Global Experiences from Regulatory Sandboxes

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Abbreviations and Acronyms

ADGM	Abu Dhabi Global Market
AE	advanced economy
AFI	Alliance for Financial Inclusion
AFIN	ASEAN Financial Innovation Network
AI	artificial intelligence
AML	anti-money laundering
API	application programming interface
ASEAN	Association of Southeast Asian Nations
ASIC	Australian Securities and Investment Commission
BCB	Banco Central do Brasil (Central Bank of Brazil)
BCBS	Basel Committee for Banking Supervision
BFA	Bali Fintech Agenda
BIS	Bank for International Settlements
BNM	Bank Negara Malaysia
BNR	National Bank of Rwanda
BOT	Bank of Thailand
BSP	Bangko Sentral ng Pilipinas
CBK	Central Bank of Kenya
CBN	Central Bank of Nigeria
CDD	customer due diligence
CFPB	Consumer Financial Protection Bureau
CFT	combating the financing of terrorism
CGAP	Consultative Group to Assist the Poor
CMA	Capital Markets Authority (Kenya)
CNBV	Comisión Nacional Bancaria y de Valores, Mexico
CPMI	Committee on Payments and Market Infrastructures
DFS	digital financial services
DLT	distributed ledger technology
eKYC	electronic (digital) know your customer
EMDE	emerging markets and developing economies
EU	European Union
FATF	Financial Action Task Force

FCA	Financial Conduct Authority
FSB	Financial Stability Board
GFIN	Global Financial Innovation Network
GFS	Global Fintech Survey
HKMA	Hong Kong Monetary Authority
ICT	information and communication technology
IDB	Inter-American Development Bank
IFC	International Finance Corporation
IMF	International Monetary Fund
IRDAI	Insurance Regulatory and Development Authority of India
IT	Information Technology
JFSA	Japan Financial Services Agency
KYC	know your customer
LAC	Latin America and the Caribbean
MAS	Monetary Authority of Singapore
MENA	Middle East North Africa
MNO	Mobile Network Operator
MSME	micro-, small-, and medium-sized enterprises
NAL	no-action letter
NBFI	non-bank financial institution
NFIS	national financial inclusion strategy
NGO	nongovernmental organization
OIC	Office of Insurance Commission (Thailand)
OJK	Otoritas Jasa Keuangan (Financial Services Authority of Indonesia)
P2P	peer-to-peer
QR	Quick Response
RBI	Reserve Bank of India
RURA	Rwanda Utilities Regulatory Authority
Regtech	Regulatory Technology
SAMA	Saudi Arabia Monetary Authority
SAR	Special Administrative Region (Hong Kong)
SARB	South African Reserve Bank
SEBI	Securities and Exchange Board of India
SFC	Securities and Futures Commission of Hong Kong
Suptech	supervisory technology
UAE	United Arab Emirates
UFA	Universal Financial Access
UK aid	UK aid agency for sustainable development
UNCDF	United Nations Capital Development Fund
UNSGSA	UN Secretary-General's Special Advocate for Inclusive Finance for Development
USAID	United States Agency for International Development

Executive Summary

The demand for digital financial services has increased significantly in recent years. Fintech[1] plays a key role in meeting this demand by leveraging technology to bring digital financial services to previously underserved populations. These technological innovations have been met with policy responses that have the potential to create new opportunities for fintech firms through targeted regulatory approaches while balancing the potential risks to consumers and firms. One such approach is the "regulatory sandbox," which provides room for experimentation while guiding regulation toward embracing emerging technologies.

Regulators globally have embraced the regulatory sandbox[2] as a means of providing a dynamic, evidence-based regulatory environment to test emerging technologies. Using country case studies and analysis of operations and outcomes of fintech sandboxes globally, this report highlights the benefits, challenges, and lessons learned from the implementation experiences of 73 unique fintech sandboxes in 57 countries. The intention is to provide key insights for policy makers looking to establish a new fintech sandbox or to evaluate an existing one. The report details evolving concepts and key lessons for emerging markets and developing economies (EMDE), where 70 percent of the studied fintech sandboxes were created.

The emerging trends and key findings have been structured using the themes of country context; sandbox design; and impact at the level of the institution, market, and individual firms.

Country Level Objectives and Context Considerations

- **Maturity of existing fintech ecosystem:** Implementing a sandbox in a nascent fintech market may not be cost efficient for regulators, as sandboxes are resource intensive and bear large opportunity costs. In markets with few fintech firms, a sandbox may divert attention away from other fintech initiatives or policy reforms and policy makers may not realize the full benefits in terms of identifying broader policy insights. Hence, where fintech activity is at an early stage, other fintech tools and innovation mechanisms might be more effective than a sandbox.
- **One or many? When are multiple sandboxes in a country appropriate?** Multiple sandboxes are most prevalent where there are different regulators for different areas of financial services. With proper inter-agency coordination, multiple sandboxes have shown promise in generating an enabling legal and

regulatory environment and supporting fintech development. Potential challenges related to additional bureaucratic processes for firms can be mitigated with effective inter-agency coordination to align objectives and provide clear messaging to innovators. However, there may remain differences in legal, regulatory, and supervisory practices and mandates that are difficult to align through coordination alone.

- **The role of cross-border sandboxes:** If used effectively, cross-border sandboxes can allow fintech firms to benefit from streamlined licensing and reciprocal license arrangements, reducing the regulatory burden on firms looking to scale. They could also potentially be used to help reduce risks of regulatory arbitrage so fintech firms denied licensing in one country are not granted access to global markets via another jurisdiction. Other advantages include support, collaboration, and harmonization between regulators on issues such as anti-money laundering/combating financing of terrorism (AML/CFT) compliance and remittances.

Sandbox Design Considerations

- **Interaction with the legal system:** No definitive relationship exists between the country's legal system and the efficacy of a regulatory sandbox. Common law countries, civil law countries, and countries operating under a hybrid system have all established sandboxes, despite their differing supervision roles and mandates, but no one system has achieved greater benefits. In some countries, however, the regulators may have greater latitude within their mandate to implement the sandbox as well as to adjust regulation.
- **Resource intensiveness:** Sandboxes are highly resource intensive, and different governance models have been adopted for running them. The two most common approaches are the "hub-and-spoke"[3] model or the dedicated unit. No one set-up is ideal, however, and it is likely that not all the expertise necessary to review applications and support firms through testing will be available from a single set of resources.
- **Testing durations:** Testing is an important part of the sandbox process. While the testing period varies with the type and objectives of the individual sandbox, it is important that the testing period be time-bound to keep the process agile and to prevent underdeveloped or simply unviable business models from operating indefinitely. All jurisdictions require sandboxes to define limited testing periods, with testing durations ranging from two weeks to two years.
- **Thematic sandboxes promoting specific technologies or products:** Some evidence shows that well-defined, thematic sandboxes can be effective in encouraging particular technologies or products to come to market. Often, the success of thematic sandboxes depends on the availability of supporting technology or financial sector infrastructure. While most fintech sandboxes are geared toward general fintech innovations, some are geared specifically toward themes such as enhancing blockchain technology, technology innovations that support insurance or payment systems, and remote know your customer (KYC)/digital ID technologies.
- **Measures for protecting consumers:** Consumers can face added risks if consumer protection measures are not properly implemented with participating firms. Most sandboxes have a component in their framework that addresses consumer protection. However, both the type of consumer protection measures mandated in the sandbox framework as well as the supervision capacity available for oversight vary significantly.

Impact: The Evidence so Far

- **Assisting policy makers' decisions and effecting regulatory change:** While early evidence suggests that sandbox programs can result in regulatory change, interviews with some policy makers suggest that change can be attributed to the open engagement between regulators and innovators. Sandboxes are not necessarily uniquely positioned to test all innovations, but they are useful where empirical evidence is needed to support policy development. They can be beneficial where regulatory requirements are unclear or missing or create barriers to entry disproportionate to the risks.

Sandboxes can also help to build the consensus among different stakeholders needed to endorse or support broader regulatory change.

- **Benefits for regulatory institutions:** Sandboxes offer value to policy makers looking to increase their understanding and capacity to facilitate and regulate a range of fintech innovations, particularly where existing policy frameworks can be tested against new technologies and business models. Sandboxes can also help to build internal capacity on different fintech innovations and provide a structured process through which to strengthen dialogue and interaction with the industry.
- **Financial inclusion:** While some examples show how sandboxes can be linked to financial inclusion mandates and potentially encourage innovations that reduce barriers to inclusion, evidence is limited overall to suggest that a sandbox with an explicit financial inclusion objective can have a greater impact than a general fintech sandbox. The limited time that these sandboxes have been in operation could be part of the reason. However, when sandboxes are implemented properly and used to encourage consumer-focused products and services, they can potentially impact the broader financial system.
- **Assisting private sector firms:** While sandboxes are often open to both regulated and unregulated firms, some fintechs have attributed the ability to access markets to their participation within a sandbox. Moreover, some evidence shows that a sandbox has reduced time to market for some firms.
- **Fostering partnerships in the market:** Sandboxes can help attract and develop marketplace partnerships, or even investors, either directly through the design of a sandbox or indirectly through firms that gain legitimacy from the sandbox. Specific design features that can encourage partnerships include partnership requirements between a fintech and a licensed firm for eligibility to participate in the sandbox as well as close association with industry accelerators that can provide advice and mentorship from more established players.
- **Strengthening competition:** Policy makers have reported mixed results when assessing if a sandbox has led to an increase in competition in their respective markets. While a sandbox can encourage competition and lower barriers for smaller firms to enter the market, it can also create an unequal playing field between firms admitted to the sandbox and those not admitted.
- **Enabling fintech market development:** When they operate within a strategic framework that enables fintech and alongside a set of fintech-driven initiatives, regulatory sandboxes can provide valuable insights to policy makers and enable innovation. For fintech to thrive, a multi-dimensional approach must be adopted, including a gap analysis of existing laws and regulations combined with an open dialogue between regulators and the industry.

Taken together, the overall evidence from outcomes observed from fintech sandboxes suggests that they have several benefits for regulators as well as for the financial sector ecosystem as a whole. They can provide an evidence base from which to make policy decisions; influence future supervisory methodology; help to define, create, or amend regulation; and, in some cases, support the regulator's competition mandate. For firms, sandboxes have been shown to offer a faster route to market and a better understanding of the regulatory environment, but in some cases, sandboxes prolong regulatory uncertainty. From a more macro perspective, the indirect benefits include spillover effects into the overall fintech ecosystem, spurring consumer-centric products, and signaling that the market is open to innovation.

At the same time, implementing a sandbox can pose several risks, particularly when poorly considered and implemented. It can potentially pose unexpected burdens on the regulators and promote risks such as creating unlevel playing fields in the market. Countries that find themselves with fewer resourced regulators or a less pervasive fintech market may find it more challenging to replicate a sandbox approach, and a sandbox in such jurisdictions may be less appropriate. For instance, some jurisdictions have operated a sandbox in markets with little to no material fintech activity. As a result, few fintech companies applied,

and even fewer entered the sandbox. In this scenario, budgetary, staff, and opportunity costs borne by the regulators may have outweighed the benefits offered by the sandbox.

Before embarking on creating a regulatory sandbox, authorities should step back and objectively review the environment in which they operate, specifically by considering their primary objective(s): increasing competition, fostering an environment for innovation, or increasing financial inclusion. Despite successes, implementing a sandbox is not always a fitting solution for unlocking financial innovation. Sandboxes are, however, a new regulatory instrument and have only been in operation for four years; hence, results are still developing. When properly designed and implemented, sandboxes can be useful tools that provide valuable insights into fintech, but they are not the only mechanism that policy makers can use to foster financial innovation.

1. Introduction and Background

1.1 The Promise of Fintech in Emerging Markets

The rapidly changing financial services industry, driven by new technology, is transforming the market. Through new business models and new players — some from outside the traditional financial sector — fintech challenges existing business practices and norms and leverages technology for consumer-centric products, offering alternatives to incumbent service providers and bringing financial services to previously underserved populations.

These changes have increasingly led regulators to question whether their approaches to regulation and supervision continue to be adequate for the changing environment in financial services. The increased demand for digital financial services (DFS), and the policy responses that follow, can create new opportunities for fintech firms. This, coupled with the landscape of the COVID-19 emergency, presents an added challenge for both financial institutions globally and the people and firms that rely upon them.[4] While not a "one-size-fits-all" solution, the regulatory sandbox can guide regulation toward embracing emerging technologies, as well as create a dynamic, evidence-based regulatory environment from which regulators can learn.

Around the world, 57 countries currently operate 73 fintech sandboxes.[5] This report collates evidence available from all known regulatory sandboxes globally and presents the lessons learned and key emerging themes using illustrated case studies with the aim of providing insights for emerging markets and developing economies that are considering or have started on a sandbox journey. The report aims to depict what makes a sandbox effective and what makes it less than effective, while providing a basis for comprehensive analysis of preliminary observable outcomes from the implementation experience of fintech sandboxes at the macroeconomic, market, and institutional levels. Appendix 3 contains what is currently the most comprehensive database of fintech regulatory sandboxes in existence globally, and it has been made downloadable so that readers can conduct their own analyses based on different variables.[6]

As context for the details on sandboxes covered in Section 2, Section 1.2 outlines other common responses to fintech adopted in various jurisdictions. Section 3 highlights the benefits, challenges, and lessons learned, illustrated using country case studies. Section 4 discusses how policy makers can measure the impacts of a sandbox,

including assessing its ongoing appropriateness and its broader impacts within the financial sector market and jurisdiction as a whole.

1.2 Observed Regulatory Responses to Fintech[7]

Regulators have responded to fintech using a range of responses, each with its own benefits and limitations. While some fintech activities can be covered under existing regulatory frameworks, the majority of jurisdictions are taking or plan to take additional regulatory measures — particularly in areas where the regulatory framework is either unclear or nonexistent — to respond to emerging fintech services. These responses vary substantially in scope and scale and include new laws, innovation offices, regulatory sandboxes, and even reskilling to respond to the transforming environment.

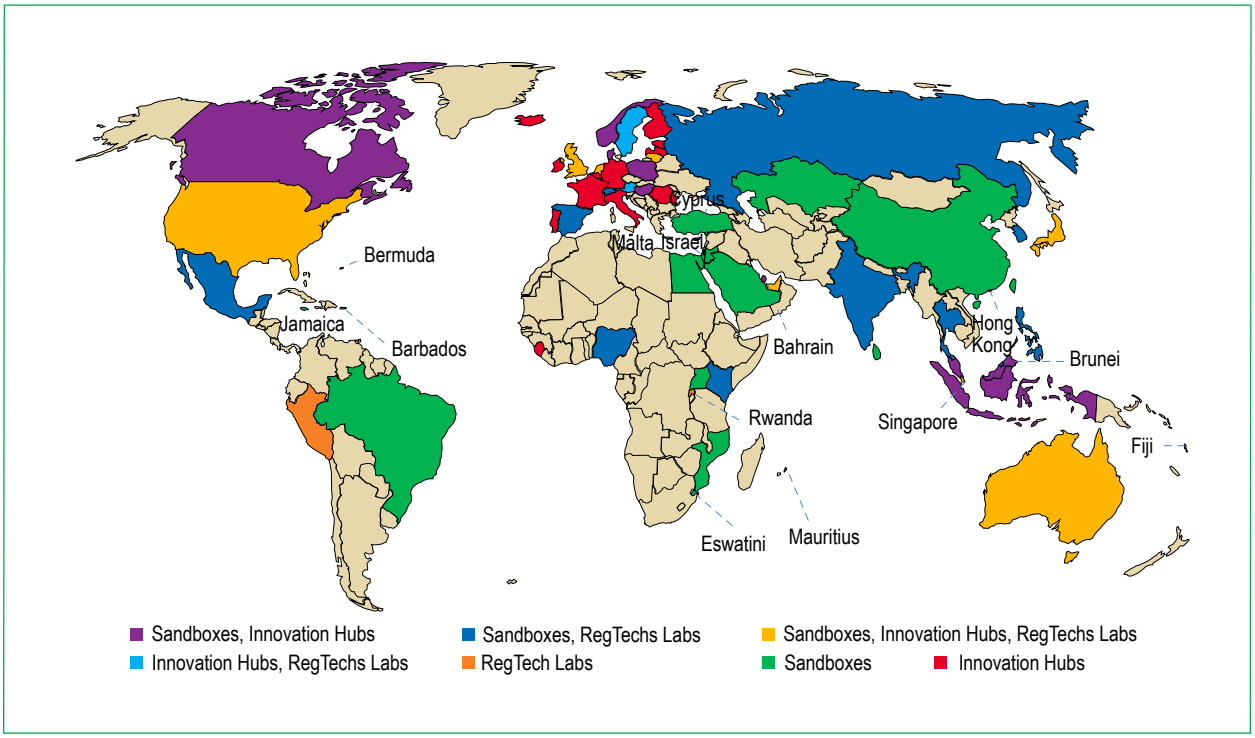
These fintech-related regulatory tools and approaches can be classified into four broad categories:

- **Wait and see.** In this approach, regulators observe and monitor innovation trends at arm's length before intervening where and when necessary.
- **Test and learn.** In this market-driven approach, regulators create custom frameworks for individual business cases, allowing the business to function in a ring-fenced, live environment (often with dispensations, such as a "no-objection" or "no-action" letter).
- **Innovation facilitators.** Regulators using this approach put in place a framework and mechanisms to promote innovation and experimentation. A proactive, often regulator-driven approach, this category includes:
    - *Innovation hubs (also referred to as innovation offices or labs):* Innovation hubs can take various forms depending on the goals and mandate of the authority. Most often, a hub serves as a central contact point to streamline queries and provide support, advice, and guidance to either regulated or unregulated firms, helping them navigate the regulatory, supervisory, policy, or legal environment. Support can be direct or indirect, via guidance to the market, and it does not generally include testing of products or services. See Appendix 2 for more detail on hubs.
    - *Regulatory accelerators (also referred to as regtech labs):* Accelerators are more inwardly focused and enable partnership arrangements between fintech firms and government authorities to innovate on shared technologies, allowing the regulator to learn about new technologies while the innovator benefits from testing its solution on a real-world use case. It should be noted that firms that partner with an institution in an accelerator process most likely do not fall within the regulatory perimeter due to conflict of interest issues.
    - *Regulatory sandboxes:* Regulatory sandboxes are typically a virtual environment that enables live testing of new products or services in a controlled and time-bound manner. Controlled experimentation in a live environment provides a structured approach to promoting innovation and guiding interactions with firms while allowing regulators good oversight of emerging financial products. Regulatory sandboxes are open to innovative business models, products, and processes, whether regulated, unregulated, or slated for possible future regulation. Typically, firms that apply to enter a regulatory sandbox have already developed an offering and wish to test its viability in the market.
- **Regulatory laws and reform.** This approach entails introducing new laws or enhancements to existing laws or licenses in response to innovative firms or business models.

