to lending.
Donations-based	Donations-based crowdfunding allows individuals (donors) to send money to people (or projects) in need (beneficiaries), without the expectation of any financial return in exchange. This form of crowdfunding is commonly used within the nonprofit sector to aid social, environmental, political, and charitable causes, among others. A platform facilitating donations-based crowdfunding primarily derives its revenue stream from fees collected from each donation.
Equity-based	Equity-based crowdfunding enables both individual and institutional investors to invest in unlisted entities (issuers) in exchange for shares in the entity. It specifically caters to the needs of legal entities that raise funds by selling their equity. This type of crowdfunding is particularly well-suited to MSMEs. Once an investment target is met, the deal between the pool of funders, the issuer, and the platform closes. The platform charges a commission based on the total amount raised and, in some cases, on the basis of future profit.
Rewards-based	Rewards-based crowdfunding allows funders (donors) to contribute to campaigns in exchange for a nonfinancial reward. Rewards typically come in the form of tokens of appreciation, such as an artist's autograph, a mention of the donor's name in credits, or a T-shirt. Alternatively, rewards can involve the pre-purchase of a product or service (which may be the actual item being funded), based on the amount contributed by the donor.

Source: Adapted from Jenik et al. 2017.

framework for equity crowdfunding in 2015 and P2P lending in 2016. The industry has recorded stronger growth since (SCM 2021).

According to a survey, about a third of jurisdictions allowed P2P lending and equity crowdfunding to grow without regulation or under self-regulation while outright regulatory prohibition was rare (WBG and CCAF 2019).⁶ A significant share of regulators surveyed could not identify their approach as nonregulation, regulation, or prohibition. This is typically the case for jurisdictions where the sector is absent or not developed, or where relevant activities have yet to be officially defined. From a regional perspective and likely due to the absence of activity in the region, Sub-Saharan Africa has the lowest share of jurisdictions that regulate crowdfunding, including P2P lending.

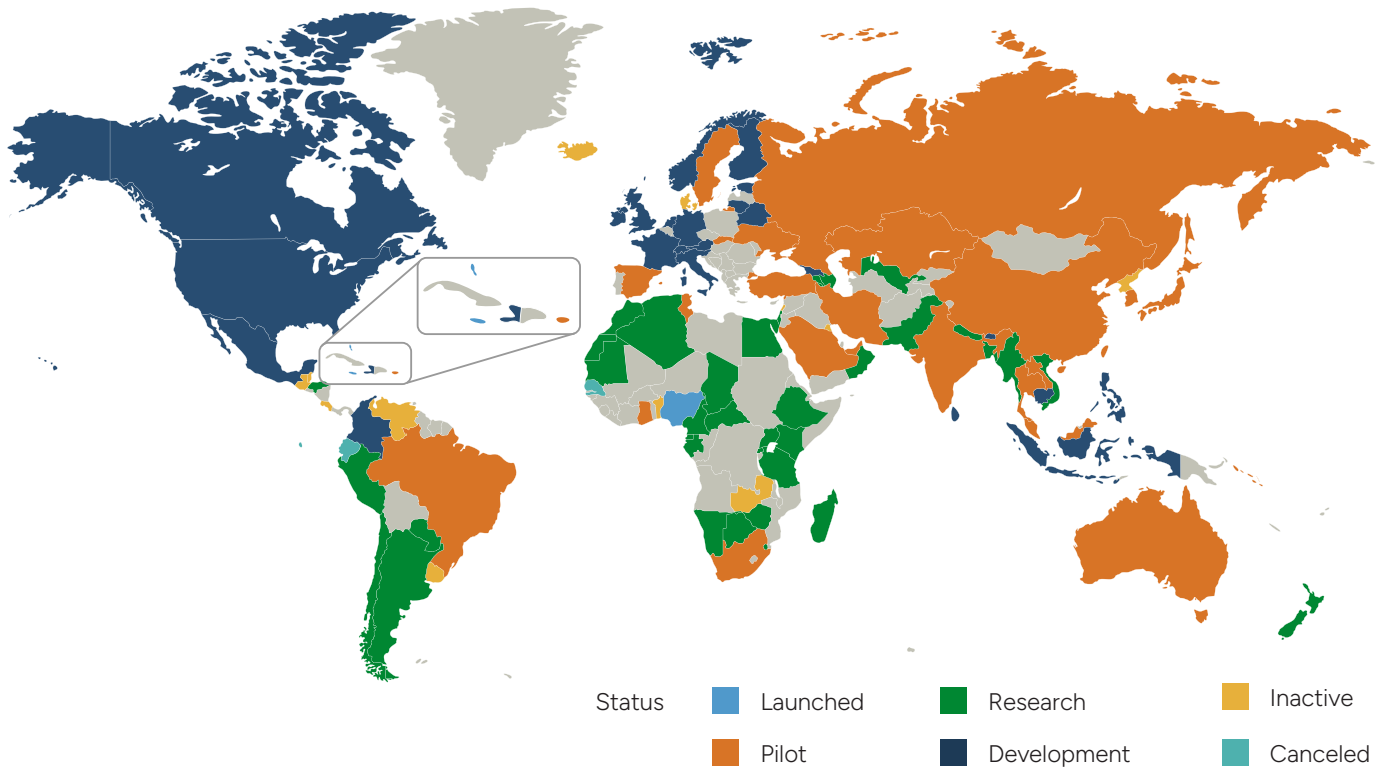
CENTRAL BANK DIGITAL CURRENCY

[CBDC](#) is a new form of fiat currency. It differs from the previously discussed product innovations in that it is not private-sector led but rather a central bank response to private-sector innovations—crypto assets in particular. CBDCs are of two types: wholesale and retail. As of April 2024, more than 90 countries had recently issued (e.g., the Bahamas, Nigeria), piloted (e.g., China, Ghana), or were exploring (e.g., Indonesia, Peru, Thailand) retail CBDCs for public use as a new way to store value and make payments with the majority being at pilot or research stage (see Figure 4).

A major difference between retail CBDCs and existing cashless payment instruments (e.g., credit transfer, direct debit, card payments, e-money) is that a CBDC represents a direct claim on a central bank rather than

⁶ For examples of how some countries regulate crowdfunding, see Ziegler et al. (2022).

FIGURE 4. Status of CBDC implementation



Source: Atlantic Council (2024).

a liability of a private FSP. Retail CBDCs may be further segmented into one- or two-tier, according to the role of intermediaries in CBDC distribution (e.g., banks, PSPs). Only 18 countries have experimented with wholesale CBDCs limited to users such as FSPs (Kiff 2023).

Many central banks considering CBDC issuance believe it has the potential to improve payments efficiency, reduce costs, and further financial inclusion. Across EMDEs, increasing financial inclusion is often the stated primary motivation for developing a CBDC (Auer et al. 2022). However, early retail CBDC launches have faced limited adoption (e.g., Nigeria, the Bahamas) so far. Some countries (e.g., Kenya, the Philippines) have deprioritized CBDCs. Recently, the tone of the debate seems to be shifting toward skepticism regarding the need to issue a CBDC (Cook et al. 2023). Whether and to what extent—and at what cost—it could advance

financial inclusion depends on how the central bank designs its CBDC, the retail payment infrastructure, and supporting policies adopted, among other specifics.

CBDCs will also come with new risks. For example, as with other accounts accessed via online interfaces, CBDCs could be compromised by cyberattacks or poor security controls. A Bank for International Settlements (BIS) survey of 26 EMDEs showed cybersecurity as one of their biggest CBDC-related concerns (BIS 2022). Data privacy is also a frequently cited concern because a central bank (and/or other government authority) with access to a CBDC ledger can see details of consumer transactions and personal information.