These approaches are discussed at length in our publication "How Regulators Respond to Fintech: Evaluating Different Approaches — Sandboxes and Beyond" (2020). In that report, we emphasize that no one "blanket approach" exists for enabling and regulating fintech, as appropriate regulation depends on the jurisdictional context, including legal and regulatory frameworks, the complexity of the fintech market, and the availability of resources. For more guidance on identifying the approach best suited to specific regulatory needs, please refer to the previous report.

Here, we focus only on regulatory sandboxes and the lessons learned from examining over 70 of them globally. The methodology, data sources, and definitions employed are covered in detail in Appendix 1. While the authors acknowledge that sandboxes are not a universally suitable approach, regulatory sandboxes have been shown to be effective and amenable to most business needs and to provide flexibility in terms of resources and architecture. They are often seen as the first step along a regulatory journey, providing support, advice, guidance, and even, in some cases, physical office space to either regulated or unregulated firms to help them identify opportunities for growth and navigate the regulatory, supervisory, policy, or legal environment. It should be kept in mind that sandboxes are a relatively new phenomena and have only been in existence since 2016. As such, evidence to draw definitive conclusions on outcomes is limited, although it continues to grow.

Figure 1.1. Sandboxes, Innovation Hubs, and Regtech Labs Around the World (April 2020)[8]



Source: WBG Research.

2. The Rise and Evolution of Sandboxes

Regulatory sandboxes[9] have garnered a lot of attention over the past few years, and currently WBG research indicates that over 70 fintech-related sandboxes have been officially announced globally (Appendix 3). These sandboxes have been used by regulators around the world for a number of reasons, including to help assess and adapt a jurisdiction's regulatory framework and to signal the regulator's (or government's) openness to innovation.

A regulatory sandbox has the potential to meet several objectives, both regulatory and institutional. While regulatory objectives are most commonly limited to financial stability, integrity, consumer protection, inclusion, and, occasionally, competition, institutional objectives may be wider in scope, such as supporting the fintech ecosystem or encouraging engagement with the private sector. Sandboxes, however, are not a panacea for all challenges confronting regulatory and policy-making bodies faced with innovations in the financial services ecosystem.

The sandbox concept is well grounded. It originated in the IT industry to refer to a segregated, isolated environment for testing products or software, thus mitigating risks before products were brought to market. Developers used IT sandboxes to execute suspicious code, launch stealth attacks, or check security software for vulnerabilities without risking harm to the host device or network.

Sandboxes have also been used in the health industry to identify and experiment with innovative tests and services. For instance, Health Data Research UK, the United Kingdom's national institute for health data services, used a sandbox environment to virtually test services and innovations for predictive early detection of neurodegenerative diseases, antidepressant treatment responses, or rare disease scanning, among other medical uses.[10]

While banks and payment ecosystems have often experimented with new products and services, sandboxes only made their way into financial sector regulation in 2012 with the introduction of Project Catalyst, launched by the Consumer Financial Protection Bureau (CFPB) in the United States, with the sole intention of promoting consumer-friendly innovation solutions.[11] The term "regulatory sandbox," however, was popularized by the U.K.'s Financial Conduct Authority (FCA) through its Project Innovate,[12] which in 2016 first promoted the sandbox idea to support and enable the environment for fintechs. While advanced economies (AE) such as the United

Kingdom and Singapore have arguably been first movers in this space, EMDEs have not been far behind.

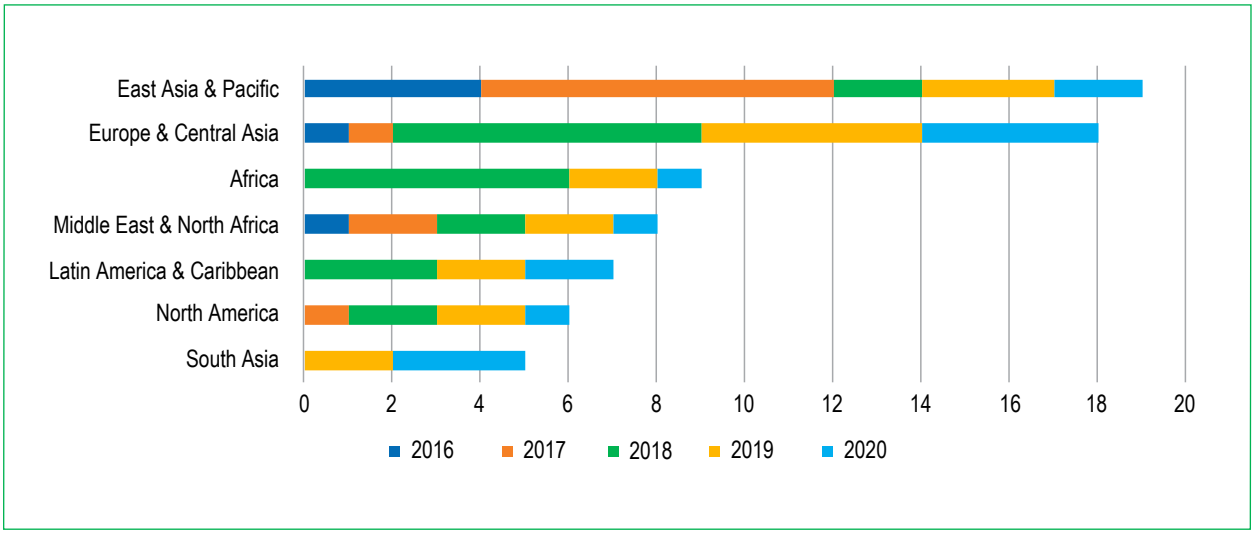
The objectives of a sandbox vary in practice. Sandboxes are usually classified into four types, based on their objectives: (i) policy-focused; (ii) product or innovation focused; (iii) thematic; and (iv) cross-border. These categories are not mutually exclusive, however.[13]

- **Policy-focused sandboxes:** These sandboxes use the sandbox process to evaluate particular regulations or policies.
- **Innovation- or product-focused sandboxes:** These sandboxes encourage innovation by lowering the cost of entering the regulated marketplace, allowing firms to test the market viability of new business models.
- **Thematic sandboxes:** Sandboxes of this type focus on a precise theme with the objective of accelerating adoption of a specific policy or innovation or supporting development of a particular subsector or even of specific products aimed at particular population segments.
- **Cross-border sandboxes:** Cross-border or multi-jurisdictional sandboxes support firms' cross-border movement and operations while encouraging regulator cooperation and reducing arbitrage. Objectives for these sandboxes include improving cross-border regulatory harmonization and fintech firms' ability to scale more rapidly on a regional or global basis.[14]

Since 2016, 73 fintech-related sandboxes have been announced globally. Of these, 52, or about 70 percent,[15] ere initiated in EMDEs; the rest were created in AEs. Some countries have created more than one fintech-related sandbox (see Table 3.2), reflecting the jurisdictional authorities' different priorities and resources. Interestingly, the highest number of fintech-related sandboxes have been created in the East Asia and Pacific region, closely followed by Europe and Central Asia. On the lower end, North America and South Asia reported the fewest sandboxes, although India and the United States have concentrations (see Figure 2.1 below).

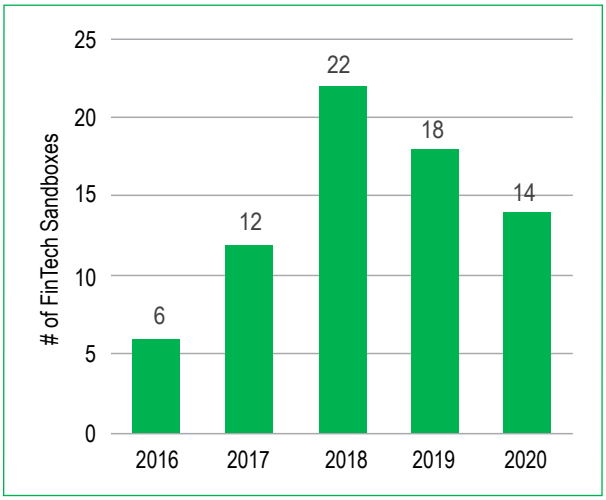
More than half of all relevant sandboxes, or about 56 percent, were created between 2018 and 2019, and about a fifth were created in the first half of 2020 alone, suggesting rapid growth around the world in the use of sandboxes to test fintech innovations and regulation. The increasing density of global fintech-related sandboxes, particularly from mid-2018 through 2020, is illustrated in Figures 2.2 and 2.3.

Figure 2.1. Rise of Sandboxes by Region



Source: WBG Research, Appendix 3.

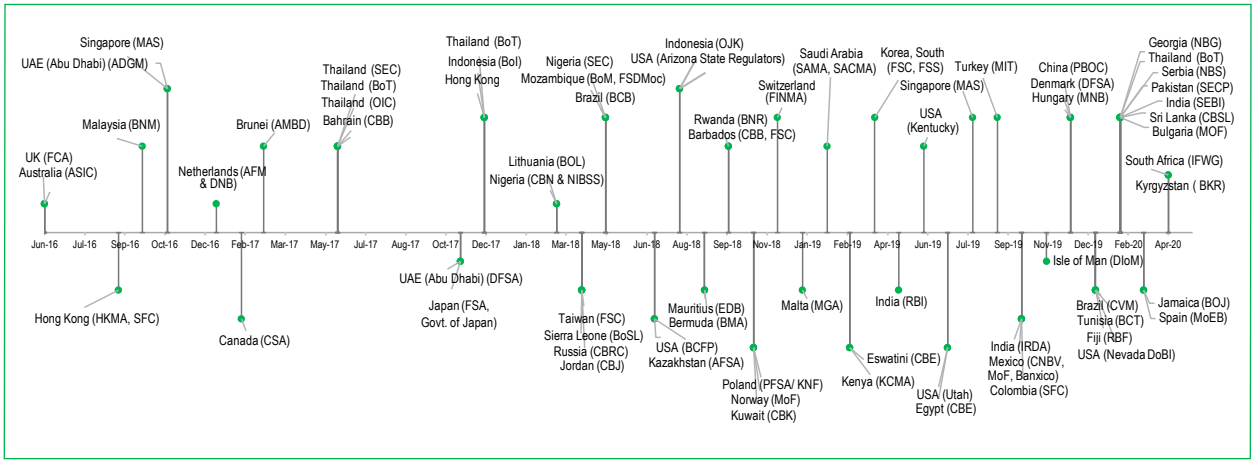
Figure 2.2. Number of Fintech Sandboxes Created Since 2016



Source: WBG Research, Appendix 3.

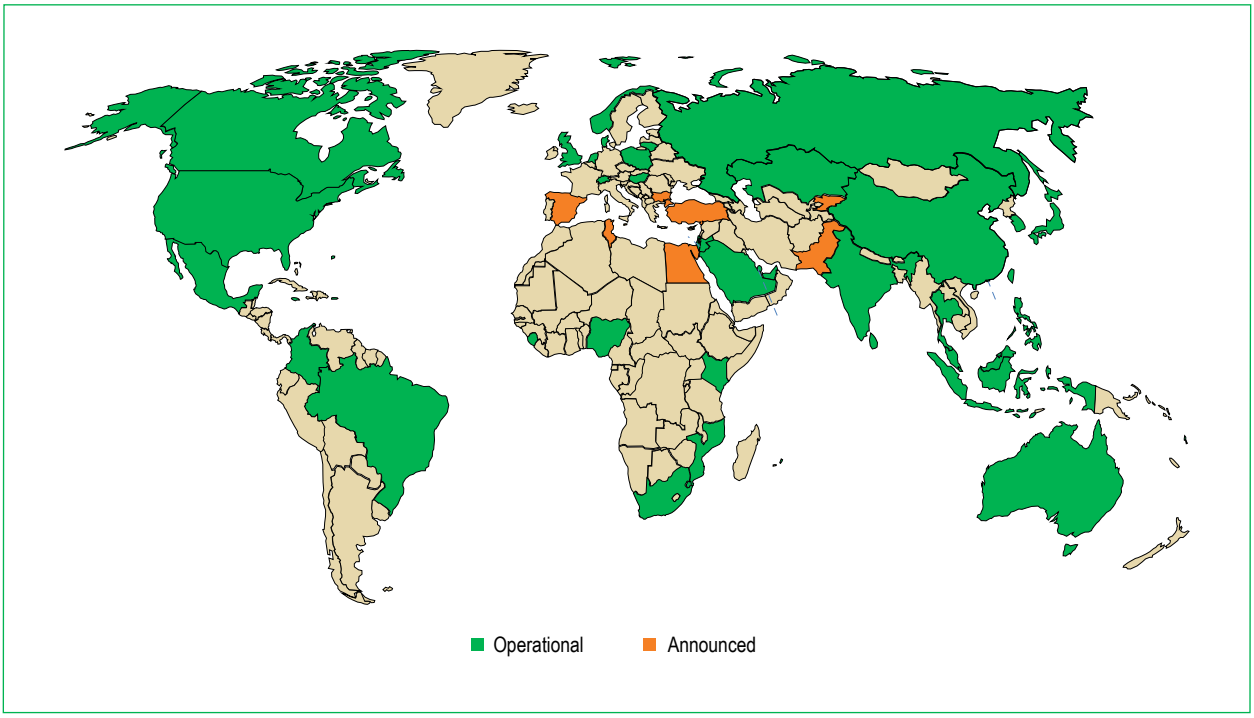
Although not all sandboxes are created equal, at their core sandboxes are formal regulatory programs that react to the rapidly changing backdrop of digital financial services. They provide a dynamic, evidence-based regulatory environment for learning from, and evolving with, emerging technologies. As this document illustrates, no one-size-fits-all approach exists for implementing a regulatory sandbox. Several types of sandboxes have emerged over the past five years, each with unique traits and attributes, and Section 3 of this report unpacks the impetus behind this proliferation and offers some of the insights that have emerged from their study, particularly in EMDE contexts.

Figure 2.3. Timeline of Fintech Sandbox Creation Since 2016



Source: WBG Research, Appendix 3.

Figure 2.4. Global Fintech-Related Regulatory Sandboxes (Announced and Operational)



Source: WBG Research, Appendix 3.

Note: Some countries with multiple sandboxes, such as Brazil, Nigeria, and the United States, have both announced and operational sandboxes. These countries are represented as having operational sandboxes.

3. Global Experience and Lessons Learned

Many regulatory authorities have established sandboxes in hopes of developing of a vibrant, innovative financial sector. Some were also spurred by a desire to emulate country peers or to target specific inroads into the fintech sector. Sandboxes emerge from contexts unique to each country, and their benefits can be difficult to replicate elsewhere. While sandboxes can be a useful tool when used and set up appropriately, the rush to create them can run into snags when authorities strive to achieve multiple aims. This is especially true if all of the many factors that can contribute to the success and overall impact of a sandbox have not been fully considered. Consequently, although many sandboxes have achieved some degree of success, others have encountered bottlenecks and challenges, including the failure to attract firms to participate.

This section explores common queries from policy makers and identifies themes emerging from sandboxes globally. We draw evidence from country experiences across different regions and income groups and provide insights from regulator and firm interviews and surveys. The benefits, challenges, and lessons highlighted in this section are intended to inform policy makers' efforts to establish a new sandbox or to evaluate an existing one.[16] To provide these insights, this section explores sandboxes from three perspectives: (i) Objectives and Context; (ii) Design considerations; and (iii) Impact from the evidence thus far.

Table 3.1. Overview of Considerations Behind Sandbox Design and Implementation

	Summary Findings & Insights	Selected Case Studies
Objectives & Context Issues • Maturity of the existing fintech ecosystem • The role & need for inter-agency coordination • The role of cross-border sandboxes • One or many: When are multiple sandboxes in a country appropriate?	• The differing market context and the objectives of authorities have led to diverse structures and aims of sandboxes; we observed initiatives across advanced and developing markets. But some local fintech activity is needed for effectiveness. • There are few examples of multiple and cross-border sandboxes to date; but the need to improve domestic and cross-border cooperation is recognized. • Some authorities have concluded that other means are available to facilitate competition and they do not always have a strong mandate to promote the fintech industry.	• Philippines • Estonia • Kenya • Thailand • Hong Kong • GFIN
Design Considerations • Inter-relationship with the legal system • Resource intensiveness • Testing durations • Focusing on themes • Measures for protecting consumers	• Authorities benefit from clearly defining their objectives and identifying their legal and institutional constraints. • The most prevalent aim of sandboxes is to promote development of digital financial services innovation and act as a signaling mechanism that the regulator is open to dialogue. • Legal systems do not appear to be an impediment to or significantly complicate the set-up and operation of sandboxes. • Sandboxes are resource intensive but can be effective for providing an evidence base for initiating legal change and can enhance an authority's knowledge and skills. • The testing periods range from 2 weeks to 2 years based on the risk appetite of the regulator. • The detailed scope and organization of sandboxes may need to evolve over time as they respond to changing market conditions.	• Thailand • Mexico • India • Australia • Lithuania • Rwanda
Impact => The Evidence So Far • Inter-relationship with the legal system • Resource intensiveness • Testing durations • Focusing on themes • Measures for protecting consumers	• Evidence is insufficient to demonstrate a direct causal relation between a sandbox created with an intention of innovation and one with wider financial inclusion goals. • Regulatory sandboxes are one mechanism within a broader array of interventions that can help to promote an orderly development of fintech in pursuit of greater dynamic efficiency and innovation. • Several initiatives have made pragmatic contributions to promoting entry of new firms and addressing specific challenges, such as around eKYC. • It is still too early to draw definitive conclusions about the overall efficiency and opportunity costs of sandboxes as mechanisms for achieving regulatory change and stimulating innovation and competition.	• Malaysia • South Korea • Brazil • Jordan

3.1 Objectives and Context

3.1.1 Market Maturity & Demand

For a sandbox to function effectively, it must meet an existing market demand. In general, the local ecosystem must already have a functioning and mature entrepreneurial environment, including some local fintechs, although a market can also proactively expand by inviting foreign fintechs into the sandbox. Since most sandboxes only admit firms with a viable and tested product, less mature markets may have fewer fintechs (if any) that are eligible to enter the sandbox. In some cases, a sandbox has been set up only to find no applicants ready to test within its boundaries; the regulators thus had to wind down the sandbox and pursue a different approach.

For those markets where fintech activity is at an early stage, other fintech tools and innovation mechanisms might be more effective than a sandbox. These could include a test-and-learn approach with regulatory forbearance provided on a case-by-case basis. Other innovation facilitators can also enable engagement between regulators and innovators, including fintech committees and innovation hubs offering points of contact and guidance to firms. Still other methods include direct rule or regulatory change, proportional/risk-based licensing regimes, or existing regulations extended to new technologies whose innovations do not require a live-testing environment. The Singaporean authorities have gone so far as to say that a sandbox should be the tool of last resort and should only be used in those cases where players don't fully understand, are uncertain about, or are unable to meet regulatory requirements from the onset.

Even when the regulator has the capacity to design and manage a regulatory sandbox and its risks, other complementary methods to advance fintech innovations are potentially both easier and more effective. In Kenya, for example, the CEO of BitPesa, recommends sponsored licensing[18] programs as a way for start-ups to build partnerships with incumbents in the industry and to scale beyond the caps imposed by sandboxes. Emerging market governments have also considered reciprocal licensing[19] arrangements with other jurisdictions.[20]

Additionally, a fintech market study by the Kenya Capital Markets Authority (KCMA) suggested that an innovation office would be an effective way of resolving the regulatory questions of fintech start-ups looking for guidance. Currently, no single regulatory source is available to supply fintech companies with clarification on regulations, hindering innovation and raising the risk of regulatory uncertainty. Based on consultations with stakeholders, KCMA is considering a one-stop-shop regulatory helpline combined with a regulatory sandbox to encourage fintech innovation in the country.[21]

Prior to establishing a sandbox, policy makers should identify the most suitable approach by undertaking a feasibility study and thoroughly assessing their own fintech markets and the demand for, and appropriateness of, a sandbox as compared to other regulatory tools.

Country Example: Estonia's Fintech Market and Fintech-Driven Initiatives

Estonia, with a total population of 1.3 million people, has a burgeoning start-up scene: Tallinn, the capital, is home to roughly 435 fintech start-ups.[22] To respond to the growing fintech sector while also managing the resource and opportunity costs required to establish a sandbox, the Estonian Financial Supervision Authority (EFSA) opted to establish the in-house fintech Working Group in 2016.

The Working Group operates much like an innovation hub. It operates as a single point of contact and is made up of an informal group of regulators, including representation from the central bank, the anti-money-laundering (AML) regulator, and the securities regulator. The members of the group provide fintechs with guidance on navigating the legal and regulatory system and also help gather knowledge and build the capacity of policy makers within EFSA. Based on the group's interaction and information exchange with fintechs, it also works to develop proposals for regulatory adjustment. In the past, consultations have included data aggregation, payment services, and crowdfunding requirements.

Almost three years later, having successfully implemented necessary reforms (including strengthening the policy framework for research and development as well as innovation policy) and gathered the necessary market intelligence, the Working Group has unveiled plans for a sandbox to be established with the European Bank for Reconstruction and Development (EBRD).[23]

Country Example: The Philippines — Scaling Up Using a Test-and-Learn Approach

The test-and-learn approach toward fintech development, an alternative to the regulatory sandbox approach, has been used successfully in a few emerging economies, including the Philippines. In this approach, regulators can use instruments such as letters-of-no-objection or case-by-case waivers to allow innovators to operate in an environment free of specific regulation, while allowing regulators to respond as results become more apparent through the testing process.[24]

In 2004, taking an approach similar to one used in Kenya, Bangko Sentral ng Pilipinas (BSP) allowed two large telecommunications firms to test new mobile money products for consumers. At the time, it was a nascent market: there were no established regulations or models for mobile money. BSP allowed the telecommunications firms to proceed with testing new models of delivering financial services through non-bank entities, and BSP closely supervised the process. Five years later, in 2009, this experiment led to issuance of "Guidelines on Use of Electronic Money."[25]

Because sandboxes are very resource intensive and have large opportunity costs, implementing a sandbox in a nascent fintech market may not be cost efficient for regulators. In markets with few fintech firms, a sandbox may divert attention and resources away from other fintech initiatives or policy reforms. Even if a few firms enter the sandbox, policy makers may not realize the full benefits in terms of identifying broader policy insights.

3.1.2 One or Many?

In some jurisdictions, different regulators run separate regulatory sandboxes, which may require coordination. Some constructive tension between sandboxes may be helpful in spurring innovation, but coordination will be needed, particularly given that many fintech innovations cut across established fault lines of financial sector regulation.

Multiple sandboxes are most prevalent where different regulators control different areas of financial services. A country with separate and well-developed securities and banking sectors may have different needs to address. For instance, in Poland and Indonesia, authorities for banking and capital markets each opted to launch their own sandboxes to develop an enabling financial ecosystem. In many countries, multiple sandboxes work together to enable innovation within the broader financial sector, reflecting the different remits of different authorities. When applied appropriately and with proper interagency coordination, multiple sandboxes have shown promise for holistically generating an enabling legal and regulatory environment and enabling fintech.

In India, the RBI, the Securities and Exchange Board of India (SEBI), and the Insurance Regulatory and Development Authority of India (IRDAI) all launched parallel sandboxes in 2019 with the basic goal of supporting and encouraging responsible fintech. In Thailand, three different regulators (the Bank of Thailand (BOT), the Securities and Exchange Commission (SEC), and the Office of Insurance Commission (OIC)) launched regulatory sandboxes focusing on innovation in different aspects of the financial system. A similar approach was taken in Hong Kong where different sandboxes cater to different firm and institution types. The Hong Kong Monetary Authority (HKMA) sandbox allows authorized banks to test new fintechs, the Securities and Future Commission (SFC) sandbox allows both licensed firms and start-ups to test,[26] and the Insurance Authority (IA) allows authorized insurers to test new fintech products. Firms that intend to conduct a pilot of a cross-sectoral fintech product are requested to apply to the most relevant sandbox.

Country Example: Complementarities of Thailand's Multiple Regulatory Sandboxes

In Thailand, three different regulators launched regulatory sandboxes: the Bank of Thailand (BOT), the Securities and Exchange Commission (SEC), and the Office of Insurance Commission (OIC). Each sandbox covers a different aspect of the financial

Table 3.2. Countries with Multiple Fintech-Related Sandboxes and the Authorities Governing Them

Country	Authority	Fintech-related Sandboxes (#)
Thailand	BoT, SEC, OIC	5 (3 by the BoT)
USA	CFPB, state gov'ts (Arizona, Kentucky, Nevada, Utah)	5
India	RBI, IRDAI, SEBI	3
Brazil	BCB, CVM	2
Hong Kong (SAR)	HKMA & SFC, IA	2
Indonesia	OJK, BI	2
Nigeria	CBN & NIBSS, SEC	2
Singapore	MAS	2
UAE (Abu Dhabi)	ADGM, DFSA	2

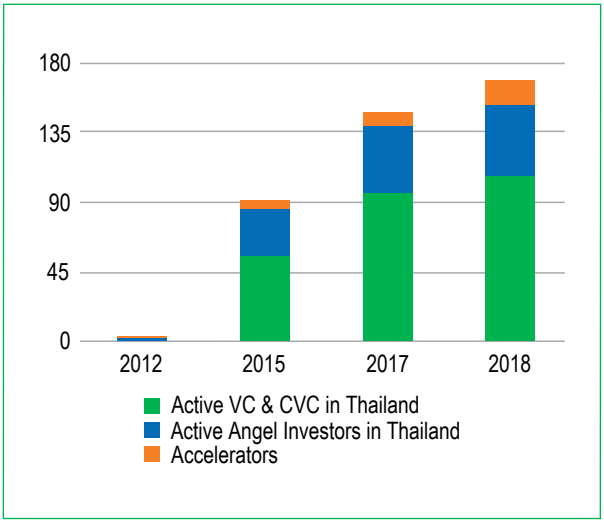
Source: WBG analysis; see Appendix 3 for more detail.

system: payments, remote identity verification, and insurance, respectively.

The sandboxes, however, differ in approach, eligibility, and mandate. The BOT sandbox focuses on new, "never-before-seen" innovations and thus far has focused on quick-response (QR) codes and cross-border payments. The SEC sandbox allows fintechs to test new eKYC (electronic know your customer) technologies, and the OIC sandbox has enabled insurers, agents, and InsurTech firms to test InsurTech innovations. The sandboxes also complement Thailand's fintech hub, F13 (launched by the Thai fintech association), working together to develop a fintech ecosystem. The F13 hub provides space for fintech start-ups to test and validate their services with customers. As a result of these multiple initiatives, new regulations and initiatives were introduced for robo-advisory, peer-to-peer (P2P) lending, eKYC, and QR payments.[27]

Although fintech growth in Thailand is not directly attributable to the sandboxes only, since the launch of the various regulatory innovation facilitators, Thailand has shown some competitive outcomes in line with the "Thailand 4.0" national strategy to encourage innovation. For instance, Thailand's Global Talent Competitive Index for 2019 moved to a rank of 66 out of 125 countries surveyed, as compared to 70 in 2018 and 73 in 2017.[28] In addition, Thailand has experienced significant growth in the number of venture capital firms, angel investors, and fintech accelerators (see Figure 3.1). Although direct linkage cannot be proven, the role of the BOT, OIC, SEC, and F13, combined with regulatory incentives (for instance, Thailand provides tax incentives to merchants who use card-accepting equipment) and stimulus through fintech accelerators, cannot be ignored.

Figure 3.1. Investment growth in Thailand



Source: E&Y.

Country Example: The Case of Hong Kong

The financial sector in Hong Kong is regulated by separate, sectoral regulators: the Hong Kong Monetary Authority (HKMA),[29] the Securities and Futures Commission, the Mandatory Provident Fund Schemes Authority (MPFA), and the Insurance Authority.

The Insurance Authority established its sandbox in December 2017, the same time that the Securities and Futures Commission and the HKMA announced their formation of new regulatory sandboxes or enhancements to existing sandboxes. All three sandboxes, at the time of the announcement, were to be linked together, providing a single point of entry for pilot trials of cross-sector fintech products. Coordination with the other regulators on fintech issues is via their existing memorandums of understanding (MOUs). When a cross-sectoral issue has arisen, the lead authority tested the product in its sandbox and coordinated and communicated results to its sister authorities. For example, the Insurance Authority used its sandbox to test the distribution of an insurance product via online banking channels by an insurance company that was part of a banking group. Compliance with both insurance and banking regulations (e-banking, agent banking rules, etc.) was checked before the product was allowed to graduate.

Country Example: The Inception of the Sandbox in India

In July 2016, the Reserve Bank of India (RBI), India's central banking institution, created an inter-regulatory Working Group (WG)[30] to study the scope and potential of fintech and review the regulatory framework with which the industry must comply. The WG included representatives from RBI, the Securities and Exchange Board of India (SEBI), the Insurance Regulatory and Development Authority (IRDAI), and the Pension Fund Regulatory and Development Authority, as well as from select financial entities regulated by these agencies, rating agencies and fintech companies.

On February 8, 2018, the government committee, representative of all the financial sector regulators and select industry members, published its "Report of the Working Group on Fintech and Digital Banking." One salient recommendation of the WG was to introduce a regulatory sandbox, and it recommended the Institute for Development and Research in Banking Technology (IDRBT) as having the expertise to run a regulatory sandbox and innovation hub in collaboration with the regulators. In response, the RBI, SEBI, and IRDAI all launched parallel sandboxes in 2019. While the basic premise of supporting and encouraging responsible fintech is common to all three, their designs differ somewhat, particularly regarding eligibility criteria and testing environments.

While multiple sandboxes can be useful, they may also pose challenges for fintechs operating across sectoral boundaries and straddling the scope of authorities' mandates. The parallel operation of different sandboxes could introduce added layers of bureaucratic complexity for fintech firms that straddle more than one sector.

Downsides can be minimized, and risks mitigated with effective interagency collaboration and coordination to align objectives and provide clear messaging to innovators. But differences in legal, regulatory, and supervisory practices and mandates may remain that are difficult to align through coordination alone. Effective cooperation may require alignment on new crosscutting regulations (on cloud computing or artificial intelligence, for example) or some degree of regulatory arbitrage between different business models.

3.1.3 Cross-Border Sandboxes

Cross-border sandbox coordination supports fintech firms to achieve scale, but the harmonization required from different jurisdictions has proven to be a high threshold to cross. Regional and cross-border sandboxes can have benefits for firms, such as support for reciprocal licensing arrangements, but their functioning in practice is still being tested.

To remain sustainable, fintechs may require larger customer bases than that of a single country. In Latin America and the Caribbean (LAC), approximately 20 percent of all fintechs operate in more than one jurisdiction, as many individual markets may be too small for business models to achieve scale, according to a 2017 IDB study.[31] The study led to the development of a regional sandbox in March 2019. Another example is the Global Financial Innovation Network (GFIN), which was created as a platform for regulatory cooperation and collaboration on common challenges

or policy questions firms face across different jurisdictions. One of the specific considerations for setting up GFIN was the potential to run a cross-border testing pilot. While the initial pilot did not see any successful fintechs, a number of invaluable lessons were learned that will be incorporated into the next phase. (See Box 1.)

If used effectively, cross-border sandboxes can allow fintech firms to benefit from reciprocal license arrangements, streamlined licensing, and reduced regulatory burden. For instance, the Bank of Thailand, after its successful sandbox experiment that enabled QR codes to come to market, directly partnered with other ASEAN central banks, including in Cambodia, Japan, and Singapore, to develop a regional interoperable cross-border payment via QR code technologies.[34] A cross-border sandbox covering those countries may have accelerated roll-out of cross-border QR payment solutions.

Another potential advantage is the ability to help reduce risks of regulatory arbitrage, so fintech firms denied licensing in one country are not granted access to global markets via another jurisdiction.[35] Other potential advantages of cross-border sandbox initiatives include support, collaboration, and harmonization between regulators on key inclusion issues, such as AML/CFT compliance and remittances.

Country Example: Regional Sandbox Under the Pacific Islands Regional Initiative (PIRI)

The Pacific Islands Regional Initiative (PIRI) launched a regional sandbox in March 2020. PIRI, supported by AFI and UK aid, launched the Pacific Regional Regulatory Sandbox Guidelines to support fintech development and regulation across seven central banks, including: Banco Central de Timor-Leste, Bank of Papua New Guinea, Central Bank of Samoa, Central Bank of Solomon Islands, National Reserve Bank of Tonga, Reserve Bank of Fiji, and Reserve Bank of Vanuatu.

The sandbox is designed to remove barriers to innovation between the islands and to mitigate risks by allowing members to act as a regional bloc rather than individual markets. This concept can potentially help bolster expansion of interested fintechs to the wider Pacific regional market which has a total GDP of US$10.45 billion as of 2019.[36] It is expected that, in contrast to a national sandbox, this regional sandbox

Box 1. Global Financial Innovation Network — The Global Sandbox

In early 2018, the United Kingdom's Financial Conduct Authority (FCA) proposed a global sandbox for firms to test innovative products, services, or business models across more than one jurisdiction. The Global Financial Innovation Network (GFIN) was formally launched in January 2019 by an international group of financial regulators and related organizations, including the World Bank Group, with the aim of creating a platform for shared knowledge and experiences. GFIN currently has a network of over 60 members and observers committed to supporting financial innovation.

One of the considerations when setting up GFIN was the need for regulatory cooperation and collaboration on common challenges or policy questions facing firms across different jurisdictions. In response, a cross-border pilot workstream provided innovative firms with an efficient way to interact with regulators across different national jurisdictions. In January 2020, GFIN released a report on the lessons learned from the cross-border testing pilot. Prior to the launch of the pilot, market demand was unknown; however, it became clear with the volume of applications received that demand for the pilot was very strong. The GFIN members selected 8 firms from a set of 40 applications to develop a suitable testing plan.[32] However, the lack of a streamlined application process for the various sandboxes proved too a high threshold for firms to cross.

Based on the pilot testing phase, GFIN identified improvements for the testing experience, including launching a GFIN website as a single mechanism to better communicate with the market and to share information about cross-border testing more effectively; producing a publication with information on the types of activities that can receive support, to improve the application process for regulators and firms; and developing a single online application form with a set of common questions to collect information relevant to all jurisdictions/regulators.[33]

The members strongly believe that cross-border cooperation through the network will both help facilitate firm testing through the pilot project and enable the regulatory community to develop an increasingly collaborative approach going forward.

will help firms tap into a larger, more diverse customer base; reduce regulatory and legal bottlenecks; and ensure new business model sustainability and viability.

While it is too early to draw any conclusions concerning the successes of the PIRI sandbox, in general, regional approaches are aided by the geographic proximity of the participants, similarity in macroeconomic conditions, and presence of shared priorities — all factors that can support the development of effective cross-border sandboxes.

3.2 Design Considerations

3.2.1 Feasibility Assessments

Feasibility assessments are a critical first step that policy makers must undertake before setting up any sandbox initiative and, where possible, at periodic intervals after. This is important for measuring the legal ability and internal feasibility such as a regulators' resources — financial, technical, and physical — as well as capacity to implement and operate a sandbox. It is also important to check the viability based on external criteria such as market demand gaps and the current fintech ecosystem.

The United Nations Secretary-General's Special Advocate for Inclusive Finance for Development (UNSGSA) reported that roughly a quarter of regulators launched sandbox efforts without conducting an initial feasibility assessment to determine whether it made sense to do so. Without a proper feasibility study, sandboxes may launch prematurely or become unviable over time. In some instances, less resource-intensive regulatory tools may better address the needs of regulators and industry alike. Operating a sandbox has been overly cumbersome for some policy makers, resulting in low- and slow-functioning processes. In some instances, a sandbox framework was put in place only to receive few or no applicants. These scenarios could have been avoided if proper assessments had been conducted before and throughout the sandbox implementation process.

To conduct a feasibility assessment, government and regulatory officials should consider the concrete demand for a sandbox and the unique policy goals a sandbox could address. They should ask themselves these fundamental questions at the outset:[37]

- Do we need a sandbox? What benefit does it provide us over other regulatory tools?
- What is our specific objective? How will we measure success?
- Do we have the operational, technical, and financial capabilities to support a sandbox?
- If a sandbox is the best tool, how (and where) should the sandbox be deployed?

A feasibility assessment provides the opportunity to discuss, at the outset, metrics for measuring the sandbox's potential contribution to a particular industry or to the economy, rather than leaving this determination to after implementation. Sandbox "success" depends to a large extent on results of such initial assessments, and these findings should influence the establishment, institutional arrangements, and design of any sandbox. Success in regard to a sandbox is subjective and depends directly on the initial benchmarks set for the sandbox. See Box 2 on the World Bank Sandbox Simulation exercise and Section 4 below for further details and guidance on measuring impacts of a sandbox.

Country Example: Rwanda's Simulation Exercise

The National Bank of Rwanda (BNR) set up its regulatory sandbox in 2018, as highlighted in Chapter IV of the official Gazette no. 14 of 02/04/2018, to facilitate developing and adopting innovative financial technology, specifically within the payments space. Since then, two further sandboxes have been created within BNR alone, one for micro-insurance and another for deposit-taking institutions. In 2019, a World Bank team supported BNR with fine-tuning its regulatory sandbox using a phase 2 Sandbox Simulation exercise (see Box 2 for details).

The Sandbox Simulation exercise was attended by BNR key representatives from several departments, including Bank Supervision, Policy, Payments Systems Supervision, Insurance Supervision, and Financial Inclusion; representatives of two other regulators, Rwanda Utilities Regulatory Authority (RURA) and Kenya's Capital Markets Authority (CMA), as well private sector incumbents and innovators, were also present. In total, 21 individuals participated.