From a regulatory perspective, CBDC issuance may require new rules on issues such as the role of the central bank in providing this type of currency and

supervising its implementation.⁷ The Central Bank of Nigeria has issued guidelines that apply to CBDC (i.e., eNaira) users and FSPs that act as intermediaries in its CBDC system. In some jurisdictions the legal definition of “legal tender” may need to be revised to include its digital version and to give the central bank the necessary powers to issue a CBDC.⁸

Innovations in technology

Many of the business models and products described above are made possible by innovations in technology, for example, the use of [DLT](#) for crypto assets. New technologies have also created new access modes, such as electronic wallets, [open banking](#), and super apps (BIS and WBG 2020). New technologies of relevance to financial inclusion include APIs, AI/[machine learning \(ML\)](#), biometric technologies, and cloud computing, among others. They have the potential to reduce provider operating expenses and enable providers to innovate products and services on multiple fronts, such as payments, lending, savings, and insurance.

The new technologies providers use with new business models depend on the quality of their underlying information and communication technology (ICT) infrastructure. Gaps can result in vulnerability to cyberattack, system failures, or lack of network coverage and reliability for certain groups. At the same time, EMDEs with less developed ICT infrastructure may have an easier time adapting to new technologies than those entrenched in [legacy systems](#). According to a Financial Stability Institute (FSI) survey among 31 countries, current regulatory and policy responses to new technologies mainly rely on revising existing regulations or guidelines to include technology-specific elements. Some authorities have also

conducted exploratory analyses and assessments of the regulatory implications of using a particular new technology and formulated general principles for its regulation (Ehrentraud et al. 2020).

APPLICATION PROGRAMMING INTERFACES

[APIs](#) are at the heart of financial sector innovations and are used in many of the previously described business models to support [open finance](#), embedded finance, and modularization. APIs also support payment initiation services and facilitate nonbank access to customer payments and bank account information, which could expand access to more diverse services to the underbanked. PSPs additionally use APIs to facilitate merchant integrations, particularly in e-commerce, and to interface with payment systems (BIS and WBG 2020).

APIs can also be used in [collaborative CDD models](#), such as know-your-customer (KYC) utilities, that support customer identification and verification to satisfy anti-money laundering/combating the financing of terrorism (AML/CFT) requirements by enabling selected data to be shared among FSPs while ensuring that data not needed for CDD purposes remain private (Lyman et al. 2019).⁹

A variety of potential operational and cybersecurity issues have been identified, including data breaches, misuse and falsification, denial of service attacks, and unencrypted logins. Some FSPs mitigate risks via mechanisms including stricter access privileges, exchange of certificates and end-to-end encryption, authentication mechanisms, vulnerability testing, and monitoring API-related cyber incidents as part of an overall cyber incident monitoring program (BCBS 2019).

7 For discussions on the legal and regulatory aspects of CBDC, see Bossone et al. (2021a and 2021b) and Cirasino et al. (2021).

8 Other important considerations are the effect of CBDC on financial stability (BIS 2021) and monetary policy (Garratt et al. 2022). These issues go beyond the scope of this paper.

9 See CGAP's open APIs collection page for an expanded discussion of the topic: <https://www.cgap.org/topics/collections/open-apis>

Regulators around the globe are taking action to facilitate the establishment and appropriate use of APIs in data sharing. The Central Bank of Brazil has actively facilitated standardization of APIs and open finance to improve access to finance (Central Bank of Brazil 2020). Mexico's Fintech Law, another example of regulatory response, requires FSPs to establish APIs that enable connectivity with other FSPs for data-sharing purposes.

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

AI is an important enabler of new business models and financial services offerings. ML is a subset of AI. Credit scoring algorithms that use AI to process unstructured and alternative data, for example, enable FSPs to offer credit to individuals with little or no credit history and reduce the cost of assessing risk for certain segments, such as low-value loans. Fintech lenders in Brazil use AI-based credit scoring models to offer credit to consumers rejected by banks.¹⁰

AI tools such as chatbots can also help automate customer service processes, which can in turn reduce costs and increase customer satisfaction. Safaricom offers its Zuri chatbot on multiple communication channels (e.g., WhatsApp, Telegram) to help M-PESA customers perform account management tasks. Chatbots are especially useful to financially illiterate customers or those who face difficulties accessing physical channels (e.g., branches, agents). Voice-enabled chatbots can help customers who cannot read or write.

The use of third-party AI models may bring new risks to the sector. For instance, FSPs using them may lack the capacity or skills to monitor outsourcing risks. In many jurisdictions FSPs also rely on a limited number of AI providers, which increases market-level concentration risk. In this case, FSPs may be impacted if one or more dominant AI providers experience significant

disruptions or cease operations. However, risk varies depending on the materiality/significance of the AI models FSPs rely on. Consumer risk may increase if an AI model is not transparent or uses data in a manner that leads to or exacerbates bias and discrimination against specific customer groups, so FSPs need robust AI model risk management. An emerging body of principles, guidance, and, less often, regulations are addressing AI model governance in the financial sector (see Theme 3 under the section titled, "Implications of regulating disruptive innovations for inclusive finance" for more details).

BIOMETRIC TECHNOLOGIES

Biometrics encompasses unique biological and behavioral characteristics such as a fingerprint, iris print, hand, face, voice, gait, or signature that can be used to automate recognition of individuals. Biometric technologies can be used for identification (e.g., customer onboarding) or authentication (e.g., customer access to a financial service). India's Aadhaar system is a prominent example of a nationwide biometric identification program. As discussed in Lyman et al. (2019), biometrics supports financial inclusion by facilitating certain collaborative CDD models such as digital identity (digital ID) and electronic know your customer (eKYC). These models make it easier for unbanked individuals to open accounts with simplified documentation requirements, enable cost-effective remote customer onboarding, and enable other functions such as accepting digital signatures and obtaining customer consent (Appaya and Varghese 2019).

Biometrics may facilitate ATM use without a bank card and secure delivery services where identity fraud is likely or customers lack literacy or numeracy skills. However, the increasing use of biometric technologies raises data privacy issues. When a collaborative CDD model benefits from biometrics as an authentication method, concerns may develop regarding biometrics

¹⁰ According to CGAP interviews with fintech firms in Brazil.

collection and centralized storage since personal information could be vulnerable to cyberattack and large-scale theft. Where the rule of law is fragile, political figures may even exploit the system against their opponents.

To support financial inclusion, collaborative CDD models such as biometric-based eKYC should be backed by appropriate data privacy and protection risk management standards and proper AML/CFT regulation. These standards and regulations explicitly allow FSPs to rely on the results of valid system queries without the need for further customer data verification.

CLOUD COMPUTING

[Cloud computing](#) is at the center of many innovations and is particularly relevant to nonbanks, fintech firms, and other providers with emerging business models. It also supports the increasing modularization of financial services delivery. By enabling on-demand network access to a shared pool of computing resources, cloud computing allows FSPs to avoid heavy investment in IT resources and expertise, dramatically reducing entry and operating costs. This can increase both competition and innovation in the financial sector.

Cloud computing also supports inclusive innovation by increasing DFS flexibility and scalability, which impacts product design and delivery (Dias and Izaguirre 2019). However, its use may lead to important concerns such as data privacy, security, and effective oversight. Third-party cloud services can improve cyber security risk management because large cloud services providers (CSPs) have deep pockets to invest in state-of-the-art cyber defense and the ability to spread risk across multiple sectors and jurisdictions.

The content and level of outsourcing to CSPs also impacts the level of FSP dependency on CSPs. As with any kind of outsourcing, dependency on third parties such as CSPs brings a host of supervisory concerns. FSPs may have a reduced ability to identify, manage, and mitigate the risks of outsourced activities (FSB 2020a). Concentration risk is also growing, with the

top four providers controlling an estimated 70 percent of the global cloud services market across all sectors (Synergy Research Group 2024). Large CSPs operating in multiple countries often only follow their home country's data protection regulations and not those of countries where their FSP clients are located. This could lead to supervisory challenges and conflicting data protection rules for consumers.

As large-scale FSP use of cloud services providers becomes more common in EMDEs, regulators must assess whether conventional outsourcing rules and existing regulations remain sufficient enough to address the risks of significant outsourcing, especially for large global CSPs. There is growing discussion about whether the need exists to adopt a framework that allows supervisors to directly oversee and supervise such CSPs. In addition, [data localization rules](#) that restrict transnational data flows can keep both international and local FSPs from entering the market. They may also create significant additional costs if they rely heavily on cloud services, undermining their potential to offer innovative products that would benefit underserved individuals (Baur-Yazbeck 2018; Dias and Izaguirre 2019; Flaming et al. 2023).