Box 2. Testing the Feasibility of a Sandbox — Simulation Exercises

The World Bank Sandbox Simulation exercise[38] is designed to provide financial regulators with insights into the design and implementation of regulatory sandboxes and to help "operationalize" the environment while considering country context. The simulation helps policy makers understand if a sandbox is viable and if the intended framework and its related operational plans are realistic in practice. The World Bank Group has helped many policy makers assess (i) the feasibility of implementing a sandbox as compared to other tools, (ii) the effectiveness of sandbox frameworks, and (iii) the alignment of the process to the goals and objectives of the sandbox.

The simulation draws on our global expertise and entails cognitive, strategic, and practical exercises to support regulators in thinking through the structure of the sandbox and articulating its unique purpose and process in an environment that simulates the day-to-day processes of running a sandbox. Additional considerations for fine-tuning sandbox operations include identifying potential legal and operational frictions, including inter- and intra-regulator coordination; licensing and approval processes; staffing; safeguards; and testing; among others.

Simulations are most often conducted with sandbox staff, members of the governance committees involved in key decisions, representatives from all relevant divisions and departments within the regulatory body (such as insurance, banking, payments, nonbank finance, etc.), and other regulators that might have their own sandboxes or whose remits might influence or affect the decisions or functioning of the sandbox; market innovators, too, are sometimes included.

Outputs of Sandbox Simulation

Phase 1 Conducted at Design & Pre-Launch Stage	Phase 2 Conducted After Sandbox Is Operating
Phase 1 Conducted at Design & Pre-Launch Stage	**Phase 2Conducted After Sandbox Is Operating**
• Identify sandbox objectives • Tighten scope and remit • Review existing best practice sandbox structuresIdentify clear eligibility and evaluation criteria (including licensing norms, etc.) • Define testing and exit procedures • Create sandbox prototype • Provide an understanding of relevant internal governance arrangements • Support creation of a sandbox manual • Shortlist communication options to publicize sandbox	• Provide global knowledge and learnings • Familiarize attendees with established sandbox guidelines • Simulate each individual stage of sandbox process with the use of carefully crafted case studies particular to the country context: • Application review • Selection • Testing • Reporting and risk mitigation • Supervisory oversight • Post-test options (e.g., exit and licensing) • Identify areas of improvement in the design and process of sandbox structure • Distinguish areas of improvement in the governance procedures followed • Consider MOUs with other regulators or external bodies

Before the detailed simulation exercise was conducted, the WB team presented for four days on global sandbox models and approaches to sandbox governance and processes. Using five case studies created uniquely for the Rwanda context, the simulation took participants through all aspects of the sandbox lifecycle, from application and evaluation through to test design and implementation, culminating in an exit strategy. The simulation forced participants to review and design tests and supervision strategies for the realistic case studies, with the aim of integrating lessons learned into the policy framework.

The results and learnings helped the BNR refine the goals and objectives of the sandbox, define and communicate clear and tangible objectives and instructions for innovators looking to apply to the sandbox, and highlight specific areas where the application form could be updated. The exercise also supported the BNR in identifying which waivers they could consider without harming the regulator's objectives and while the honing the governance structure in place around the sandbox, including the cooperation mechanisms between different regulatory bodies.

Country Example: Australia's Sandbox — A Process of Iteration and Fine-Tuning

In Australia, the Australian Securities and Investments Commission (ASIC) revealed its first iteration of a sandbox in December 2016. Any eligible fintech company needed only to notify ASIC of its intention to offer products and services within the sandbox rules. No further approvals from ASIC or other regulators were required.

The relatively restrictive parameters of the sandbox, however, resulted in limited participation, with only one start-up utilizing the sandbox in seven months. ASIC therefore took further measures to improve the sandbox, and the government thereafter issued new draft legislation and regulations to create an enhanced regulatory sandbox.

The new sandbox provides a "lighter touch" regulatory environment to allow fintech's additional flexibility while still testing their ideas. Safeguards remained the same in the new legislation, but the following key changes were made:

- Extended exemption period from 12 months to 24 months.
- Enabled ASIC to grant conditional exemptions to financial regulations for the purpose of testing financial and credit services and products.
- Empowered ASIC to make decisions regarding how the exemption starts and ceases to apply.
- Broadened the categories of products and services that may be tested in the sandbox to include life insurance products, superannuation products, listed international securities, and crowd-sourced funding activities.
- Imposed additional safeguards, such as disclosures, information about a provider's remuneration, associations and relationships with issuers of products, and the dispute resolution mechanisms available.

The reform allowed ASIC to control how exemptions are granted and withdrawn and required fintech firms to notify clients that they are using the exemption. Moreover, certain baseline obligations continue to be applied during the course of the process, such as the responsible lending obligations and obligations on handling client money and on preparing statements of advice where personal advice is provided. Breaching these obligations may lead ASIC to cancel a firm's exemption.[39]

This example illustrates the need to fine-tune a sandbox to respond to market demands and the regulator's changing needs.

Country Example: Morocco's Bank Al Maghrib — Strategic Choices for Fintech Support

Faced with the digitalization of financial services and the advent of new electronic payment and fintech entrants, Bank Al Maghrib (BAM) began, as early as 2017, to think about how best to address these developments, given its legal and regulatory framework.

At first, BAM, with WB assistance, studied the sandbox option. However, after some deliberation, this regulatory approach was abandoned for four main reasons:[40]

- BAM considered that its position, in principle, was to regulate the institutions under its control fairly, not to regulate activities or institutions in an individualized manner.
- International experiences gathered were mixed and inconclusive, with few operational fintechs at the end of cohorts.
- The main applications received from fintechs were within the current legal and regulatory framework. Other applications required review of the banking law to carry out their activities.

- As the legislative processes are long and uncertain, even those firms that successfully exit a sandbox might have been unable function unhindered in the market, creating an unnecessary burden for the fintech player.

In light of these concerns, BAM looked to other approaches, such as accelerators or incubators, and to gradual implementation of more agile and responsive regulation that could provide a framework commensurate with the risks to consumers, financial integrity, and operational resilience.

To do this, BAM has decided, as part of its work during 2019–2023 to formalize its digital strategy and to develop and promote an environment conducive to fintech development along two axes:

- Creation of the one-stop-shop for fintech within the SMP Supervisory Directorate, with a focus on communication with the market, monitoring, and accreditation of fintechs.
- Integrating innovation into the central bank's core activities by creating an Innovation and Digital Lab to foster innovation that supports the functioning and operations of the Bank.

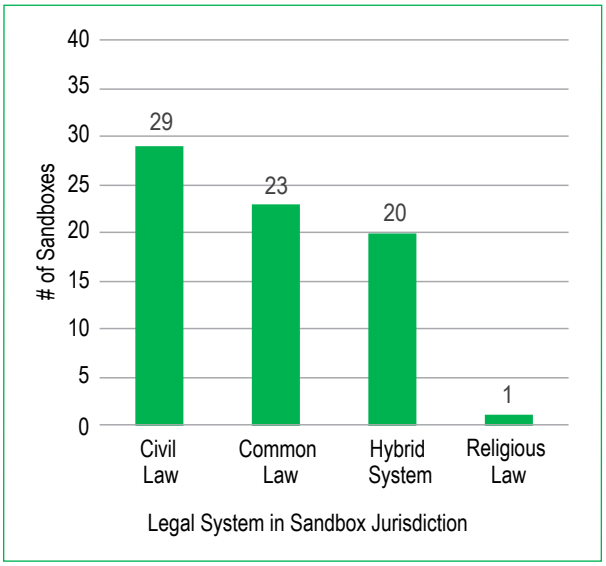
3.2.2 Interaction Between Legal Systems and Sandboxes

No definitive relationship exists between the legal system and the efficacy of a regulatory sandbox. Sandboxes have been implemented across a wide variety of legal systems, and no one system has shown more benefits than the others. However, in some countries, the regulators may have greater latitude within their mandate to implement a sandbox, and the degree of autonomy regulators or supervisors are given to make adjustments to regulations and their interpretations also varies.

The Global Fintech Survey (GFS) conducted in 2019 by the IMF and the WBG, highlights that all regulators report being keen to support firms; a sandbox is quicker to set up in some jurisdictions than others, however, and this depends largely on the powers afforded the regulator.

Common law countries, civil law countries, and those operating under a hybrid system have all established sandboxes, despite their differing supervisory roles and mandates, as depicted by the CGAP-WBG innovation facilitator survey as well as in desk-based research. Figure 3.2 shows that civil law systems are the most common type of legal system in which sandboxes operate, but common law and hybrid legal systems follow closely, highlighting that no one system is more suited than the others.

Figure 3.2. Number of Fintech Sandboxes by Legal Jurisdiction



Source: WBG research, Appendix 3.

The majority of sandbox initiatives in EMDEs did not require any amendments to laws or regulatory powers. For instance, in May 2016 the FCA was the first regulator to launch a regulatory sandbox initiative, allowing businesses to test out new, innovative financial services without incurring all the normal regulatory consequences of engaging in those activities. This was created under the existing powers available to the FCA under the Financial Services and Markets Act under which it was created. Further, the sandbox was put in place to directly support the secondary objective of the regulator: to increase competition. This is similar to India and South Africa, where regulators had the power to set up a sandbox without needing an explicit law to provide approval.

In other jurisdictions, however, laws and designated regulatory powers have required adjustment to initiate a sandbox and to designate an institutional mandate over fintech activities. Prior to establishing a sandbox,

for instance, the AFSA (Astana Financial Services Authority) in Kazakhstan, a civil law jurisdiction, required an amendment within its framework to include fintech objectives and give AFSA the power to waive or modify requirements in financial regulations.[41] A similar case occurred in Mexico, where a fintech law mandated a regulatory sandbox initiative.[42]

Country Example: Sandbox as Part of Mexico's Holistic Fintech Approach[43]

In Mexico — a civil law jurisdiction — a regulatory sandbox is one of many complementary initiatives under the nation's fintech law that work together to build an enabling fintech ecosystem. Mexico enacted its renowned fintech law in March 2018 to encourage innovation and extend regulatory perimeters to cover existing fintechs operating in the market. The law granted the various regulators the authority to supervise fintechs, set up a legal and regulatory framework for fintech institutions, establish a fintech supervision department within the Comisión Nacional Bancaria y de Valores (CNBV) to oversee crowdfunding and e-money, and launch regulatory sandbox(s). The sandbox, supervised by a sandbox team, works with both regulated and nonregulated entities to test innovations.

In addition, the law launched an open banking initiative and allowed transactions to be made using certain cryptocurrencies, among other initiatives. With the law passed, the phased secondary regulations can be adjusted and updated to hone the specifics of the operation of the law and the sandbox's inter-agency collaboration arrangements. These efforts achieved some early successes in building fintech expertise, encouraging active engagement between policy makers and fintechs, and integrating policy makers and industry stakeholders within broader fintech forums domestically and abroad.

Country Example: Colombia — Introducing Supportive Fintech Regulation via a Sandbox

In 2018, Colombia's regulator, Superintendencia Financiera de Colombia (SFC), initiated a legislative change to launch its InnovaSFC program to encourage financial sector innovation with targeted regulatory assistance.[44] The program has three mechanisms: a hub to serve as a single contact point; the sandbox, or La Arenera; and a regtech mechanism to leverage innovations to help the regulator's internal processes.

As part of the sandbox, the regulator issues a temporary, two-year fintech license for sandbox graduates before deciding whether to permanently adopt any linked regulatory changes. If adopted, the changes are communicated through external circulars, which help to familiarize the financial sector with updated practices.[45] Using this mechanism, Colombia has thus far issued new regulations for cybersecurity, cloud computing, payments schemes, and QR codes and is in the process of issuing fintech licensing and new anti-money laundering rules.[46]

3.2.3 Resources and Governance of Sandboxes

Sandboxes are highly resource intensive, and policy makers should be aware of this prior to initiating one. The WBG-CGAP innovation facilitators survey found that policy makers found the intensity of resources needed to implement a sandbox to be a major weakness of the approach. Moreover, many policy makers significantly underestimated the resources required to develop and operate a sandbox, with the estimated cost varying considerably, from $25,000 to $1 million ($25,000 to $100,000 in EMDEs).

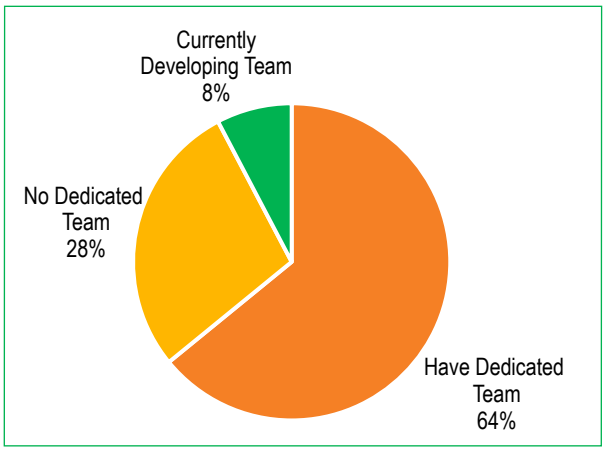
Approaches to running a sandbox can differ substantially between countries. The two most common governance models are (i) the dedicated unit, and (ii) the hub-and-spoke model. The former requires countries to develop and staff new departments specifically to implement the sandbox. An extreme example is the United Kingdom's FCA, which has nearly 100 staff dedicated to fintech; while not all are solely involved in running the sandbox, they provide supporting policy and other operational support to the framework. Bank Negara Malaysia also established a new department, the Financial Development and Innovation Department, tasking it with operating the regulatory sandbox in coordination with the Financial Technology Enabler Group.[48] In a hub-and-spoke model, only a skeletal permanent staff count is maintained, and expertise is drawn both from within the regulator and from outside, as needed. For example, the Bank of Jamaica sandbox, although housed in the Financial Market Infrastructure (FMI) department, draws on various other regions of the bank for support in determining eligibility and with testing individual firms. A third, less common model,

entirely outsources running the sandbox to an external firm able to support capacity and technical resource gaps, but this approach also requires substantial financial resources. In all three models, it is vitally important that supervisors are capable of (i) advising innovators effectively, (ii) designing relevant, robust tests for firms admitted into the sandbox, and (iii) understanding risks.

A survey on innovation facilitators conducted by the Bank for International Settlements (BIS)[49] revealed that most regulators either have a dedicated team for their sandbox or are in the process of developing one. Only 28 percent of regulators reported that they did not have a dedicated unit for their sandbox operations (see Figure 3.3).

Regulators may find that regulatory sandboxes demand more of their time and skill than they had anticipated. Since regulators are required to assess complex innovation and innovator applicants, define testing plans and performance metrics, and supervise participants during their time in the sandbox, ill-equipped and under-resourced sandbox teams may pose risks to consumers. Despite this, most EMDEs establishing a sandbox opt to hire internally,[50] even though internal staff may lack the technical skills or qualifications needed to deal with complex new fintechs. In addition, some regulators may not have the resources and capacity to sufficiently adjust their legal or regulatory framework to regulate or license appropriately the firms exiting the sandbox, unintentionally giving those fintechs a competitive advantage by allowing them to operate unhindered or with fewer rules than incumbents. Lack of technical staff and capacity thus may lead to serious consumer protection risks as well as reputational risks for the regulator, who may be held responsible for undue consequences.

Figure 3.3. Variation in Sandbox Resource Structures



Source: BIS.

All the expertise necessary to review applications and support firms through testing is unlikely to be available from a single set of resources. The skills needed can vary from supervision to technology to governance, making it good practice to have subject matter experts available, either within the organization or externally, who are able to provide support when needed. In India, adjacent government bodies may be drawn on for insights as well.

Country Example: Inside the Bank of Thailand's Regulatory Sandbox[51]

Thailand's central bank, the Bank of Thailand (BOT), established a separate Financial Technology Department adjacent to the Payment Systems Policy Department to oversee BOT's regulatory sandbox. The fintech department includes a mix of both IT and policy experts. The department works closely with both industry players and other relevant departments in the BOT, such as the Payments System Policy Department, Bank Supervision Department, and the Technology Risk Supervision Department. The BOT has also set up multiple cross-functional "squad" teams comprised of representatives from various departments who respond to new fintech technologies by sharing different perspectives based on their expertise and learning from one another.

Country Example: Leveraging Intra-Government Expertise in India

The regulatory sandbox set up by the Reserve Bank of India (RBI) has a dedicated staff of four to five personnel responsible for developing the enabling framework and defining the operation and structure of the sandbox.

For the first cohort, the team chose "retail payments" as a theme, with the explicit intention of spurring innovation in the digital payments space and helping to offer payment services to the unserved and underserved segments of the population. To support the application and eligibility process, they sought input from the National Payments Corporation of India (NPCI), an initiative of the RBI and the Indian Banks' Association (IBA), with the primary aim of creating a robust infrastructure for India's entire banking system focused on innovations in retail payments and the move toward a "less-cash" society.

While the sandbox is still nascent and results are still developing, this exchange of information across different areas of government provides a good example of the options for leveraging expertise across bodies to fulfill a common goal.

3.2.4 Testing Durations

All jurisdictions recognize the need for a defined and time-bound testing period. Because a sandbox is primarily useful for making evidence-based decisions on innovative products and services that can impact policy decisions, testing, the source of the evidence collected, is one of its most important components and forms the crux of the framework.

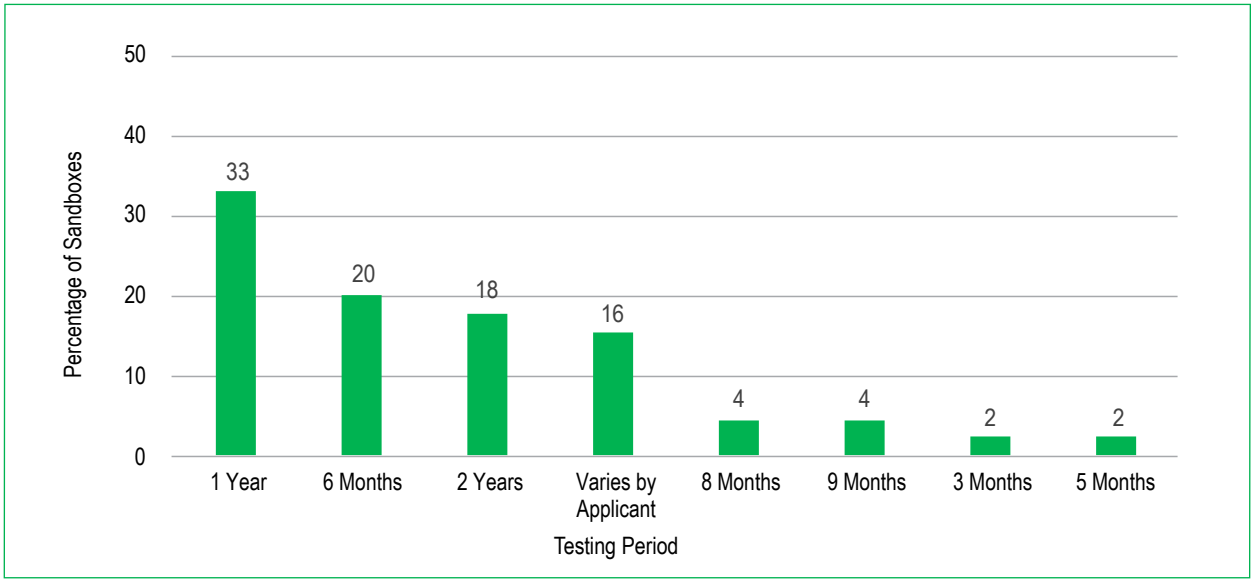
Sandboxes worldwide vary considerably in the testing durations used, from two weeks to two years. Testing periods should be long enough to allow the regulators (and firms) to understand the market impacts of the fintech product, but not so long as to mimic licensing without having met the full requirements. While an optimum period should be decided based on the regulator's requirements, the testing period should be a minimum of three months and a maximum of one year, with the option to extend.

For the sandboxes with available data on testing periods, the most common testing period is one year[34] (33 percent of the sample of 45 sandboxes). About 16 percent of sandboxes assess the testing period based on firm needs, and most provide the option of extending beyond the stated testing period if the firm and authorities deem it necessary (see Figure 3.4). While the testing period varies with the type and objectives of the sandbox, having a time-bound testing period is important to avoid using resources on underdeveloped or unviable innovations.

3.2.5 Thematic Sandboxes Promoting Specific Technologies or Products

Evidence has shown that well-defined, thematic sandboxes can be effective in encouraging particular

Figure 3.4. Variation in Testing Periods of Sandboxes



Source: WBG Research, Appendix 3.

technologies or products to come to market. While most (about 60 percent)[35] fintech sandboxes are geared toward general fintech innovations, some specifically adopt themes such as enhancing blockchain technology, innovations in insurance technology, payment system innovations, or digital authentication and verification technologies (see Figure 3.5).

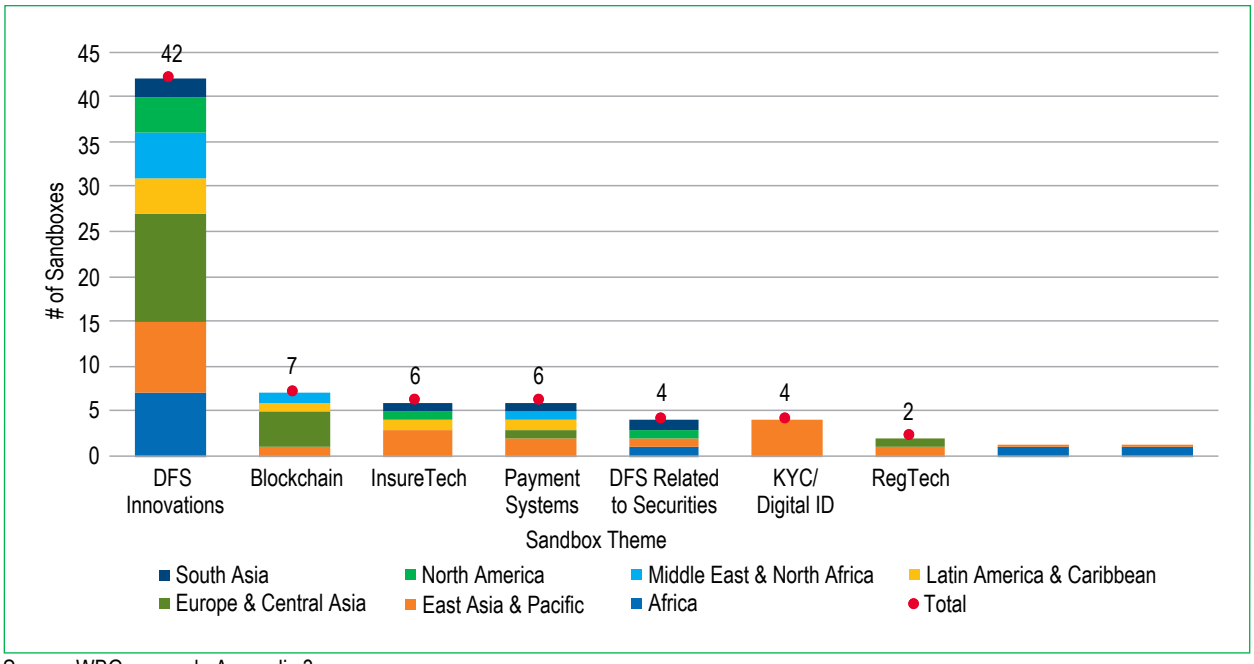
Thematic sandboxes can be effective in promoting certain technologies and specific policy priorities. This can be done in several ways, including through fintech challenges, as in the case of Sierra Leone and Mozambique. Malta and Lithuania have created sandboxes geared toward promoting the use of blockchain technology, while Thailand's thematic sandbox encouraged development of standardized QR codes, resulting in QR codes becoming commonplace for Thai consumers in Thailand and across borders.

Country Example: Bank Negara Malaysia's Thematic eKYC Sandbox Track[56]

Bank Negara Malaysia (BNM)[57] introduced a specialized thematic track for its sandbox. Termed a specialized sandbox, it is intended to accelerate innovations with clear potential to improve financial services. The specialized sandbox streamlined the application processes for thematic innovations, while the broader sandbox continued to provide wider coverage for other innovative solutions. The first specialized sandbox focused on eKYC and digital onboarding in an attempt to evolve KYC regulation historically performed in person. Under the specialized sandbox, two fintech companies and seven banks tested new eKYC technologies.[58]

One of the first participants of the regulatory sandbox, MoneyMatch — an online cross-border remittance service provider — offered peer-to-peer remittance services and tested digital onboarding by conducting multiple video conferences to verify potential clients. The firm created a platform to match individual buyers and sellers of currencies with a focus on SMEs who do a lot of cross-border transfers over the course of one day. For verification, MoneyMatch used AI-powered third-party facial recognition. Using the sandbox for a controlled roll-out and to test the effectiveness of the eKYC process, MoneyMatch successfully graduated in June 2019, exiting BNM's eKYC sandbox and receiving approval to operate and use its new KYC methods within the Malaysian market.[59]

Figure 3.5. Sandbox Themes by Region



Source: WBG research, Appendix 3.

The sandbox results helped the BNM enable digital verification and develop new eKYC policies. In December 2019, the BNM issued an exposure draft proposing requirements and guidance for eKYC implementation.[60]

Country Example: Blockchain Fintech Product Testing in Lithuania

The Bank of Lithuania (BOL) launched its blockchain-based sandbox, LBChain, in March 2020, with the objective of accelerating the development and application of blockchain-based solutions in the financial sector and attracting more fintechs to the country. BOL is working with external service providers to build the LBChain platform, which allows firms to test blockchain-based solutions while guiding them on applicable regulations and providing temporary relief on some supervisory requirements.

While the regulatory sandbox is in its early phase of operation, it has become the testing environment for several different types of financial products. Of 21 registrations, 6 fintech companies from 3 different countries were deemed eligible based on criteria including genuine innovation, consumer benefit, need for testing in a live environment, readiness for testing, and a goal of providing financial services in Lithuania.

For its LBChain sandbox, BOL provides consultations on regulation as well as technical and technological support to eligible fintech companies to support development of products into market-ready solutions. These companies have used LBChain to test their products, including a KYC solution for AML compliance, a cross-border payment solution, smart contracts for factoring process management, payment tokens, a mobile POS and payment card solution, a crowdfunding platform, and an unlisted share trading platform.[61]

Country Example: QR Codes Through the Bank of Thailand's Thematic Sandbox[62]

The BOT's thematic sandbox successfully encouraged financial providers to test standardized QR Codes using the BOT's PromptPay system.[63] In 2017, the BOT accepted eight financial institutions into the sandbox to test QR codes,[64] and five institutions successfully exited the sandbox with approval to provide QR code payment services to the general public.

As a result, QR codes are now commonplace in Thailand. By end 2019, PromptPay registrations reached 49.7 million[65] and more than 3.7 million merchants accept PromptPay QR payments (compared to 140,000 merchants accepting cards with 480,000 traditional POS devices).[66] Daily transactions through PromptPay averaged 9.6 million, reaching a peak of 13 million transactions. Moreover, e-payment transactions per user more than doubled from 63 in 2019 to 135 transactions in 2020.[67]

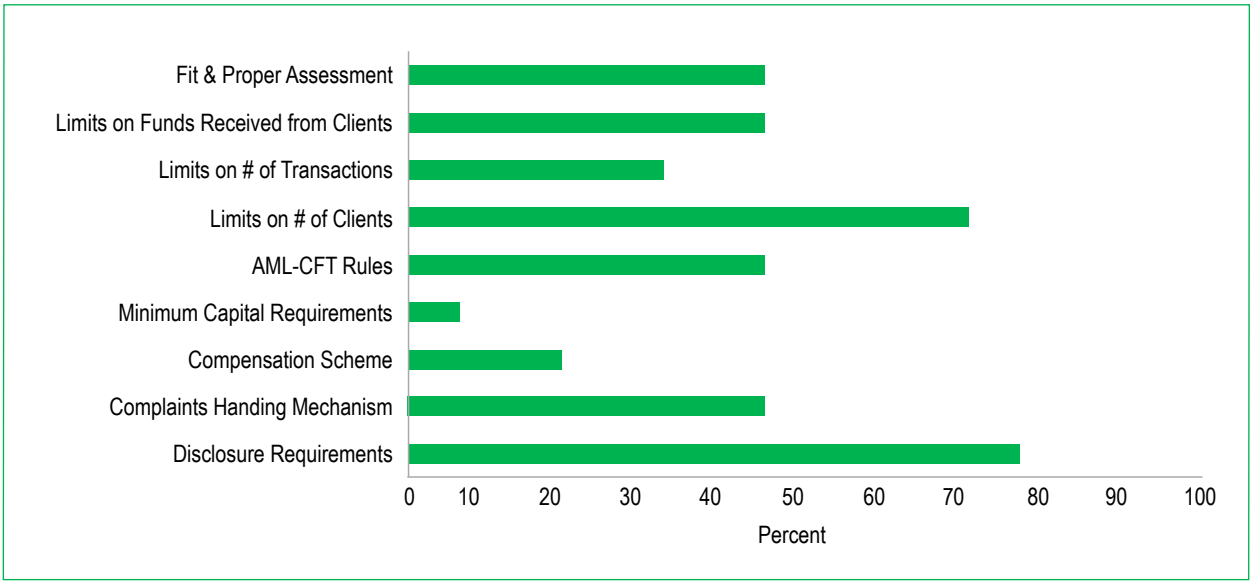
The sandbox results also helped build the rails for cross-border QR payments, which are now available in several ASEAN countries. Thai banks have partnered with foreign banks — for example, Krungsri with MUFG in Japan — to enable Thai customers to use their Thai QR system in foreign shops.[68] In addition, the BOT and the National Bank of Cambodia entered into an MOU in 2019 to create an interoperable Cambodian-Thai QR system.[69]

The successes described in the country examples are context specific and must be evaluated in terms of the unique circumstances and objectives of the jurisdictions implementing them. Often, the success of thematic sandboxes depends on the availability of supporting technology or financial sector infrastructure. For instance, the success of Bank of Thailand's thematic sandbox in promoting standardized QR codes in the market depended on the availability of BOT's PromptPay system. Establishing a thematic sandbox may not in itself guarantee success and will require careful assessment by policy makers, but it shows promise in supporting wider market development.

3.2.6 Consumer Safeguards

Regulators must ensure that participating consumers are not unduly exposed to risks from firms participating in the sandbox. To this end, as revealed in the WBG-CGAP Innovation Facilitator survey, 70 percent of regulators have safeguards in place to protect the consumers using their sandboxes, and 52 percent granted temporary waivers from full licensing regimes but required full authorization at the end of testing (see Figure 3.6).[70] Sandboxes are not meant as fertile ground for fintechs looking to exploit regulatory loopholes, and they do not provide exemptions from extant laws and regulations. Instead, sandboxes prescribe proportional legal and regulatory requirements for specific

Figure 3.6. Safeguards Commonly Used in a Sandbox



Source: WBG-CGAP Innovation Facilitator survey.

innovations, including (i) restricted authorization; (ii) rule waivers; (iii) individual guidance; (iv) no-enforcement-action letters; or (v) exemptions. The proportionality afforded to firms is time-bound and usually restricted to areas over which the jurisdiction has absolute control.

A poorly designed sandbox can have severe consequences for regulators and the consumers they protect. Inadequately defined exit strategies for firms with unfeasible business models can cause serious consumer protection risks. Moreover, when jurisdictions with relatively unsophisticated supervisory processes adopt sandboxes, monitoring risks can potentially be more difficult.

Consumer protection measures within sandbox frameworks include the need to provide transparent information to consumers on fees, data protection, and clarity on the firm's status as part of a testing process and lacking a full license. Most jurisdictions include clear details in their application and eligibility criteria describing the need for sufficient funds to cover liability for customer funds, should they be required. Other common protections include a thorough fit and proper assessment and limits on the number of transactions and number of consumers that can subscribe to the business model. Although cases of consumer complaints against a sandbox firm have not been recorded in any jurisdiction, supervisors should be attuned to this possibility; post-test consumer surveys might be a useful source of information.

3.3 The Impact So Far

Countries have established sandboxes as one among many mechanisms to stimulate innovation. Many sandboxes are established under the assumption that they can contribute to accelerating financial sector or country-level outcomes. These targeted outcomes often include increasing competition, promoting financial inclusion, or developing specific technological or product-focused innovations. This section explores linkages between sandboxes' policy objectives and their impacts on the broader financial sector.

Although it is early to draw firm conclusions, the growing number of cases provides useful lessons. Emerging key trends include ensuring (i) the sandbox aligns with country needs; (ii) the sandbox has a focused, well-developed scope and objectives; (iii) sufficient financial and technical resources are available; (iv) the fintech market is mature, ready, and has demand for a sandbox; (v) robust, well-thought-through exit plans exist; (vi) the sandbox engages in interagency and international coordination; and (v)

the sandbox is agile and flexible in its operation. This section explores some of these emerging lessons.

Most sandboxes are set up with the aim of achieving specific institutional and firm-level outcomes. These include improving the supervisory capacity of regulators, testing or adjusting the appropriateness of current regulations, facilitating engagement between fintechs and regulators, and providing firms with regulatory guidance. This section explores linkages between a sandbox's objectives and its impact on institutional arrangements, market development, and individual firms.

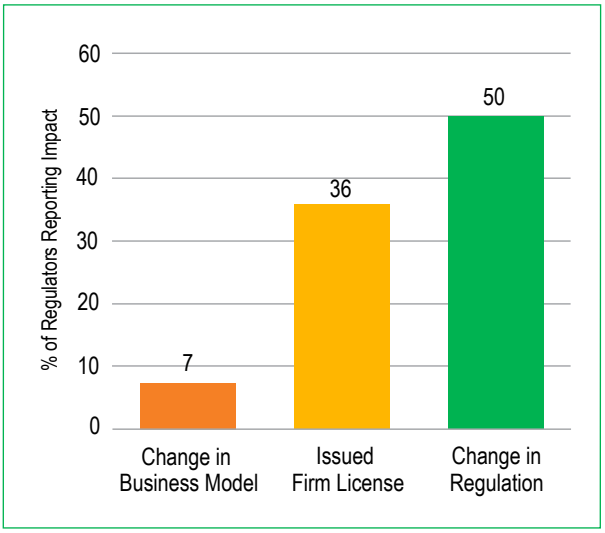
3.3.1 Assisting Policy-Maker Decisions and Effecting Regulatory Change

Regulatory sandboxes are one of several mechanisms authorities may use to facilitate innovation and drive regulatory change through evidence-based policy decisions. Sandboxes are not necessarily uniquely positioned to test all innovations, but they are useful in cases that require empirical evidence to support policy development. Like pharmaceutical industry sandboxes, fintech sandboxes are uniquely suited to providing the evidence base needed to support policy decisions and allow technological innovations or new business models into the market. This is especially relevant for the financial sector when viewed with the regulatory mandate in mind.

That said, a sandbox test environment is not necessary for regulatory approval or licensing; their usefulness depends largely on the business model being tested. Where regulatory requirements are unclear or missing or create barriers to entry disproportionate to the risks, a regulatory sandbox can be beneficial. While these are not the only two circumstances under which sandboxes are created, they show the clearest link to direct benefits. Sandboxes can also help build the stakeholder consensus needed to endorse or support broader regulatory understanding and change. For instance, Kenya's Capital Markets Authority (CMA) regulatory sandbox testing process led to updated guidelines on debt-based crowdfunding, and in Brazil, the Central Bank of Brazil reported that its sandbox and the linked LIFT initiative has helped the regulator assess risks and changes needed in the regulatory environment.[71]

According to the WBG-CGAP survey, many authorities reported instituting some type of regulatory change based on sandbox results. About 50 percent reported that live testing resulted in changed regulations, while 36 percent reported providing firms with full authorization to proceed (see Figure 3.7).[72]

Figure 3.7. Outcomes from Sandbox Participation



Source: BIS.

Several notable examples illustrate this effect. The Bank of Thailand's thematic sandbox for QR payments, already discussed, helped it engage with the industry and develop related common standards and business rules. Other sandboxes in Thailand helped introduce regulations and initiatives for robo-advisory, P2P lending, and eKYC. Malaysia's BNM sandbox helped authorities develop new eKYC policies and issue an exposure draft proposing requirements and guidance for eKYC implementation. The Astana International Financial Center[73] in Kazakhstan enabled issuance of new frameworks on private e-currencies, fintech, and crowdfunding.[74] In another example, Dubai's the Financial Services Authority used its sandbox to develop regulations in tandem with testing and innovations undertaken by participating firms (see Box 3).

Country Example: Using the Sandbox Approach to Adopt New Regulations in Kenya

In Kenya, the Capital Markets Authority (CMA) has used the regulatory sandbox testing process to update regulations by allowing firms to experiment outside the current regulatory framework. Upon exit from the sandbox, participants are either granted a license to operate in Kenya under existing regulations, or the CMA authorizes temporary operations until new regulations or guidelines are adopted according to section 12 and 12A of the Capital Markets Act.

For example, one participant, Pezesha, tested an internet-based crowd-funding platform through which investors can provide loan facilities for small and medium enterprises. The CMA uses these tests to create guidelines for debt-based crowdfunding in Kenya. Similarly, the Central Depository and Settlement Corporation (CDSC), the fourth firm to enter the sandbox, began testing its proposed screen-based securities lending and borrowing (SLB) platform for a period of five months starting April 2020. If the test succeeds, the CMA will update the current securities lending and borrowing regulations to include the screen-based model and will improve the uptake of the bilateral SLB product.[75]

Country Example: Stress Testing Underwriting Algorithms in the United States' CFPB Sandbox

Upstart Network, a fintech that began to operate in 2016, uses both traditional underwriting information and alternative sources of information — such as employment history and educational background — to evaluate an individual's creditworthiness. The Upstart platform pools this alternative data while applying computing and machine learning to identify relationships and evaluate creditworthiness that might not have been achieved using traditional assessments.