DISTRIBUTED LEDGER TECHNOLOGY

[DLT](#) enables network participants—referred to as “nodes”—to securely propose, validate, and record changes or updates to a synchronized ledger distributed across the network's nodes (Ehrentraud et al. 2020). Crypto assets are one of the major DLT applications. From a financial inclusion perspective, DLT could support solutions that allow low-income customers to make rapid, low-cost cross-border transactions due to greater efficiency and a lower number of intermediaries and settlement costs. In addition, self-sovereign ID solutions based on DLT could empower customers to hold and manage their own identity data (Lyman et al. 2019). These solutions could allow low-income people to reliably record and store information (e.g., biometric scans, birth certificates, reference letters from the village head or clan leader, transaction histories) that makes it easier

for providers to perform CDD. This would be a game changer, considering that an estimated 850 million people around the globe and 35 percent of women in low-income countries do not have official identification (Clark et al. 2022).

In addition, use and repayment of credit offered by different types of lenders via DLT may present the opportunity for underserved people to build credit histories and better access to low-cost credit due to verifiable credit histories. DLT also has the potential to transform FSP back office operations and dramatically reduce their regulatory compliance costs, which may help FSPs serve less profitable segments.

DeFi solutions also leverage DLT. DeFi aims to provide financial services without intermediaries. It benefits from automated protocols on permissionless DLT (e.g., blockchain) and stablecoin to facilitate fund transfers (Aramonte et al. 2021). However, this form of intermediation is still new and not fully understood. Since DLT is a distributed system with no single point of attack throughout the network, it can be more resilient than a traditional centralized database and offers better protection against cyberattacks. While, for example, a permissionless blockchain serves the immutable database of all transactions, possessing a transparent and traceable nature accessible to everyone, many crypto transactions occur off-chain, not on their respective blockchains, posing challenges in tracing such transactions (Graf von Luckner et al. 2021). Also, in certain cases, the use of DLT may raise concerns about data privacy since a user's identity can be inferred based on transaction patterns or other indicators—even if their real identity is hidden and transactions are encrypted. While DLT may bring benefits to FSPs and their offerings, regulatory frameworks may need to be created or updated to guarantee adequate data privacy standards.

Implications of regulating disruptive innovations for inclusive finance

THE CHANGING LANDSCAPE OF business models, products and services, and technologies has important implications for financial regulation within the context of financial inclusion. This section synthesizes the cross-cutting issues into three broad themes: 1) defining the financial sector regulatory perimeter, 2) managing relationships between different types of authorities, and 3) balancing different policy objectives (see Table 3).

Theme 1: Defining the financial sector regulatory perimeter




Not all new products and services fall easily within the legal definitions of financial sector activities and not all new business models fit neatly into existing FSP typologies. In the absence of a holistic regulatory approach, new providers and activities (including those

that span multiple financial and nonfinancial sectors) may operate in a regulatory gray area or as third-party providers under outsourcing rules until they become “too important to ignore.” Regulators and supervisors are increasingly challenged to increase clarity and certainty in the regulatory perimeter.

ACTIVITIES, ENTITIES, OR BOTH?

As financial services provision becomes more modularized (Zetterli 2021) and the regulatory perimeter increasingly blurry, regulators are rethinking their approach to containing risks from the failure of certain types of activities and entities. The task is further complicated by nonfinancial firms that offer financial services and entities that combine the same or similar activities in different ways. Is the classification of regulatory approaches as either entity-based or activity-based (see Box 2) still relevant in light of the rise

TABLE 3. Cross-cutting themes of disruptive innovations

Theme	Issues
 <p>1. Defining the financial sector regulatory perimeter</p>	Regulators and supervisors may need to redraw the regulatory perimeter in light of the emergence of disruptive innovations that increasingly involve nonbanks (and even nonfinancial sector players) in financial services provision, and in new products, services, and technologies.
 <p>2. Managing relationships between different types of authorities</p>	Authorities should consider updating their approach to coordination and collaboration since disruptive innovations often have a cross-border and/or cross-sector presence.
 <p>3. Balancing different policy objectives</p>	Regulators should explore strategies to handle linkages and tradeoffs among primary policy objectives while harnessing the financial inclusion potential of disruptive innovations.

BOX 2. What are activity-based and entity-based approaches to regulation?

While interpretations differ on how to apply an activity-based vs. entity-based approach to regulation, we do not attempt to resolve the issue here. This paper draws from an FSI definition that describes an *activity-based regulation* as one that directly strengthens the resilience of a systemically important activity by constraining entities in their performance of that activity.

Entity-based regulation, on the other hand, indirectly strengthens the resilience of activities by imposing restrictions on combining them at the entity level. It reduces the likelihood and repercussions of the failure of entities, including insolvency and other disruptions to their functioning that may affect financial stability. There is a case for activity-based regulation when an activity can fail even if the entity performing it does not, and it is feasible to constrain the activity in isolation. By contrast, entity-based regulation helps prevent systemic events due to entities failing in the performance of a combination of activities (Borio et al. 2022).

of new business models, products and services, and technologies—or should it be reconsidered?

In the entity-based approach, rules apply to a specific type of provider (e.g., bank, microfinance institution, insurance company) in terms of the products and services it can offer based on the risks it presents to the financial system, particularly stability. Licensing categories define permitted activities and financial and operational requirements with the goal of reducing potential disruptions from an entity's failure. Most prudential regulators have different frameworks for banks and nonbank deposit taking institutions, for example. Some regulators apply entity-based rules to fintech firms; for instance, Mexico's Fintech Law of 2018 created two types of entities that are allowed to mainly offer e-money and crowdfunding services, respectively (Staschen and Kerse 2021).

On the other hand, an activity-based approach focuses on the activity conducted rather than the provider type. In this case, specified rules and requirements equally apply to all providers of a given activity (e.g., credit, payments, insurance), regardless of legal structure. Some risk areas, such as consumer protection and AML/CFT, typically warrant the activity-based approach across all provider types.

Yet entity vs. activity distinctions are not always clear-cut or universally adopted. Digital credit and e-money offer interesting examples. The Central Bank of Kenya recently issued a digital credit regulation to specifically cover previously unregulated digital credit providers. Because digital credit offered by banks, microfinance banks, and savings and credit cooperative societies (SACCOs) was already covered under their respective legal frameworks, the new regulation does not apply to these entities. On the other hand, the Reserve Bank of India's (RBI's) new digital lending guidelines apply to all regulated credit providers, including commercial banks, cooperative banks, and nonbanking financial companies, and thus follow an activity-based approach. E-money is another example of where regulations may vary within a jurisdiction. Ethiopia, Ghana, and Myanmar, among other countries, have created a separate category for nonbank EMIs but allow banks to issue e-money under their existing licenses.

Another activity-based vs. entity-based debate concerns firms that offer both financial and nonfinancial services. For example, should rules apply to a platform as an FSP (entity) or to its products and services (activity)? Or do platforms require a unique regulatory approach of their own? Typically, platforms offer financial services by obtaining licenses (e.g., banking, payments) for their financial services businesses or by partnering with or acquiring licensed FSPs. A platform's specific needs and risks may not be fully captured only by bringing its financial services business within the regulatory perimeter (Crisanto et al. 2021a). And if platform activities expand beyond their initial scope and/or begin to exhibit systemic importance, the suitability of the regulatory perimeter

may be called into doubt (Pacheco Rodríguez and Ortún 2020). These questions are of interest to regulators in the context of e-money services provision by mobile network operators (MNOs) and banks as well, with their different approaches to licensing and the use of subsidiaries as a result (BCBS 2016).

Relationships between platforms and FSPs also raise interdependency issues. For example, platforms partner with FSPs to offer financial services while those FSPs rely on platforms for cloud computing or data analytics. To address risks, authorities may decide to apply specific entity-based rules for operating platforms in the financial sector, which allows them to monitor and control risks from the combination of financial and nonfinancial activities (Borio et al. 2022). For example, the People's Bank of China created a specific regime requiring companies such as big techs that control two or more types of FSPs exceeding a certain size to create financial holding companies. The framework imposes new rules for corporate governance, company structure, shareholder eligibility, and capital adequacy, among others. Ant Group in China has applied for a license as a financial holding company (Financial Times 2024).

Fintech firms, big techs, and similar innovative providers present new challenges that have spurred extensive research and debate by global SSBs regarding the best approach to bring them within the regulatory perimeter. However, guiding principles and approaches do not yet exist. As EMDE regulators consider these issues in the context of financial inclusion, both approaches remain relevant, with some regulations more activity-based (integrity), some more entity-based (stability), while in other cases a combination is needed (e.g., for big tech). Cross-border activities where an entity's home and host regulators differ adds to the complexity. In all cases there is the need for a deep understanding of the risks

and opportunities different models present, including implications not only for financial inclusion but for stability, consumer protection, integrity, and competition.

OUTSOURCING CONSIDERATIONS

Providers with new business models usually leverage outsourcing and other third-party relationships to a greater degree than they had in the past. They may rely more heavily on third parties when outsourcing core activities they previously had not (or were not allowed to) outsource or operate as "outsourcee" and partner with other regulated FSPs. Many FSPs benefit from AI tool providers to make credit decisions in seconds or leverage digital onboarding providers to seamlessly manage remote onboarding of end users. These third parties may not fall within the regulatory perimeter.

The BaaS model is an extreme form of outsourcing where the BaaS provider outsources front-end functions to nonbank clients (e.g., fintech firms). The provider offers them white label financial products—the product, software, banking license, and balance sheet as a single solution that integrates easily (Mdluli et al. 2022; Zetterli 2021).

Traditional outsourcing risk management requirements and existing standards may not adequately address risks inherent in new activities with a more fragmented or modularized value chain.¹¹ Fragmented business models also raise consumer protection concerns, such as making it harder for customers to know where to turn in case of grievances.¹² These issues raise the question of whether the increased scope of outsourcing arrangements indicates the need to bring third parties within the regulatory perimeter in some cases. For instance, to better assist customers with grievances, the RBI's digital lending guidelines require both digital lenders and their third-party service

11 For example, BCBS Principles for Operational Resilience and Principles for the Sound Management of Operational Risk (BCBS 2021a and 2021b, respectively) provide guidance on how to manage the risks stemming from third-party relationships. However, they do not specifically address modularization-related issues.

12 Earlier BCBS guidance discusses the implications of outsourcing to agents and agent network managers, both widely used in the financial inclusion context, for operational and consumer protection risks (BCBS 2016).

providers to have a suitable grievance redressal officer to deal with issues borrowers raise.

It has also become more challenging for supervisors to assess and monitor systemic risks posed by third parties that become “critical providers” of financial services to multiple FSPs and nonfinancial companies if supervisors only focus on outsourcing FSPs. One example lies in the increased use of CSPs. Currently, most cloud computing by third-party providers is not subject to regulation beyond requirements for outsourcing FSPs in areas such as business continuity, data security, and exit planning. Yet FSPs may struggle to identify, manage, and mitigate these issues. Also, the current regulatory framework may not mandate that FSPs inform the supervisory authority or apply for approval to engage in material (significant) outsourcing. As a result, the authority may not be able to assess an FSP’s capacity to deal with the risks associated with early- stage outsourcing of material cloud services.¹³

Reliance on a small number of large global CSPs also raises concentration issues in the financial sector and could have implications for financial stability. Large global CSPs may use standard contracts that do not ensure supervisory access and audit rights, sometimes due to concerns about customer data privacy. Clearly, no single FSP can manage risks arising from the concentration of critical services a third party offers to multiple FSPs.

Regulators are now considering whether the traditional burden on FSPs to manage outsourcing risks should evolve where services pose a threat to financial stability. The UK, for example, is planning to introduce new regulations that apply to third parties, including CSPs, which will allow regulators to directly oversee the services critical third parties provide to firms (see Box 3). Also, large foreign CSPs are

BOX 3. UK and cloud computing

A consultation paper has recently been jointly published by the UK’s Prudential Regulation Authority, the Financial Conduct Authority, and the Bank of England (FCA 2024). It outlines the proposed requirements to be established in rules and their corresponding expectations for critical third parties, including cloud computing firms, that provide services to the UK financial sector.

The key aim of the proposed requirements and expectations outlined in the consultation paper is to manage potential risks to the stability of, or confidence in, the UK financial system. These risks may arise due to a failure in, or disruption to, the services provided by a critical third-party provider to one or more FSPs and/or financial market infrastructure entities.

The proposed requirements aim to enable the regulators to effectively monitor and manage the aforementioned risks in a manner that is both effective and proportionate, advancing their respective objectives. Also, these proposed requirements will allow regulators to directly oversee the services provided by critical third parties to firms. They will also complement but not replace the individual responsibilities of firms, their boards, and senior management in fulfilling their existing regulatory obligations regarding operational resilience and third-party risk management. Through these measures, UK regulators intend to ensure that critical third-party services are resilient and thereby reduce the risk of systemic disruption. The recent Financial Services and Markets Act 2023 grants the UK Treasury the right to designate a third party that provides services to multiple FSPs as a “critical third party” under specific conditions.

¹³ However, it is generally inadvisable to impose stringent authorization requirements for all cloud outsourcing services since it may have adverse effects on innovation and data security. It could also overburden supervisory resources. See Dias et al. (2023) for an expanded discussion of the supervisory implications of cloud outsourcing.

sometimes hired under standard-form contracts that do not always guarantee audit and access rights for domestic supervisors. As a result, authorities may need to actively engage in interinstitutional collaboration arrangements that facilitate cross-border sharing of regulatory and supervisory information, auditing of foreign CSPs, or indirect access to CSP data (Dias and Izaguirre 2019). In these cases, the regulator may consider amending outsourcing regulations to impose minimum contractual clauses that ensure the supervisor's audit and access rights.

RIGHT TIMING FOR RESPONSE

In addition to deciding whether and how to revise the regulatory perimeter, regulators need to determine the right timing for changes to it. To do so, EMDE authorities must balance two fundamental imperatives that may seem at odds with each other:

- **Leave space for innovation.** Authorities should avoid a “rush to regulate” without a proper understanding of the relevant innovation and its impact on the market and consumers. Many new business models have only emerged by taking advantage of regulatory space to test and learn and by allowing models to mature before they are brought within the regulatory perimeter. Hastily written rules may be poorly targeted, ineffective, or even harmful to innovation and growth.
- **Take timely action.** While sufficient space to test innovations is necessary, it needs to be balanced with timely regulation so “wait and see” does not turn into “waited too long.” Some new business models may rapidly evolve, reach a large customer base in a short time, and/or create new risks that can easily spiral out of control while outside the regulatory perimeter. There is also the risk of delayed regulatory action leading to legal uncertainty that can hinder inclusive providers from entering the market.

Crypto assets are a good example of this type of challenge. While the merits of crypto assets and their underlying technologies are the subject of vigorous

debate, consumer risks are high and growing in the absence of timely action in most jurisdictions (Newbury and Kerse 2023). Policy makers have been slow to provide regulatory clarity and oversight beyond some efforts to address AML/CFT, taxation, and warnings to consumers/investors due to a combination of inadequate understanding of risks, regulatory turf issues, and lack of global guidance, among other reasons. As Perez (2022) noted, some EMDE authorities (e.g., China, Nepal, Tunisia) have responded by prohibiting the issuance or holding of crypto assets or their use for certain purposes, such as payments (e.g., Türkiye).

While an outright crypto asset ban may be appealing given the risks and oversight challenges, it may be impractical to enforce prohibition. This is the case in China, which, despite an explicit ban, is among the world's most crypto-adopted markets. In the meantime, as described earlier, the number and scale of incidents leading to consumer harm are increasing. Authorities need to determine whether and how to regulate different types of crypto assets and adjust regulatory perimeters to cover issuers and service providers. At the same time, they must avoid driving out underlying technologies that foster other promising innovations, such as DLT.