Concerns about the fairness in algorithmic lending, the use of nontraditional data, and the adherence to the fair lending laws set out in 1970 necessitated that Upstart engage with the Consumer Financial Protection Bureau (CFBP), a U.S. consumer regulatory agency that just launched its sandbox.[76] Over a period of time, the CFPB reviewed the model using a series of tests; for example, it processed the same loan application using both traditional data and Upstart's model with alternative data. The CFBP issued the firm a no-action letter (NAL), referencing the application of the Equal Credit Opportunity Act (ECOA) and its implementing regulation,[77] for its use of artificial intelligence (AI) and machine learning in its credit underwriting and pricing models.

A report by CFBP in August 2019 highlighted that the Upstart model increased approval of borrowers by 27 percent relative to traditional models while offering 16 percent lower interest rates.[78] Moreover, over the past year it has kept defaults in check and reached profitability; however, the impact of the COVID-19 pandemic on this initiative is yet to be seen. As part of the NAL, Upstart has continued providing CFBP with simulations on credit reporting, further proving that AI can improve credit scores and credit approval. The sandbox tests have allayed the regulator's concern over inherent bias in the alternative data and algorithmic decisioning and have shown that Upstart operates in compliance with lending laws and regulations.

Sandboxes can provide a useful (virtual) space for innovative start-ups to test new ideas and concepts in accord with regulatory objectives. They play an important role in providing the concrete empirical

Box 3. Dubai's Progressive Approach to Developing Regulation Through a Sandbox

Dubai's Financial Services Authority (DFSA) introduced an Innovation-Testing License (ITL) in 2017 that allows eligible fintech firms to test innovations in the sandbox under a restricted license. DFSA used this model to develop regulations in tandem with testing and innovation by firms in the sandbox.[79]

One example is Sarwa, a technology-based financial advisory firm that was the first fintech operator to receive an ITL. During the testing period, DFSA worked with Sarwa to understand the company's underlying operating model and then developed the appropriate regulation to allow its innovative products into the market while meeting the requirements for risk mitigation and consumer protection. Sarwa completed the regulatory test plan and graduated from the DFSA ITL to a full Dubai Financial Services Authority license. Prior to receiving the full license, the platform was limited to use by UAE residents, but it is now available to users across the region. going forward.[80]

evidence needed to make overarching decisions that lead to regulatory change. When used with this purpose in mind, sandboxes can provide unmatched benefits to the policy maker. However, while early evidence suggests that sandbox programs can result in regulatory change, interviews with some policy makers suggest that change is often attributed to the open engagement between regulators and innovators and the specific guidance received by firms while in a sandbox. As illustrated in the benefits section below, some of these commonly cited benefits can be achieved using other, less resource intensive, initiatives. It is thus difficult to quantify the direct impact of a sandbox on instituting regulatory change as compared to successes achieved with other innovation facilitators.

3.3.2 Benefits for Regulatory Institutions

Sandboxes offer considerable value to policy makers seeking to increase their understanding and capacity to facilitate and regulate a range of fintech innovations. Sandboxes can provide a structured and arm's-length process through which to strengthen dialogue and interaction with the industry. About 73 percent of regulators reported that implementing a sandbox contributed to building their capacity around fintech, and about 85 percent reported that it helped them to assess the appropriateness of their legal or regulatory frameworks.[81] While testing innovative use cases can help build internal capacity on different fintech innovations and encourage more market-regulator dialogue, the added value unique to a sandbox is elevated when authorities focus on applicants that can test existing policy frameworks against new technologies and business models.

While most regulators we spoke with cited interactions with the industry and regulator as an important benefit of sandboxes, the CGAP-WBG survey also revealed that the vast majority of interactions in the surveyed jurisdictions took place outside the sandbox environment. Informal interactions with market participants themselves have revealed preference for guidance units within the regulator to provide targeted advice and direction. Used instead of, or as complements to, regulatory sandboxes, these structures promise to be more effective and better suited to most business needs and able to build similar capacities through close engagement with the fintech sector. See the example in Box 4.

While we should not underestimate sandboxes' signaling benefits, it should be noted that other more indirect objectives, including promoting competition, spurring innovation, and facilitating exchange with market participants, can potentially be achieved through other market interventions. An example is the Monetary Authority of Singapore (MAS), which provided regulatory guidance to approximately 140 firms in connection with its regulatory sandbox. Of the applications received by MAS, 75 percent were later withdrawn or allowed to proceed without the need for a sandbox.[82] This illustrates that if the objective is to reduce regulatory barriers or deepen understanding of particular technologies or business models, structures such as innovation hubs or guidance units set up by the regulator may be effective complements to a regulatory sandbox. Moreover, t**hese alternatives are cheaper and easier to implement, requiring less time or cost investment, and do not lead to the distortionary effects of unlevel playing fields**.

3.3.3 Enhancing Financial Inclusion

Several sandboxes include a specific mandate to advance financial inclusion, including those in Bahrain, Malaysia, Sierra Leone,[87] and India. Others, like Jordan,[88] have made the development of a sandbox a core part of implementing a national financial strategy that bolsters inclusion by enabling an innovation environment (see Box 5). In Mexico, the sandbox is linked to a financial inclusion mandate under the fintech law.[89] Figure 3.8 shows the regional concentration and dominant themes of fintech-related sandboxes with a financial inclusion focus.

Country Examples: Jordan, Bahrain, and Sierra Leone

Jordan linked its sandbox activities to its NFIS, which includes a fintech pillar aimed at reducing bottlenecks to financial inclusion and promoting financial access through innovation. The sandbox contributes to inclusion goals by testing innovations that support inclusive and scalable products, services, and delivery channels targeted toward Jordan's priority populations: women, youth, refugees, and low-income populations.

Some of the fintech initiatives to support inclusion include interoperable retail payment systems; digital payments, such as cash transfers and bill payments;

Box 4. Leveraging Other Innovation Tools: Germany

The Bundesbank and the Federal Financial Supervisory Authority (BaFin) have taken coordinated steps toward fintech innovation. But, for several reasons, nothing that can be defined as a regulatory sandbox has been set up in Germany. Germany takes an innovation hub approach, as do the majority of the European Union's member states.[83]

An important institutional consideration, not only for Bundesbank but also for BaFin, was based on their legal mandate. Often the objective of using a "regulatory sandbox" is to proactively boost competition and, potentially, to relax regulatory or supervisory requirements to achieve this end. Yet, the promotion of competition is not a primary component of German financial supervisors' mandate, and it was felt that setting up a sandbox could not be justified under strict interpretation of that mandate. They were also concerned that supporting or admitting firms to a regulatory sandbox could generate reputational issues or conflicts of interest that would undermine the supervisors' fulfillment of their overall mandate.

A second consideration is that much of the pertinent law and regulation around financial markets is developed and defined at the EU level due to the need to harmonize regulations across the area. When developing input for reform of EU legislation, authorities, including the Bundesbank and BaFin, coordinate through the European Supervisory Authorities, in particular the European Banking Authority in the case of banks and financial services providers. The EU has no single specific "regulatory sandbox." Instead, the European Forum for Innovation Facilitators (EFIF), a network of over 35 innovation facilitators[84] (including innovation hubs and some regulatory sandboxes) was established;[85] there, supervisors could, for example, share information and technological experience. Bundesbank and BaFin are members of EFIF.

At the national level, scope nevertheless remains to apply the principle of proportionality and a risk-based approach to supervision in a manner that eases constraints imposed on smaller fintech firms or firms that may pose less systemic risk. Accordingly, in several cases, the risks and size of new fintechs have defined supervisory practices. Interactions with fintechs have also led to adjustments in guidance and application of rules, as in the qualifications of directors, to adjust to the new fintech environment.

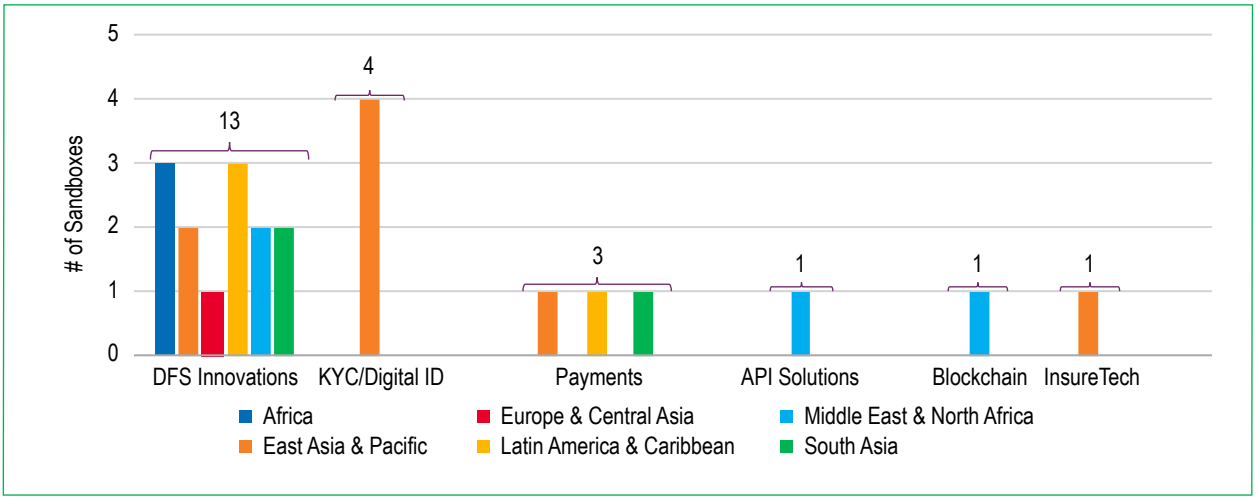
Third, the Bundesbank and BaFin already had other measures through which to contact and support the start-up and fintech community, including regular "open door" consultation meetings where fintechs could interact with officials to learn to better understand how existing regulations or supervisory practices would apply to their business model. In addition, the Bundesbank, BaFin, and the Ministry of Finance often come together to work on topics of mutual interest.

Another form of support to the fintech ecosystem in Germany is the Bundesbank's Digital Office, which not only looks at trends in the market and interacts with incubators but also reviews how the central bank could use fintech to support its own internal functions. The Digital Office has a partnership with Frankfurt´s TechQuartier, a melting pot for entrepreneurs and innovators from the financial industry. Through this partnership, the Bundesbank is in close contact with the fintech scene. Besides innovation challenges, workshops, and other events, the supervisory garage is a key feature of the partnership. The supervisory garage gives fintechs the opportunity to enter into a simple and direct exchange with Bundesbank officials and provides assistance in navigating through regulations. The Bundesbank is also involved in considering the implications of new business models on market dynamics and stability.[86]

In 2016, BaFin launched a landing page for start-ups and fintechs. This landing page gives information on typical fintech business models and authorization requirements. In addition, BaFin launched a contact form for start-ups and fintechs on its homepage. The event, BaFin-Tech, hosted by BaFin, enables a broad dialogue with various stakeholders of the German fintech market. BaFin's fintech unit, Technology-Enabled Financial Innovation, is engaged in identifying, understanding, and assessing fintech innovations and their relevance to and impact on the financial market. The unit aims to develop strategic positions, including on the need for regulatory or supervisory action, in relation to financial innovation. The fintech market in Germany is strong, and the market appears to be content with the role the regulators are playing.

and innovative identity solutions to include vulnerable sections of society. These cannot be solely attributed to the sandbox, however. The sandbox is coordinated and supported by the NFIS implementing entities. In practice, Jordan's Financial Inclusion Secretariat played an integral role in establishing the regulatory sandbox, and it continues to support both NFIS implementation activities and sandbox activities. It is important to note that an implementing body — such as the NFIS Secretariat in this context — with sufficient capacity or a separate dedicated unit to implement the sandbox is vital to its proper functioning.

Figure 3.8. Fintech-related Sandboxes with Financial Inclusion Elements



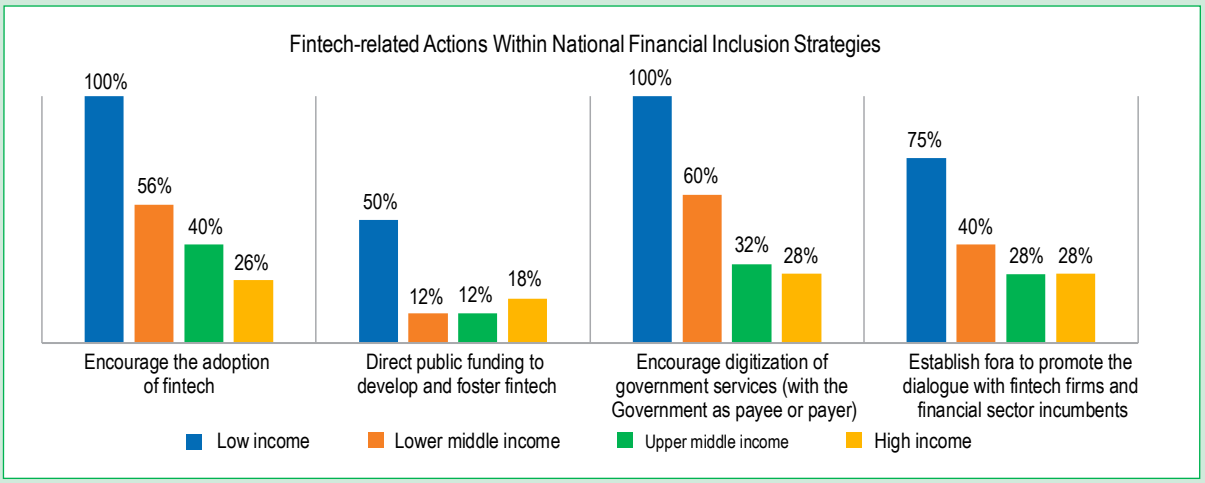
Source: WBG Research, Appendix 3.
*A total of 23 sandboxes are related to financial inclusion or financial inclusion themes.

Box 5. Fintech and National Financial Inclusion Strategies (NFIS)

The first national financial inclusion strategies were launched around 2010, and by 2019 more than 45 countries had launched one and 39 others were in the process of doing so.[90] Recently, these financial inclusion strategies have played a role in encouraging the use of fintech and digital financial services specifically to further financial inclusion goals.[91]

In a WBG-IMF study we noted that over 60 percent of jurisdictions, primarily in middle-income countries, reported incorporating fintech in an NFIS. These national strategies tend to focus on fostering adoption of fintech (41 percent of survey respondents), encouraging digitization of government processes (41 percent), and establishing a forum for public-private dialogue (33 percent).[92]

All low-income countries with financial inclusion strategies focus on encouraging fintech adoption and digitizing government services. In comparison, on average, about half the sample of middle-income countries contained strategies to encourage fintech adoption and encourage digitizing government services. About 75 percent of financial inclusion strategies in low-income countries focused on encouraging dialogue between fintech firms and financial sector incumbents, while on average less than 40 percent of strategies in middle-income countries had this as a focus.



Source: Global Fintech Survey (GFS 2019).

Other countries linking financial inclusion to sandboxes include Bahrain and Sierra Leone. The Central Bank of Bahrain (CBB) launched its sandbox initiative in June 2017 to foster market development that advances financial inclusion. It is one of the few sandboxes that specifically identifies financial inclusion as a primary objective within its framework, stating as its goals "to promote effective competition, embrace new technology, encourage financial inclusion and improve customer experience." In addition, the integration of financial inclusion remits within the innovation office suggests that CBB is well positioned to monitor the impact of financial inclusion throughout the initiative.[93]

In Sierra Leone, the sandbox was initiated in April 2018 to facilitate new business models to promote greater financial inclusion, as well to achieve clear benefits for potential consumers. Evaluation criteria in the Sierra Leone sandbox framework require applicants to demonstrate how a proposed innovation can advance the country's national financial inclusion strategy. The framework also allows inclusion objectives to be bound to sandbox participants through requirements that the underserved be included in sandbox testing (collecting vital information and data about their needs) and/or be direct beneficiaries of the proposed innovation after deployment. Incentives may also be offered to innovators who primarily address financial inclusion objectives.[94] While it is too early to assess the country-level impacts on financial inclusion, early evidence suggests that creating a focal point for fintech in Sierra Leone, such as the sandbox team, has strengthened the overall fintech ecosystem by tapping into latent market demand and creating stronger links between the Bank of Sierra Leone (BSL) and fintech companies.[95]

Innovators can test new products and services that better meet the needs of the underserved, but according to regulators responding to the WBG-CGAP survey,[96] less than a quarter of sandboxes tested focused on business models or technologies that explicitly addressed the financial needs of the underserved.[97] Similarly, the UNSGSA found[98] that regulatory sandboxes "are neither necessary nor sufficient for promoting financial inclusion," particularly if they are prioritized over more impactful financial inclusion reforms.

Although some sandboxes do have an explicit mandate of financial inclusion, evidence is limited on the success of these initiatives in reducing barriers to inclusion. Currently little evidence shows that those sandboxes set up with the key objective of financial inclusion have achieved more to that end than sandboxes set up with, say, an innovation mandate. One reason for this limited evidence may be that sandboxes have only been operating since 2016; however, it is equally probably that sandboxes in all forms are able to support better consumer-centric products and services and encourage innovation in the wider economy.

For instance, the majority of innovations that flow through a sandbox often operate within the payments, clearing, and settlement spaces, which clearly link to financial inclusion goals.[99] Malaysia provides one of the most successful examples of a sandbox contributing to financial inclusion when authorities opened up their sandbox to test remote customer identification (eKYC). Four firms were allowed to test their products with the Bank Negara Malaysia (BNM) sandbox. Recognizing the usefulness of eKYC and its potential for financial inclusion, BNM subsequently drafted e-KYC guidelines promoting its use and removing some of the friction in account opening.

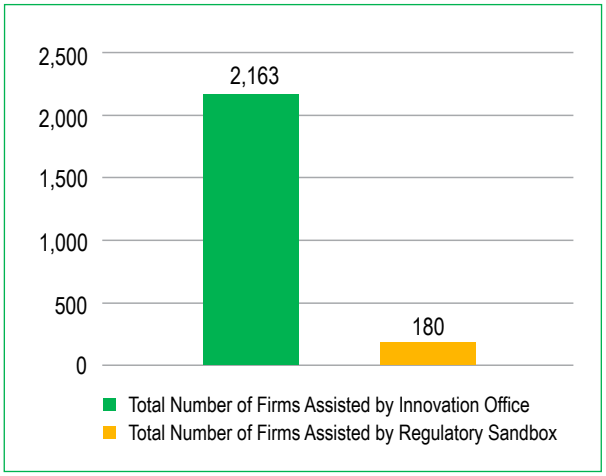
Evidence is thus insufficient to demonstrate a direct causal relation between a sandbox created with an intention of financial inclusion and those created with wider financial inclusion goals. However, it can be surmised that properly implemented sandboxes used to encourage consumer-focused products and services, especially to fill a market gap, can potentially impact broader financial inclusion goals.