To find the right balance between allowing space for innovation and preventing a buildup of excessive risks and uncertainty, regulators need different tools to monitor the emergence of new business models and products. As the Bali Fintech Agenda highlights (IMF and WBG 2018), countries need to closely follow developments to facilitate the timely formation of policy responses that foster fintech benefits, identify emerging opportunities, and mitigate potential risks. One option is to use innovation facilitators (e.g., regulatory sandboxes, innovation offices, accelerator programs) to help regulators decide whether they need to adjust the regulatory perimeter. Bank of Ghana's Fintech and Innovation Office is working to change the culture of its engagement with industry and the general public by, for example, having its staff visit accelerators, setting up booths at public events,

introducing a chatbot so consumers can raise issues, and launching a regulatory sandbox.

Regulators also need to look beyond the current regulatory perimeter and conduct market monitoring that looks at broader trends. Identifying quantitative and qualitative indicators that are in line with their policy goals and objectives is one way to do so. CGAP's Market Monitoring Toolkit provides a wide range of tools to enhance monitoring by market conduct supervisors (Izaguirre et al. 2022). Information generated by some of these tools could be equally useful for other types of supervision, such as prudential and AML/CFT.

Theme 2: Managing relationships between different types of authorities

Many disruptive innovations have a cross-border and/or cross-sector presence, including business models that operate in both financial and nonfinancial sectors plus products, services, and technologies offered in multiple jurisdictions. To effectively oversee these innovations, different authorities need to coordinate individual efforts and collaborate on shared initiatives.

DOMESTIC RELATIONSHIPS

Financial regulators often need to collaborate with nonfinancial regulators such as competition, consumer protection, labor, telecommunications, and transport authorities to effectively regulate and supervise risks in new business models, products and services, and technologies. Existing coordination mechanisms within the financial sector may serve as a precedent (e.g., agreements between banking and securities agencies). In mobile financial services, a signed memorandum of understanding (MoU) is a common tool for clarifying roles among financial and telecommunications regulators. For example, in 2016 Ghana's National Communication Authority and Bank of Ghana signed an MoU to govern e-money cooperation (AFI 2017).

Platform-based finance is another example of a business model that spans multiple industries. EMDE regulators should monitor platforms with a view to enabling them to introduce healthy competition and preventing them from creating new concentration risks (Staschen and Meagher 2022a). For a financial regulator to act strictly within the traditional silos of banking, payments, and other nonbank financial services would be to miss what is unique about platforms. For example, Mexico's competition commission has MoUs with the two lead financial services regulators. Other financial regulators have concurrent jurisdiction with competition agencies. In 2015, the UK's FCA gained concurrent powers for enforcement of competition policy along with the Competition and Markets Authority.

In other cases, various government authorities are directly involved in the planning and provision of innovations that require collaboration with financial regulators. For example, the design and implementation of collaborative CDD solutions typically relies on a digital ID system governed by one or multiple public institutions (e.g., the national identification authority) and needs to be accompanied by respective changes in the CDD rules set by the financial sector authority (Lyman et al. 2019). With a view to harnessing the financial inclusion potential of collaborative CDDs, the national ID authority and the financial regulator need to cooperate from the outset in the process of designing and implementing solutions.

CROSS-BORDER RELATIONSHIPS

Cross-border issues come to the fore not only in relation to business model innovations but with new products, services, and innovative technologies. On the business model side, platforms—especially regional and global big techs—operate across multiple jurisdictions, which requires international collaboration and cooperation. In EMDEs, even supervisors with the requisite authority may technically and politically struggle to deal with global big techs (Staschen and Meagher 2022b).

Recognizing the need to join forces, initially five African competition authorities—Egypt, Kenya, Mauritius, Nigeria, and South Africa—committed to collaborate and determine how digital markets, which include big techs, impact domestic participation in the local and global economy and the terms of participation (Competition Authority of Kenya 2022). The authorities agreed to share knowledge, develop capacity and mutual strategies, and provide a stronger and more collaborative approach to digital market regulation. Other African competition authorities joined this initiative in 2023 (The EastAfrican 2023).

CSPs raise another important cross-border issue since many operate in multiple countries. Efforts by domestic authorities may not suffice for efficient and sound oversight across borders as they are often hampered by the foreign location(s) of CSP facilities (e.g., for cloud storage), inconsistencies between national legal frameworks, and a paucity of skilled and experienced supervisory staff. As previously noted, there is growing consensus that regulation of material outsourcing by FSPs should be consistent across financial sectors, functional authorities, and countries (Dias 2020).

At a minimum, bilateral coordination between home and host countries is needed to allocate jurisdiction over providers, including audit and access rights, and to protect citizens' rights over data held by foreign providers (Meagher and Staschen 2022). The EU's Digital Operational Resilience Act (DORA), for example, promotes convergence at the international level on best practices for reviewing risk management of ICT third-party service providers, including CSPs. The act envisages European supervisory authorities (ESAs) concluding cooperation arrangements with relevant counterparts to facilitate the development of best practices to address ICT third-party risk (EU 2022). Recently, a consultation paper was circulated on the joint draft guidelines on the oversight cooperation and information exchange between the ESAs and the EU competent authorities (EBA 2024).

Another example of cross-border regulatory challenges relates to crypto assets. Crypto's borderless nature limits the impact of unilateral national approaches, especially blanket prohibitions. Crypto service providers can register in regulatory-friendly locations and use that platform to serve the global market, as was the case with the now-bankrupt FTX registered in the Bahamas (IMF 2023).

Theme 3: Balancing different policy objectives

Harnessing an innovation's financial inclusion potential requires EMDE regulators to have a clear understanding of the impact of regulatory choices on relevant policy objectives, such as closing the financial inclusion gender gap or reaching specific underserved customer segments. As regulators attempt to balance possible tradeoffs and synergies between innovation and inclusion, it can help incorporate CGAP's I-SIP approach (see Box 4).

Applying the principle of proportionality can also help deter the negative side effects of regulation and supervision on financial inclusion. This is true for both activity-based (e.g., AML/CFT) and entity-based regulation (e.g., for banking or insurance firms), as discussed in Restoy (2022). Following a proportionate regulatory approach, requirements are tailored to an innovation's risk profile and its systemic importance to balance risks and benefits against costs. If regulations are not carefully drafted, innovations have the potential to reverse financial inclusion progress, widen the digital divide, or harm the customers they were intended to serve.

Similarly, proportionate and risk-based supervision adapts supervisory procedures, attention, and intensity to individual provider risk profiles to ensure that FSPs operate safely and responsibly without unnecessary compliance burden. It also helps authorities optimize

BOX 4. **The I-SIP approach to managing linkages among policy objectives**

CGAP's research on linkages between four key policy objectives—inclusion, stability, integrity, and protection (I-SIP)—found them to be interrelated and mutually reinforcing under the right circumstances. While each objective is valuable on its own, failure with one can lead to problems with the others. The main idea of the I-SIP approach is to identify linkages between objectives and manage them to design policies that lead to improved outcomes. Synergies between objectives are ultimately maximized and trade-offs or negative outcomes avoided or minimized (Tomilova and Valenzuela 2018).

their limited resources. Yet there is a general need for more practical guidance on how to implement proportionality,¹⁴ along with examples from EMDEs on how changes to the regulatory architecture have impacted financial inclusion and the role of a proportionate approach in doing so.

Illustrative examples of how the choice of regulatory requirements for specific innovations can positively or negatively influence their financial inclusion impact are provided below.

DIGITAL IDs

Proof of identity is an important gateway to DFS access and digital IDs are a promising tool in that respect. However, certain population segments lack the evidence documents they need for identification—digital or otherwise (e.g., birth certificate, passport, driver's license, other government-issued documents)—especially those who are not citizens of a country (e.g., forcibly displaced people). The lack of access to digital technology (e.g., mobile or smartphones), low levels of technology literacy, or a lack of coverage and/or unreliable connectivity may

exclude low-income and rural populations from digital ID use. In addition, as discussed in FIGI (2021), where IDs use biometric technology, physical characteristics may preclude certain customers from having their biometrics captured (e.g., altered features due to aging or illness; the inability to read a manual laborer's worn fingerprints; facial recognition failure related to darker pigmentation, eye shape, or facial hair).

Religious or cultural beliefs related to capturing biometrics may also lead to self-exclusion. A woman, for example, may be uncomfortable having a man take her fingerprints (World Bank 2019; World Bank 2024). For these reasons and to address the issues, digital ID design and implementation requires collaboration between the national ID authority and the financial regulator, including the development of a proportionate regulatory framework that makes the digital ID system as inclusive as possible and provides alternative CDD mechanisms for still-excluded customer segments.

CENTRAL BANK DIGITAL CURRENCY

Most central banks considering development of a CBDC aim to promote its use and availability across the entire country. Yet an ill-designed CBDC, along with low digital and financial literacy, could increase the digital divide. Some proposed CBDCs require smartphone use and internet access, which can hinder adoption in countries where they are not widely available. In fact, in many countries more than 50 percent of the population does not have internet access (Statista 2024). On a granular level, smartphone adoption in Sub-Saharan Africa was only 51 percent in 2022 (GSMA 2023a).

The risk of exclusion is even higher for women. In low- and middle-income countries they are 18 percent less likely than men to own smartphones (GSMA 2022) and 19 percent less likely to use the internet (GSMA 2023b). The Central Bank of Kenya has stated that with less than half the population in Kenya having access to a 4G

¹⁴ An example is the BCBS's high-level considerations on proportionality developed by the Basel Consultative Group (BCBS 2022).

smartphone, a CBDC could further isolate those currently lacking access to financial services (Coingeek 2022).

There are multiple examples of central banks attempting to address these challenges through different methods, including certain offline solutions (BISIH 2023). The Central Bank of Nigeria (CBN) introduced a USSD code to enable people without smartphones to make eNaira transactions on its CBDC platform (CBN 2023). The People’s Bank of China has added a feature to its digital payment app so that mobile phone SIMs can still be used to make payments, even if they lack connectivity or power (Du Chuan 2023). The Reserve Bank of India confirmed that it is exploring offline solutions to improve its retail CBDC (The Paypers

2024). Bank of Canada has been researching a network-independent Universal Access Device that may prevent the interruption of digital transactions in cases of infrastructure failure (Minwalla et al. 2023).

ARTIFICIAL INTELLIGENCE

Algorithms are useful for customizing tailored product or service offerings to different customer segments. Yet a key concern is whether these AI models could lead to unfair end user bias during the loan assessment process, which could lead to or exacerbate unfair discrimination against specific customer groups based on attributes such as gender, ethnicity, place of residence, race, or sexual orientation (IIF 2021b). For

BOX 5. Protecting consumers from AI bias

Some AI models lack transparency and explainability in their design (IIF 2021a). Many countries do not require providers to disclose the types of data used in credit scoring. Models may be developed and maintained by a third party (i.e., the AI model’s provider) that treats the model and the data as its intellectual property, potentially imposing obstacles to transparency, accountability, and supervision. Users of “black box” AI models are thus unable to explain how the algorithm works—even to supervisors.

While AI-powered algorithms have become more common in EMDEs, oversight is often slim. Providers of AI tools may not operate within the regulatory perimeter and are likely to fall outside the scope of supervision (Dias et al. 2023). Additionally, FSPs may lack sound model governance and the capacity or expertise to monitor their AI providers.

The growing use of AI-driven models necessitates a framework of policies and risk management expectations for FSPs. While challenging in low-capacity environments, supervisors need to gradually enhance their own skills and monitoring tools to oversee the use of AI models and respond to evidence of discriminatory or other harmful results. An emerging body of principles, guidance,

and less often, regulations are addressing AI model governance in the financial sector (Prenio and Yong 2021). Two examples follow.

Example 1.

The Monetary Authority of Singapore (MAS) issued principles to promote fairness, ethics, accountability, and transparency in the use of AI and data analytics in Singapore’s financial sector (MAS 2019). The principles were developed in consultation with the industry and close coordination with authorities responsible for data protection and communications. They complement previously existing requirements for internal governance frameworks and must be applied and calibrated according to the materiality of the different AI models FSPs use.

Example 2.

The European Parliament recently adopted the Artificial Intelligence Act, which will soon come into force. It applies to both public and private actors, including FSPs inside and outside the EU, as long as the AI system operates in the EU market or its use affects people within the EU. The proposal follows a risk-based approach and imposes regulatory burdens only when an AI system is likely to pose a high risk to fundamental rights and safety (European Parliament 2024).

instance, algorithms could incorrectly rate a customer from an ethnic minority as a higher default risk because customers of that ethnicity historically had lower levels of bank access and hence thinner credit histories.

Some scoring models mitigate this type of risk by excluding data on sensitive attributes such as race, ethnicity, religion, sexual orientation, and gender. A lender may attempt to correct for algorithm output bias via human intervention, following a clear policy and predetermined procedures to avoid unfair discrimination. This is useful even in cases of an ex-ante effort to correct input data because implicit algorithm bias may remain via the inclusion of proxy variables—even when the main variable (e.g., gender) is deleted from a data set (Kelly and Mirpourian 2021). Proxies for gender, sexual orientation, and other attributes can include mobile phone model, mobile apps installed, postal code, and social media contacts (Kessler and Menajovsky 2021). This complex technology requires providers to have robust AI model governance and authorities to effectively oversee their use (see Box 5).

Toward a holistic approach: Stocktaking exercise

As is often the case with EMDE policy issues, there is no single recipe for an enabling environment for inclusive innovation. Regulatory reforms tend to respond to individual innovations (e.g., cloud computing, fintech, digital credit) rather than comprehensively rethink necessary changes to regulatory and supervisory approaches, especially with the explicit goal to advance financial inclusion. Current literature and guidance reflect this piecemeal approach.

For regulators that want to apply a more holistic approach to innovation regulation, a good place to start is with a basic stocktaking exercise—how

regulations and regulators shape provider and service innovations and to what extent they are forward-looking and inclusion-friendly. Stocktaking can be done informally by considering basic questions (see Box 6) and using the three themes discussed above, or it can follow a more structured diagnostic.¹⁵ Either way, the process should help regulators identify areas where change is required.

The goal of the stocktaking exercise is to understand the extent to which the current regulatory framework toward disruptive innovation aligns with financial inclusion goals. CGAP is currently conducting further research and developing guidance for regulators on how to best harness innovation for inclusive finance.

Some countries have followed a similar process in the context of promoting the digitalization of the economy. Ghana, for example, used a diagnostic exercise to review its digital payments ecosystem (Amoah et al. 2017), including regulatory approaches. The result was a Digital Financial Services Policy and Digital Payments Roadmap (Ghana Ministry of Finance 2020 and 2023). Such strategies break the process into phases and identify key actors that need to coordinate across multiple ministries and government departments with an eye to advance financial inclusion. As part of the Digital Uganda Vision (Uganda Ministry of ICT 2023), the country's Insurance Regulatory Agency created the Regulating for Innovation Toolkit (Cenfri 2021) to develop an enabling environment and capacity for regulating innovations. While targeted to the insurance sector, the process offers an interesting model that could be expanded to a wider context.

¹⁵ The following are examples of some regulatory diagnostic toolkits for DFS and fintech: Claessens and Rojas-Suarez (2020), UNCDF (2022), and UNSW and UNCDF (2018). As an additional resource, the World Bank's (2021) global fintech-enabling regulations database allows for comparison with other markets.

BOX 6. Questions for a basic stocktaking exercise



Theme 1: Defining the financial sector regulatory perimeter

This theme considers whether (and how) the regulatory perimeter should be redrawn, including the focus on entities and activities, approaches to third-party/outsourcing risk, and the right timing for reforms.



Theme 2: Managing relationships between different types of authorities

This theme considers how regulators in different domains and jurisdictions collaborate in general and how they obtain and share the information they need in particular.



Theme 3: Balancing different policy objectives

This theme considers how policy choices impact financial inclusion and how to follow a proportionate approach to regulation and supervision in considering various policy objectives.

Questions to consider:

Priorities. Do your innovation-related policies consider the potential impact—good or bad—on financial inclusion?