3.3.4 Assisting Private Sector Firms

Most sandboxes aim to facilitate market entry of innovative firms that would otherwise struggle to establish themselves due to high regulatory thresholds. Evidence is mixed thus far on how successful sandboxes are in this respect. While sandboxes are often open to both regulated and unregulated firms, some fintechs attribute the ability to access markets to their sandbox participation. However, data collected from policy makers show that many more fintechs have been supported by innovation hubs than by sandboxes and accelerators combined.[100] In fact, a recent study by the CCAF and WBG showed that innovation offices had assisted 12 times as many firms as sandboxes covered in the same survey.

Other research[101] has similarly concluded that innovation hubs are potentially better suited to, and more capable of, dealing with the wide variety of companies that seek guidance on maneuvering the regulatory landscape.

Figure 3.9. Number of Firms Supported by Innovation Offices and Regulatory Sandboxes



Source: CCAF and WBG Regulating Alternative Finance survey.

Country Example: Australian Licensing Exemption Scheme

In Australia, the Australia Securities and Investment Commission (ASIC) put forth a fintech licensing scheme. While still referred to as a sandbox, unlike a supervised sandbox test, the ASIC fintech licensing exemption allows eligible fintech companies to test certain products or services for up to 12 months without an Australian Financial Services license or credit license.[102] Firms can thus begin operation immediately while keeping the ASIC notified of their plans, should the regulator wish to clarify their operations.

The regulator does not have a defined application process. Issues of an unlevel playing field do not arise, and firms are only allowed to operate within certain boundaries, that is, below 100 retail customers and within $A50,000 in individual customer exposure; total maximum exposure for all clients is $A5 million during the testing period, while complying with responsible lending obligations and compensation arrangements. Once the thresholds are breached, they must apply for a permanent license.

Another frequently cited benefit of sandboxes for firms is reduced compliance costs, which can lower barriers to market entry. Although true, as with the alternate avenues for guidance, the sandbox might not be the best tool for reducing costs. Other regulatory tools, including license exemptions, rule changes, or proportionality, could potentially be better suited to supporting firms in carrying out activities for which regulations already exist. Moreover, in some cases, if sandbox application processes are complex, unclear, or constantly evolving, firms may consider entry into sandboxes to be cumbersome. That said, the firms with which we spoke that had been through a sandbox process indicated that they had benefitted from the process, the framework, and the relationship with the regulator (See Box 6).

Box 6. Reactions from Fintech Firms[103]

Indonesia: PrivyID Testing Digital Signatures within Bank Indonesia's Sandbox

Established in 2018, the Bank Indonesia (BI) FinTech Sandbox aims to provide a safe space to test Financial Technology Operators and their products, services, and business models. Fintechs entering the BI sandbox must be listed companies registered with the bank and meet other common sandbox criteria, such as providing innovative and relevant services targeted toward Indonesian customers, readiness to test, and others.

PrivyID was an early entrant to BI's sandbox. A member of the Indonesian FinTech Association (AFTECH), PrivyID was registered by the BI as Indonesia's first digital identity and legally binding digital signature solution provider. Prior to entering the sandbox, PrivyID provided banks with digital signature technologies for some financial services. However, digital signature solutions for credit card applications were not as yet legal. This prompted PrivyID to apply to the sandbox to test digital solutions to replace hand-written signatures for credit card applications.

In early 2019, PrivyID submitted its application to BI's sandbox. The application process included a detailed interview with BI sandbox staff, adequacy requirement tests, and many follow-up information and documentation requests, all to a relatively tight timeline. The process as a whole took six months before PrivyID received the go-

ahead to launch its new digital signature solution for credit card applications. Once PrivyID was in the sandbox, many banks were keen to partner with it. The new technology expedited credit card approval processes from three to five days to 15 minutes. Over the course of one year, PrivyID and financial service providers processed e-signatures for more than 50,000 credit card applications.

The sandbox provided other benefits to PrivyID. Inputs from Bank Indonesia helped PrivyID refine and adjust its solutions to better meet the needs of the consumer. For instance, PrivyID initially processed credit card applications by requiring users to send information to bank partners that then forwarded the application to PrivyID for verification. Once verified, PrivyID would message users (through SMS) with a unique user ID, a password, and a secure link for signature. However, some customers were unable to find their notifications or links for e-signature. This led PrivyID to include the added ability to use facial recognition against accredited identification documents with added one-time password controlled security methods that could also facilitate the digital signature.

PrivyID exited BI's sandbox in August 2020 after successfully completing all the tests, including no signature or application failures. Since then, providers must still obtain explicit approval from BI to utilize PrivyID's digital signature solution. Moreover, service providers are required to seek permits from OJK (the Indonesia Financial Services Authority), as the regulator for e-KYC, to employ PrivyID's solution. While the product still has a low take-up level, the firm indicated that it was very happy with the process and had benefitted immensely from the close relationship with the regulator.

Rwanda: Riha Payment System Ltd.

Riha, a subsidiary of the technology company Aurora Soft, is a mobile payments company based in Rwanda. Among its products is a payment aggregator platform and a service powered by artificial intelligence (AI) that offers end-to-end business solutions for merchants. Because it uses AI in its business model, Riha was not allowed to launch directly into the market.

In 2018, when Riha first sought a way to test its digital payments product, it turned to the newly established sandbox of the Rwanda Utilities Regulatory Authority (RURA),[104] because the Central Bank of Rwanda (BNR) did not yet have a sandbox facility. BNR, recognizing the implications of a sandbox for the financial market and the direct impact on consumers, set up a regulatory sandbox of its own, focusing on firms that do not clearly correspond to currently regulated products, for hybrid products, or products that use technology in a novel way. BNR's process from that point showed agility and a willingness to learn from the market, but it did not come without its hurdles.

The sandbox is applicable only to digital payment services (rather than to fintech in general) and was established by way of a secondary measure (Regulation No. 05/2018 of March 27, 2018, governing payment services providers), since it is framed within existing legislation. Entrants need to demonstrate that they (a) address a significant problem or issue or bring benefits to consumers or the industry; (b) improve accessibility, efficiency, security, and quality of payment services; (c) enhance efficiency and effectiveness in managing risks; or (d) address gaps in or open up new opportunities for financing or investments in the country. Since then a number of separate but connected sandboxes have been initiated in the BNR to specifically address gaps identified by regulators, including microinsurance and deposit-takers.[105]

One initial challenge for Riha was the relationship and mandate with other regulators operating within the jurisdiction, in this case RURA. Riha's parent company is a technology firm, making it natural to first approach the utilities regulator about entering its existing sandbox. However, lack of clarity on the treatment of innovative business models and the overlying regulatory mandates created a convoluted application process. Moreover, Riha was required by the BNR to satisfy certain prerequisites before it could operate in the market. This included registering itself as a company, not solely as a subsidiary; hiring senior staff members, including a CEO (other than the founder) and a finance director; and appointing an auditor.

Both the firm and BNR admit that learning occurred on both sides, demonstrating the value of learning while doing to bring agility and innovation to supervisory processes. Mr. Robert Ford, Managing Director of Riha, described it as a "win-win" situation for both sides and commended the BNR on its willingness to always confer and its readiness to admit when it was unfamiliar with the intricacies of the technology. Riha maintains that it would not have been able to operate and gain traction in the market without the support of BNR's regulatory sandbox, and BNR attests to gaining an understanding of innovative concepts and the ability to evaluate whether its regulatory framework is fit for purpose.

Riha has been in the BNR sandbox for close to two years, and currently no other firm operates there. The firm hopes to be fully authorized in the near future, but it is as yet unclear if this will require establishing a new license.

3.3.5 Fostering Partnerships in the Market

Sandboxes can help develop partnerships in the marketplace, either directly or indirectly. Contrary to the commonly perceived risk that fintechs will disintermediate banks, evidence so far suggests that sandboxes encourage and facilitate partnerships between them. Although, sandboxes are not the only means of fostering partnership models, they offer specific beneficial features. For instance, some sandbox designs require fintechs to partner with a licensed firm to apply, fostering cooperation and knowledge sharing.

A 2016 study[106] showed that more than half of the world's largest 500 companies work with start-ups and prefer partnering with them rather than developing their own technologies. This is a synergistic model, with the incumbent getting new capabilities and the start-up gaining legitimacy and access to new distribution. Sandbox support for these partnerships has not been demonstrated, however.

One of the most important roles for sandboxes has been creating continuous dialogue with regulators that allows participating firms[107] to reassure investors, thus helping to raise capital and create another kind of partnership. However, this relationship can raise concerns about creating an uneven playing field specifically with those firms that have chosen not to go down the sandbox route.

Sandboxes can also help drive partnerships by providing shared infrastructure. While not a typical regulatory sandbox, the ASEAN Financial Innovation Network (AFIN),[108] as part of its collaboration with the Monetary Authority of Singapore (MAS) and the International Finance Corporation (IFC), launched an API (application programming interface) Exchange (APIX) — effectively an API-themed testing environment as a shared infrastructure. Through partnerships, this cross-border, industry-led sandbox has been effective in engaging fintech innovators looking to develop solutions with participating financial institutions (see Box 7 below). This brought together developers, fintechs, incumbents, and the regulator to provide a platform for shared learning and mutual benefit. Shared platforms, like blockchain protocols, open APIs, or shared security infrastructure may encourage third-party developers to build next-generation products and reduce time to market.

Country Example: Encouraging Fintech Partnerships in Brazil

In May 2018, the Central Bank of Brazil (BCB) launched the Laboratory of Financial and Technological Innovations (LIFT), a fintech incubator and a sandbox to accelerate the development of start-ups and accept submissions from early-stage innovators.[114]

Fintechs entering the BCB's sandbox are supported by participating organizations and LIFT partners, including the Federação Nacional de Associações dos Servidores do Banco Central (a Brazilian nongovernmental organization) and industry partners, including researchers, developers, specialists, and

Box 7. Early Successes from the ASEAN Financial Innovation Network

The ASEAN Financial Innovation Network (AFIN), an initiative of MAS, IFC (International Finance Corporation, the private sector arm of the WBG), and the ASEAN Bankers Association (ABA), is a regional industry marketplace and technical sandbox intended to promote the growth and integration of innovative products and services that advance financial inclusion in the region.[109]

In September 2018, AFIN launched the API Exchange (APIX) platform, promoting an open architecture platform that enables fintechs and financial institutions to more readily discover, test, and co-design new end-to-end services.[110] AFIN has been successful in raising fintechs' visibility and in helping banks experiment with services based on an API. It aims to share insights and collaborate closely with regulators, to provide them with an opportunity to better understand the practical challenges fintechs face, and to inform efforts toward policy and operational harmonization, which, in turn, can further business and investment opportunities.

The APIX ecosystem has thus far brought together more than 600[111] fintechs and 150 financial institutions from 26 countries to partner and develop innovative cross-border solutions.[112] The platform established numerous partnerships that have been accepted and are currently testing within the sandbox and has signed several MOUs with fintech associations in recent months to expand its regulatory coverage, including bringing Abu Dhabi,[113] India, and Hong Kong within AFIN's network and supporting the G20 TechSprint.

representatives from firms like Oracle, Amazon Web Services, IBM, and Microsoft.

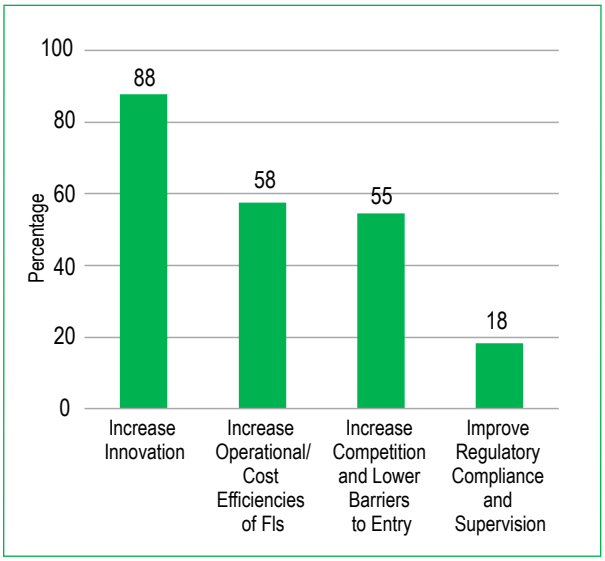
Partners provide guidance, as well as products and services to support sandbox applicants with prototypes; in many cases, they partner with start-ups to launch in the sandbox and eventually in the Brazilian market. This approach allows LIFT and the BCB to help stimulate entrepreneurship, increase competition, and introduce a new range of innovative solutions to enhance the Brazilian financial sector, such as increasing financial education and inclusion, making credit cheaper, modernizing legislation, and making the financial system more efficient.

3.3.6 Stimulating Market Competition

The role of sandboxes in fostering market competition depends largely on regulators' objectives and mandates. Opening up room for competition is one potential result, but other interactions have created unequal playing fields. Policy makers report mixed results when assessing whether a sandbox has led to increased competition in their markets.[115] For example, approximately, 88 percent report that sandboxes have, in fact, attracted innovators to their markets, particularly in the form of larger, more established fintechs.[116] In a survey of regulators in countries with sandboxes, approximately 55 percent suggested that one top benefit for the financial sector was increased competition and lowered barriers to entry (see Figure 3.10).[117] Some international fintechs have leveraged sandboxes to enter new markets and credit early and sustained engagement with policy makers as key factors in their success. Sandboxes such as the U.K. FCA sandbox have been created specifically to increase market competition. This is in line with the FCA's mandate as a regulator, and firms' time to market has been reduced, with a 40 percent reduction in application processing time reported.[118] However, not all jurisdictions have increased competition as a specific mandate, making facilitating competition a less imperative sandbox aim.

It is unclear, however, if a sandbox itself drives competition and reduces time to market or if a sandbox signals to firms that a regulator is open to innovation, thereby attracting innovators to the market. Moreover, once firms enter the market, no clear evidence suggests that firms continue to be active and profitable.

Figure 3.10. Benefits of Fintech According to Regulators



Source: GFS survey.

A number of EMDE countries have cited attraction of players to their markets as a reason for developing a sandbox. While this can be beneficial, it is not sufficient in and of itself as an objective for setting up a sandbox. Although jurisdictions like Singapore, Lithuania, and the Financial Services Authority in Seychelles have as part of their objectives making the market a more inviting environment for foreign firms, it is unusual to set up a sandbox with the sole intention of attracting foreign players, and the success of such sandboxes has not yet been observed.

It is more common for competition benefits to arise not directly through the operation of a sandbox but indirectly through linked initiatives, as in Brazil and Jordan. A sandbox is likely to have a catalyzing effect, but it can have its greatest impact when operating within a broader strategy or set of initiatives to enable fintech. In Singapore, for instance, the sandbox has helped attract overseas start-ups to do business there, contributing to making Singapore a smart financial hub.[119] However, a number of other factors are at play that make Singapore an attractive ecosystem, including its very open economy and a financial system with significant cross-border links (notably, dollar funding), particularly to China and ASEAN countries. Also, foreign banks have a significant presence, and the asset management industry channels funds to the

region from around the world.[120] Singapore also has one of the highest numbers of regulatory alliances and has cooperative arrangements with eight countries, including the United Kingdom, Australia, and Japan.

Country Example: Increasing Demand for InsureTech in Singapore

To encourage fintech innovation in Singapore, the Monetary Authority of Singapore (MAS) launched a fintech regulatory sandbox in 2016. PolicyPal, an insurance technology-based company that uses AI to digitize insurance, registered in the MAS regulatory sandbox in March 2017;[121] following six months of testing, it was the first to graduate.[122] PolicyPal and the MAS worked together to optimize insurance policy options for holders by assessing challenges and identifying gaps in insurance policy. According to PolicyPal's founder, the insurance sector grew rapidly in 2018, when digital disruptions in the traditional financial services sector created greater opportunities for InsurTech firms and insurers to introduce new business models into the market.[123]

Since PolicyPal entered the market, MAS has taken on Inzsure, another InsureTech company aiming to use its digital platform to provide end-to-end service and reduce transaction costs. A few companies in the InsureTech space in Singapore now leverage AI, blockchain technology, and internet of things (IoT) technologies, including companies in the region now collaborating with the Singapore market.[124]

Country Example: Accelerating Fintech Entrepreneurship in Jordan

A core objective of the Central Bank of Jordan's regulatory sandbox is to contribute to the nation's efforts to become a regional financial innovation and entrepreneurship hub by "encourage[ing] competition and increase[ing] effectiveness and security in money transfers."[125]

The sandbox interacts with Jordan's national fintech hub to create a pipeline of incubated financial technology innovations. The sandbox links with other partner companies, like JoMoPay, Jordan's national e-payment and mobile payment platform, and with a range of innovation facilitators to encourage competition and stimulate entrepreneurship within Jordan.

In response to the COVID-19 crisis, Jordan released a specific cohort focused on solutions for consumers battling the crisis and introducing competition to plug potential gaps in the market.

On the flip side, a sandbox can also create imbalance and cause level-playing-field concerns among firms that have chosen not to employ a sandbox process, which can reduce sandbox effectiveness in achieving its goals. Unlevel playing fields may arise in instances where firms admitted into a sandbox have an "upper hand" in attracting investment due to reputational gains and exposure garnered within the sandbox. Firms accepted into a sandbox may reflect a regulator's unintentional "stamp of approval." Some regulators have been accused of picking winners and losers, and firms who have accessed a sandbox are viewed as having greater regulator interaction and therefore a competitive advantage over firms not included in the sandbox process. In the United Kingdom, 40 percent of start-ups that flowed through the FCA sandbox received investment, either during or after the program.[126] While in other markets, sandboxes linked to accelerator-like initiatives provide support such as funding and fintech partnerships. This is mitigated somewhat, although not entirely, by having an open and transparent application process with clearly defined eligibility and entry criteria.

Another risk is the possibility that detailed entry requirements will stifle firms' time to market. This is especially true for firms that might only need regulatory guidance. Applying to a sandbox takes significant time and resources without guaranteeing sandbox entry and successful exit. At times, eligibility criteria are unclear, requiring even greater time and effort.[127] The regulator is also learning by doing, meaning larger firms could gain an unfair advantage because they have more time and other resources to invest.

A separate but related risk is that once a firm exits a sandbox, it may be able to operate with fewer requirements than incumbents. This is especially true in those jurisdictions with limited capacity to adjust supervisory frameworks appropriately, leading to unlevel playing fields. This is a key risk in jurisdictions where the sandbox merely functions to waive an existing license requirement. While waivers and reducing undue regulatory burdens is useful for increasing market competition, other safeguards must

be introduced to ensure that AML/CFT risks and the risks of unlevel playing fields are well mitigated.