Timing. If you are using a “wait and see” approach, how do you decide when to act? What are the risks for low-income consumers of acting too quickly or waiting too long?

Learning and engagement. How well do you understand new business models, products, and technologies? Are you asking innovators the right questions and getting the information you need? Do you maintain an ongoing dialogue with them?

Agility. How fast can you respond to changes in the financial sector? If the answer is “not very fast,” what is holding you back? How could this be improved?

Cross-border issues. Do you have a good handle on activities outside your physical borders with relevance to domestic markets? What new sources of intelligence do you need?

Expectations. Do new entrants understand what you want them to do? If not, what is lacking—written guidance? direct engagement (e.g., pre-application meetings, workshops)? innovation facilitators?

Remit. Where do innovations blur the boundaries between authorities? Is there duplication of effort that creates inefficiencies and confusion or gaps that lead to blind spots?

Prioritization. Concerning innovations, which authorities do you consider the most relevant domestically and globally?

Communication. How often do you engage with other authorities—formally? informally? Would an established coordination mechanism (e.g., MoU, working group) help ensure regular communication between key authorities?

Information sharing. Do you have all the information you need from other authorities? What challenges could be solved with better information sharing and what would it take to implement those solutions?

Balance. What tradeoffs and synergies do innovations create between inclusion, stability, integrity, consumer protection, and competition? Are there new tensions you are not sure how to deal with?

Proportionality. Do you have a good handle on how to use proportionality and a risk-based approach in regulatory and supervisory decisions?

Inputs. Is financial inclusion a siloed activity or an essential input to policy decisions? How often do relevant regulators (e.g., prudential, market conduct, competition, data protection, cybersecurity) engage with ministries or departments that focus on financial inclusion or whose policies potentially impact financial inclusion?

Outcomes. Do you collect evidence to see whether innovations lead to positive consumer outcomes? Do you consider the impact of policy and regulatory reforms on financial inclusion when you measure success?

Conclusion

THIS PAPER DESCRIBES SOME OF THE primary innovations that have the potential to expand the quality and accessibility of financial services and the regulatory challenges and questions that have arisen in their wake. When designed and delivered responsibly, new business models, products and services, and technologies can facilitate greater choice and improved efficiencies. However, without the appropriate regulatory and supervisory responses they can increase risks to consumers and the financial system—in some cases significantly.

Balancing the tensions that arise between innovation and policy objectives such as stability, integrity, consumer protection, inclusion, and competition is nothing new for EMDE regulators and supervisors that work hard to build capacity to oversee DFS and increase financial inclusion. What has changed is the ability to apply tried-and-true approaches that were more relevant in a lower-tech environment populated by traditional providers like banks and microfinance institutions.

In examining the financial inclusion implications of innovations and the ensuing regulatory and supervisory responses, CGAP found three main points to consider:

- First, the regulatory perimeter (i.e., who regulates what) may no longer fit the current array of activities and entities.
- Second, regulators need to more actively cooperate across domains and geographic boundaries to deal with increasingly global and multifaceted financial services.
- Third, balancing multiple mandates and objectives has never been more challenging. It requires a deep understanding of the consequences of regulatory choices.

SSBs and other experts are building a good foundation of research and guidance, but often its main focus is on issues of stability and integrity with less attention paid to consumer risks and financial inclusion opportunities. In addition, some innovations need deeper analysis and global consensus before questions about their contribution to financial inclusion and regulatory and supervisory treatment can be settled.

To help fill these gaps, CGAP recommends that EMDE regulators, naming financial inclusion among their primary policy objectives, start with a simple stocktaking exercise to ensure inclusion considerations are part of future regulatory reforms. CGAP is currently working on drafting recommendations for regulators on how best to harness innovations for financial inclusion.

Among the learning questions CGAP plans to further explore:

- What kind of regulatory and supervisory practices/ approaches to innovation are typically associated with better financial inclusion outcomes?
- How can authorities properly identify their priorities, assess their significance level, then accordingly sequence regulatory and supervisory changes in line with such priorities while responding to innovation—with a particular emphasis on financial inclusion as one of the primary policy objectives?

- What are examples of successful practices regarding definition of the regulatory perimeter; effective collaboration between authorities and other stakeholders (private and public); balancing of various policy objectives?
- In what ways can authorities adapt to swift evolution of technology, business models, and associated risks? What strategies can they employ to ensure flexibility and adaptability, fostering a more forward-looking and anticipatory approach to innovation?
- What approaches can authorities take to improve their agility toward and preparedness for future innovation?
- What are key enablers and barriers to successfully implementing those practices/approaches?
- Is there a common set of guiding principles for countries to follow in adoption and implementation of those practices/approaches?
- What are the most effective ways for authorities to enhance their learning and increase their capacity to respond to disruptive innovations?

CGAP will continue to engage with EMDE regulators and supervisors to better understand their regulatory challenges and to identify promising solutions.

ANNEX 1

Glossary of Terms

Algorithm is a set of computational rules to be followed to solve a mathematical problem. More recently the term has been adopted to refer to a process to be followed, often by a computer (FSB 2020b).

Application programming interface (API) is a set of routines, protocols, and tools for building software applications. APIs are the conduit for data transmission between two parties.

Artificial intelligence (AI) is defined as IT systems that perform functions requiring human capabilities. AI can ask questions, discover and test hypotheses, and automatically make decisions based on advanced analytics operating on extensive data sets. Machine learning (see below) is one subcategory of AI (BCBS 2018).

Banking-as-a-service (BaaS) is an entirely new business model that enables nonbanks to offer banking services under their own brand and seamlessly embedded into their digital offering. BaaS improves access to cutting-edge technology and brings economies of scope and scale. It is a combination of banking tech stack and banking license that necessitates compliance with banking regulation. BaaS providers are tech companies with banking licenses that represent the vision of banks as market utilities (Jeník and Zetterli 2020).

Big data refers to the large volume of data that can be generated, analyzed, and increasingly used by digital tools and information systems. This capability is driven

by the increased availability of structured data, the ability to process unstructured data, increased data storage capabilities, and advances in computing power (BCBS 2018).

Big data analytics focuses on discovering patterns, correlations, and trends in the data or customer preferences, for example. It can be based on machine learning or other technologies (Dias 2018).

Big techs are large global companies whose primary activity is in digital services. They have large digital services customer bases. Examples include e-commerce platforms, online search engines, ride-hailing platforms, and social media platforms. Numerous big techs have started to offer financial services, leveraging their larger customer bases and the data they have on transactions and activities that give rise to payments or a need for credit, insurance, or other financial services. Big techs include Alibaba, Amazon, Facebook, Google, and Grab, among others (World Bank 2022).

Biometrics is defined as automated recognition of individuals based on their biological and behavioral characteristics. It covers a variety of technologies in which people's unique identifiable attributes are used for identification and authentication. Includes but is not limited to a person's fingerprint, iris scan, hand, face, voice, gait, or signature, which can be used to validate the identity of individuals (Ehrentraud et al. 2020).

Central bank digital currency (CBDC) is a potentially new form of digital central bank money that is distinguishable from reserves or settlement balances held by commercial banks at central banks. A CBDC is a central bank liability denominated in an existing unit of account. It serves as both a medium of exchange and a store of value (IMF 2022).

Chatbot is a computer program designed to simulate conversation with human users. Chatbots are widely used for online customer services at FSPs and beyond. More recent chatbots use machine learning for improved performance (Dias 2018).

Cloud computing refers to the use of an online network (i.e., cloud) of hosting processors to increase the scale and flexibility of computing capacity. This model enables convenient on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage facilities, applications, services) that can be rapidly released with minimal management effort or service provider interaction (BCBS 2018).

Collaborative customer due diligence is a new approach to customer due diligence (CDD) that seeks to address the shortcomings of current CDD processes. Examples include creating a public utility FSPs can use to identify clients and verify identities on an ongoing basis, access to KYC as a service (a centralized database where banks can share and access KYC information on corporate clients), and self-sovereign identity solutions (Plaitakis and Staschen 2020).

Credit scoring is a form of statistical analysis that provides an estimate of the probability that a loan applicant, existing borrower, or counterparty will default or become delinquent (Ocal and Masunda 2022).

Crowdfunding typically describes a method of financing whereby small amounts of funds are raised from a larger number of individuals or legal entities to fund businesses, specific projects, individual consumption, or other needs (Jeník et al. 2017).

Crypto asset is a type of private digital asset that primarily depends on cryptography and distributed ledger technology or similar technology (FSB 2022). Crypto assets may be known by other names, such as virtual assets and digital assets.

Crypto asset issuer is an entity, person, or other structure that creates new crypto assets (FSB 2022).

Crypto asset services are services relating to crypto assets that may include, but are not limited to, distribution, placement, facilitating exchange between crypto assets or against fiat currencies, custody, provisioning of noncustodial wallets, facilitating crypto asset trading, borrowing or lending, and acting as a broker dealer or investment advisor (FSB 2022).

Crypto asset service provider is an individual or entity whose business is the provision of one or more crypto asset services to third parties. It includes crypto exchanges, crypto asset trading platforms, and cryptosystem lending platforms, among others.

Data localization rules are put in place by some jurisdictions to restrict the movement of data across national borders. Restrictions vary across jurisdictions and range from requirements for data generated inside a jurisdiction to be stored and processed by firms within that jurisdiction to data export conditions that need to be met before data can be moved abroad (FSB 2019).

Decentralized finance (DeFi) is a new form of intermediation in crypto markets. It aims to provide financial services without intermediaries, using automated protocols on permissionless DLT and stablecoin to facilitate fund transfers (Crisanto et al. 2021a).

Digital bank is a type of bank that adopts new technologies in all operations (back office and front office delivery) to offer banking products and services mainly through digital channels (Kerse and Staschen 2021).

Digital financial services (DFS) are the range of financial services accessed through digital devices and delivered through digital channels, including payments,

credit, savings, and remittances (AFI 2016). Digital channels may include mobile phones, cards combined with card readers, computers connected to the internet, and automated teller machines, among others. Mobile financial services are a type of DFS primarily delivered through mobile phones, which may include mobile money, mobile insurance, mobile savings, and others.

Digital identity is a set of electronically captured and stored attributes and/or credentials that uniquely identify a person. The term often refers to digital ID systems—identification systems that use digital technology throughout the identity lifecycle, including for data capture, validation, storage, and transfer; credential management; and identity verification and authentication (World Bank 2022).

Distributed ledger technology (DLT) is a means of recording information through a distributed ledger (i.e., a repeated digital copy of data at multiple locations). The technology enables nodes in a network to securely propose, validate, and record changes or updates to a synchronized ledger distributed across the network's nodes (Ehrentraud et al. 2020).

Electronic KYC (eKYC) refers to the process of electronically verifying customer credentials in line with a country's customer due diligence processes with respect to risk-based approaches. For example, it may include biometrics, one-time passwords on mobile phones, video identification, etc. (AFI 2022).

Electronic money (e-money) is monetary value electronically stored on a system or device that can be used for making payments and transfers to entities and people other than the EMI. Mobile money is also a type of e-money primarily delivered through mobile phones and mobile money agents.

Electronic money issuer (EMI) is a type of FSP that issues e-money against the collection of customer funds, offering e-money accounts and related payment and storage services. EMIs may be banks or nonbanks. Nonbank EMIs are often prohibited from engaging

in credit operations (i.e., cannot intermediate funds collected from e-money customers).

Embedded finance can be defined as the seamless incorporation of financial products or services into nonfinancial products or services (e.g., integration of payments into the ride activity on a ride-hailing platform, taking out a loan on an e-commerce platform) (World Bank 2022).

Equity crowdfunding is an activity where investors provide funding to private companies in the form of equity. The relevant platform matches investors with companies they want to invest in, enabling them to participate in the early capital-raising activities of startups and other companies (Ehrentraud et al. 2020).

Financial technology (fintech) is defined as advances in technology that have the potential to transform the provision of financial services, spurring the development of new business models, applications, processes, and products (IMF and WBG 2018). Fintech activities can be seen in different financial services (e.g., payments, credits, deposits, remittance, investment management, insurance).

Fintech firm is a company that offers financial products and services primarily through the use of financial technologies. These firms may or may not have an FSP license.

Innovation facilitator is a public-sector initiative to engage with the fintech sector, for example, a regulatory sandbox, innovation hub, or innovation accelerator (FSB 2020b).

Innovation hub is an innovation facilitator set up by supervisory authorities that provides support, advice, or guidance to regulated or unregulated institutions in navigating the regulatory framework or identifying supervisory, policy, or legal issues and concerns (FSB 2020b).

Legacy systems are potentially outdated computer systems, programming languages, or software. For

traditional banks it often means a system that cannot be taken out of service as the cost of designing a new system with a similar availability level is high (e.g., a system to handle customer accounts) (Planet Compliance 2017).

Machine learning (ML) is a method of designing problem-solving rules that automatically improve through experience. Machine learning algorithms give a computer the ability to learn without specifying all the knowledge it needs to perform a desired task, as well as to study and build algorithms that can learn from and make predictions based on data and experience (BCBS 2018).

Modularization can be defined as the unbundling of value chains in delivering financial services. With modularization, a substantial number of different providers are seamlessly involved in meeting individual customer demands for financial products and services, both on the front end and back end. Modularization also allows customers to use a greater number of different providers for different products, services, and needs.

Open banking is similar to open finance, only it is limited to the sharing of data held by banks.

Open finance is defined as consumer consent-based sharing of data across FSPs, including banks, PSPs, EMIs, insurance providers, mortgage providers, or investment advisors, by determining the requirements for and standards of participation. Uses for such data include improving product design, customization (e.g., financial advice), improving risk assessments (e.g., credit, insurance), building price comparison tools, and helping customers switch providers. Open finance also aims to give more control over personal data to the data subjects (e.g., individual customers, microentrepreneurs) (Jeník et al. 2024).

Payment services provider (PSP) is a legal entity that provides services enabling funds to be deposited and withdrawn from an account; payment transactions involving transfers of funds; the issuance and/or

acquisition of payment instruments such as checks, e-money, credit cards, debit cards, and remittances; and other services central to the transfer of funds. PSPs include banks and other deposit-taking institutions, money transfer operators, and nonbank EMIs, among others (AFI 2016).

Platforms, with their technology-enabled business models, create value by facilitating exchange between two or more participant groups. Platforms do not make or own goods or services, rather they host markets that allow people with goods and services and those who want them to find and interact with each other (Fernandez Vidal 2020).

Regulatory sandbox is a tool for developing evidence about how a new product, technology, or business model (innovation) works and the outcomes it produces. Evidence gathering can help assuage or confirm regulatory concerns about the impact of innovations, allowing beneficial innovations to reach the marketplace (Jeník and Duff 2020).

Regulatory technology (regtech) encompasses technology solutions by regulated institutions that improve compliance at potentially lower costs, including solutions for regulatory reporting.

Stablecoin is a type of crypto asset that mainly aims to reduce the high volatility seen in other crypto assets, such as Bitcoin. The value of a stablecoin is often pegged to the value of a specified asset or basket of assets. Some stablecoins are backed by an asset or a basket of assets.

Supervisory authority refers to a financial authority in charge of supervision, such as a central bank, financial market authority, financial conduct authority, and bank superintendence. It does not include regulators of other sectors, such as telecommunication regulators.

Supervisory technology (suptech) is technological solutions focused on improving the processes and effectiveness of financial supervision and regulation.

Third-party provider is a separate legal entity that provides services on behalf of or to an FSP. It can be another supervised FSP or non-supervised entity (e.g., certain fintech firms, CSPs).

Traditional bank is a type of bank licensed to offer the broadest range of financial services, most importantly, taking deposits from the general public and providing credit. Traditional banks are known by different names in country regulations, including commercial banks, universal banks, deposit money banks, and others.

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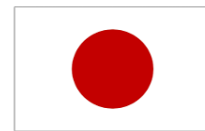
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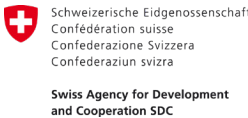
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