3.3.7 Enabling Fintech Market Development

Sandboxes by themselves are not a turnkey solution or a substitute for building effective, permanent regulatory frameworks to enable fintech. However, in the right setting, sandboxes are a valuable tool for enabling fintech by providing empirical evidence and operating within a broader strategy or set of initiatives.

Fintech and other forms of DFS can play a vital role in extending the reach and widening the access of financial services and, more broadly, the achievement of the Sustainable Development Goals (SDGs). The gains from fintech are particularly important for developing countries, as fintechs offer opportunities to address long-standing constraints. They have already helped to bring access to financial services to millions of consumers and MSMEs (micro, small, and medium enterprises) around the world. Regulatory sandboxes can provide valuable insights for policy makers and promote innovation when operated within a strategic framework that enables fintech through a set of fintech-driven initiatives. However, policy makers should be careful not to prioritize sandboxes over other, potentially less resource-intensive, initiatives that can achieve broader policy goals. For instance, resources spent on developing effective credit infrastructures or clearing and settlement institutions may be more critical to enabling fintech than are sandboxes.

Many countries, such as France, Germany, and Morocco, have eschewed regulatory sandboxes in favor of other policy tools and strategies to enable innovation. Singapore, one of the original proponents of the approach, uses sandboxes as the solution of last resort. Sandboxes by themselves are not substitutes for building permanent regulatory frameworks that stimulate and support orderly adoption of innovation, including from fintech. They should be used as a targeted, temporary measure to achieve a limited set of clearly articulated objectives.

Country Example: The United Kingdom and the Digital Sandbox

In May 2020, when the COVID-19 pandemic led most of the world to go online, the FCA piloted a "digital sandbox" to allow firms to test and develop proofs of concept in a digital testing environment while receiving enhanced regulatory support to tackle the challenges of the COVID-19 pandemic.[128] They are in the process of completing their first round of applications specifically focused on preventing fraud and scams, improving the financial resilience of vulnerable consumers, and

Box 8. The Use of Landscape Assessments for Fintech Market Development

A landscape assessment of the fintech sector can provide officials with a baseline understanding of the opportunities and challenges that the sector presents. It is important for government and regulators to actively monitor and evaluate the fintech space and look to develop flexible, risk-based regulatory approaches to fintech activities, especially in areas that may potentially promote the entry of smaller players and ensure access to affordable financial services.

In April 2019, the Fintech Roadmap Committee of the Nigerian Capital Market unveiled its report, "The Future of Fintech in Nigeria."[129] The report identified fintech's importance to the country's capital market, and it both challenges and recommends suitable regulatory frameworks that could allow fintech to play a significant role in Nigeria's capital market.

Another instance is the first Fintech Landscaping Report published by the South African authorities in early 2020, which provides a holistic view of the fintech landscape in the country.[130] The report described the landscape of fintech firms operating in the country and identified key enablers and inhibitors in the South African fintech ecosystem. The research helped estimate the market size of each segment and the potential growth per segment. In addition, a sample group of fintech entrepreneurs were interviewed to understand their journey, challenges, and perceptions of the regulatory environment.

Feasibility studies and landscape assessments can provide regulators with a baseline with which to determine whether a sandbox is truly necessary to meet the challenges identified. Regulators can then develop metrics based on the information obtained from the initial landscape assessments to demonstrate whether the sandbox has been effective in meeting the needs of the regulator and/or industry.

improving access to finance for SMEs. While the specifics are still being ironed out, the access to data, a collaborative platform, and an API marketplace are all being considered. This supports the development of fintech products and services with a specific aim and end-goal.

Interestingly the digital sandbox also gives observers the chance to participate in the sandbox, either to form partnerships with other firms, provide mentorship, or simply observe the process.

For fintech to thrive, a multidimensional approach is needed, including a gap analysis of existing laws and regulations and an open dialogue between regulator and industry. A landscape assessment to consider the country context is a necessary first step for all regulators. Conditions to be gauged include: (i) the institutional mission and policy priorities, (ii) legal and regulatory framework, (iii) maturity of the fintech segment, (iv) capacity, (v) market conditions and feasibility, (vi) stakeholder ecosystem, and (vii) risks.

Regulatory sandboxes, while useful, cannot be used as the sole response to fintech in any jurisdiction and should be complemented by other mechanisms or initiatives to bolster the ecosystem. These can range from key changes to infrastructure, such as payments systems, or to development of new systems and institutions, such as for digital ID. Other important issues may include developing funding options for early-to-late stage companies; promotion of partnerships with incumbents and other players, as in Indonesia; or MOUs with other countries, such as the United Kingdom's fintech bridges with Australia, China, Hong Kong, Singapore, and South Korea.[131]

Country Example: Inter-Regulator Coordination in South Africa to Support Growth of the Fintech Ecosystem

South Africa has a fast-growing fintech industry. A collaborative effort by the regulators led to the Intergovernmental Fintech Working Group (IFWG), in 2016, comprising representatives from the National Treasury (NT), South African Reserve Bank (SARB), Financial Sector Conduct Authority (FSCA), National Credit Regulator (NCR), Financial Intelligence Centre (FIC), and South African Revenue Service (SARS)[132] The IFWG is one of the best examples of inter-regulatory coordination globally, and together the participants support fintech ecosystem development in several ways, including hosting an annual conference on pertinent topics, collecting data on regulatory bottlenecks and discussing solutions, and releasing guidance to the market on key regulatory issues. They proactively assess emerging risks and opportunities and recently set up a dedicated virtual space comprising a regulatory sandbox environment that allows live testing of innovations and an innovation accelerator to provide a collaborative, exploratory environment for financial sector regulators to learn from and work with each other. The intra-regulatory body also set up a Regulatory Guidance Unit to resolve specific questions regarding the policy landscape.

These efforts are further complemented by the Fourth Industrial Revolution South Africa partnership, an alliance between partners from the public and private sectors, academia, and civil society launched by the president of South Africa in 2019 to bolster the drive toward a more digital economy.

Country Example: Stimulating Demand for Sierra Leone's Sandbox[133]

Sierra Leone, a developing country in Sub-Saharan Africa with high numbers of unbanked citizens, sought to meet this challenge by promoting, attracting, and catalyzing development of local financial services, geared specifically to the underserved. To meet this goal, the Bank of Sierra Leone (BSL) initiated a regulatory sandbox "pilot program" to encourage, cultivate, and promote financial innovation. The BSL's sandbox initiative is unique in the sense that the BSL stimulated demand for the sandbox in a market with limited financial sector depth, low levels of financial inclusion, and a nascent fintech market. In partnership with Financial Sector Deepening Africa (FSD Africa) and United Nations Capital Development Fund's (UNCDF) Mobile Money for the Poor, and with support from USAID and the Last Mile Trust Fund, the BSL launched the Sierra Leone Fintech Challenge in June 2017 to drive demand for the sandbox.

Twenty innovators applied to Sierra Leone's Fintech Challenge, and challenge winners received an injection of capital and automatic entry into the first cohort of the financial-inclusion-themed BSL sandbox pilot program. The first cohort of the BSL sandbox,

made up of four fintechs, launched in May 2018 and included a mobile payment aggregator, a mobile money cash transfer application for agriculturalists, a financial literacy mobile application, and an electronic money platform.

Country Example: Leveraging Multiple Initiatives to Drive Fintech in Indonesia

The Indonesian fintech association, AFTECH,[134] was established by the industry in 2016 as an umbrella organization for all companies or institutions in the financial sector that embrace technology to empower their businesses. It was appointed by the Association of Digital Financial Innovation Organizers (IKD) of the Indonesia Financial Services Authority (OJK) and focuses on policy advocacy and driving policy change to enable fintech and support the Bank of Indonesia (BI) and OJK. To do so, AFTECH developed a strategic framework with three complementary policy tracks:

- **Financial inclusion:** In line with Indonesia's national financial inclusion strategy, AFTECH activities focus on leveraging fintech, identifying digital incentives, and exploring public-private partnerships to support financial inclusion.
- **Support to the Bank of Indonesia:** Activities focus on interoperability, collective risk management, and Open APIs.
- **Support to the OJK:** AFTECH provides coordination support to better link OJK's regulatory sandbox to ten cross-industry working groups on various themes.

AFTECH also works to communicate emerging trends and policies and works closely with the media to ensure journalists are regularly updated and informed on fintech topics.

Country Example: Sandbox as Part of a Coordinated Strategy to Expand Fintech Ecosystem in South Korea[135]

In early 2018, South Korea's government designated fintech as a leading sector for innovation and has been implementing its Plan for Promotion of Fintech Innovation. In January 2019, the government announced the following strategies to expand the fintech ecosystem: implementation of a regulatory sandbox; revamping outdated regulations; expanding investment in fintech; cultivating new industry sectors; supporting global expansion; and enhancing digital financial security.

This strategy involves deregulation measures including 2019 amendments to the Supervisory Rules on Electronic Financial Transactions and the Special Act on Support of Innovation of Finance (Finance Innovation Act). Significant changes under the Supervisory Rules include adaptations to enable cloud computing and cloud-based services for processing of critical financial information. The Finance Innovation Act amendments include the following deregulatory measures:

- Regulatory exemptions through the sandbox for innovative financial services for up to four years;
- A one-stop-shop model through which the Financial Services Commission provides rapid regulatory advisory services to firms; and
- Core business outsourced to fintech companies without requiring separate regulatory approval each time under a "designated agent system."

A preliminary evaluation of the sandbox as a part of the overall sector strategy suggests job growth in the fintech space, with 225 jobs added by 23 new firms. In addition, investment in the sector increased, with about 11 fintech firms attracting KRW 120 billion in investment as of 2019, and expansion of fintech firms to different global markets, specifically in Southeast Asia, the United Kingdom, Japan, and Hong Kong.[136]

4. Evaluating Sandbox Impacts and Remaining Agile

Sandboxes are relatively new regulatory instruments, and policy makers cannot always accurately predict market reactions and impacts from them. Translating objectives into measurable indicators and targets to ensure that progress is tracked and assessed can be challenging. Simple quantitative metrics often used by sandboxes, such as the number of firms admitted into the sandbox, are not wholly useful dimensions for quantifying achievements or testing policy implications. However, measuring the intangible benefits (such as catalytic change among policy makers) or the indirect impacts of a sandbox on national goals are harder to compute.

A robust monitoring and evaluation system to measure the impact of a sandbox on country, regulatory and market level outcomes is a powerful and effective tool for identifying obstacles, demonstrating results, and ensuring the sandbox is moving toward its stated objectives. Having a clear hypothesis and logical framework can underpin sandbox success and regulators' ability to craft relevant quantitative and qualitative metrics.

Evaluation systems also help regulators pivot their sandboxes to better respond to industry needs (see Box 9). In some cases, a sandbox framework led to unsustainably large numbers of applicants or failed to attract more than a few (or any) applicants. These scenarios might have been avoided with proper assessment prior to sandbox implementation and monitoring with proper metrics throughout implementation, thus guiding regulators toward appropriate responses to evolving requirements.

In Malaysia, evaluation results prompted the BNM to develop a specialized sandbox to standardize and streamline testing parameters for more efficient experimentation and data collection, and in South Korea and Hong Kong, regulatory sandbox evaluations helped sandbox teams document success in reaching policy objectives as well as identify opportunities to further improve the regulatory sandbox and promote the fintech industry.

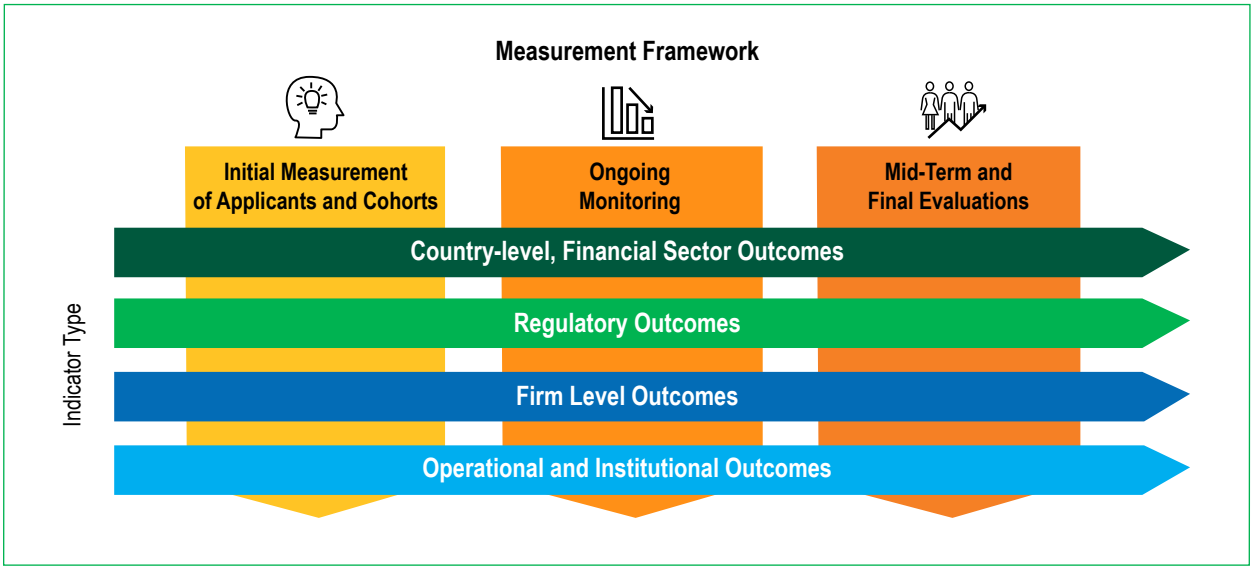
For policy makers looking to establish a sandbox and corresponding monitoring and evaluation system, we suggest a matrix structure with three measurement stages and four measurement levels that cut across them. (see Figure 4.1).

Box 9. Remaining Agile — Using Evaluation Results to Adjust a Sandbox Over Time

The Monetary Authority of Singapore (MAS) launched a "Sandbox Express" in August 2019 to address the large number of applicants applying to the sandbox and the cumbersome approval and application processes that restricted potential firms from entering. Singapore's Sandbox Express is intended to help encourage and speed up processes for experimentation and adoption of innovative technologies in the financial sector,[137] specifically for firms with low and well-understood risks, allowing them to embark on their experiments more quickly within the predefined sandbox. Applications to the Sandbox Express are fast-tracked, and approval decisions are made within 21 days.

The criteria the MAS uses to assess an application include (i) technological innovativeness of the financial service, and (ii) fitness and propriety of the applicant's key stakeholders. The Sandbox Express operates in two predefined areas: insurance brokering and establishing market operators.[138] The boundaries, expectations, and regulatory reliefs are predetermined, and applicants must declare they will fully comply with all expectations of the predefined sandbox, including providing clear disclosures and obtaining acknowledgements from users before onboarding them as customers.

Figure 4.1. A Suggested Measurement Framework for a Regulatory Sandbox



Source: WBG.

- **Initial Measurement:** This first stage should focus on defining indicators for sandbox applicants in line with the objectives of the sandbox framework. It should include not only business metrics but regulatory and market outcomes, including those that test assumptions and provide policy insights. These initial metrics defined by the policy makers will help assess an applicant's feasibility for the sandbox and how the applicant will contribute to and test sandbox goals. The metrics can be monitored by sandbox staff throughout the testing stage and evaluated during the exit stage, with a focus on potential wider policy implications. Authorities should avoid turning the assessment and monitoring of the applicant into a "check-the-box" exercise and should instead ensure the applicant has a clear link to enhancing sandbox policy goals.

- **Ongoing Monitoring:** Throughout the sandbox process, regulators should implement a series of ongoing assessments to measure the progress of the sandbox framework and the firms within it. Ongoing assessments often measure, for instance, (i) continued suitability and relevance of each sandbox firm and cohort against sandbox metrics; (ii) direct and indirect institutional changes and benefits that can be attributed to the sandbox; and (iii) operational efficiency of the sandbox process, both for regulators and for firms that move through the sandbox process. Such assessments should measure the progress and outcomes of the sandbox on an on-going basis and support policy makers in remaining agile, understanding policy implications, and adjusting their sandbox and legal or regulatory framework as needed.
- **Periodic and Final Evaluations:** Periodic and final evaluations should be conducted at the end of a sandbox process or after a defined duration. This is a point-in-time evaluation and should be positioned to help determine the impact of a sandbox on broader financial sector and national goals, such as building institutional capacity, enabling firms to come to market, growing the broader fintech ecosystem, or contributing to national financial inclusion progress. Such assessments often require broader data collection efforts and, in some cases, econometric modeling.

While the stages have been listed as separate, they can often have many overlapping elements. Aside from collecting data directly from the firm, sandbox teams should consider complementary data sources, such as leveraging insights from stakeholders through consumer surveys or feedback forms, including grievances and claims from customers through complaint handling and other mechanisms. Market research can also complement business metrics to understand a firm's market impact. Putting in place a plan to collect and leverage different data points and indicators is a useful exercise for sandbox teams. This will help policy makers conduct effective evaluation of the sandbox's impact and support the ability to adjust sandbox operations and processes to the needs of the policy maker, the consumer, and the market.

Each of the above measurement stages are intersected by levels at which outcomes should be measured. These should include: (a) country-level financial sector outcomes, (b) regulatory outcomes, (c) firm- and market-level outcomes, and (d) operational outcomes. For each of these levels, especially useful indicators and metrics — both qualitative and quantitative — that can provide insightful results have been highlighted in the sections below. Like measurement stages, outcome areas might overlap.

4.1 Country-Level Outcomes

Country-level outcome indicators should focus on how well the sandbox contributes to broader financial sector outcomes. This may include, for instance, national financial inclusion goals, economic measures such as the ability to attract foreign talent and improve growth, or broader digital development. Understandably, these are difficult to measure or attribute to the workings of a sandbox and hence should relate to goals clearly defined for the sandbox at its outset.

Some examples of specific outcomes include nationwide rise in financial inclusion levels, increased ease of doing business, or increased numbers of products or services targeting the unbanked. Outcomes can be measured through global data indicators, as in the World Bank Findex, or in-country measurements, such as national financial inclusion surveys assessing innovation uptake and/or feedback surveys from users of services offered by firms participating in sandbox tests.

Country Example: Sandbox Regulatory Outcomes in South Korea

The Korean government introduced a multisector regulatory sandbox in January 2019.[139] As part of the overall sandbox, the financial sector sandbox was launched by the Financial Services Commission (FSC)[140] on April 1, 2019, under the Special Act on Financial Innovation Support.

The sandbox is not limited to financial sector innovations and prides itself on providing quick reviews (50 days on average, from application to selection) that can result in temporary approvals. A "fast track" is available to further expedite review of cases similar to ones previously decided.

To evaluate the impact of the sandbox on overarching policy goals, the authorities implemented an evaluation against their own metrics of success. The 2019 evaluation results included the following outcomes:[141] (i) **fintech job growth:** 23 fintech firms have added 225 more jobs; (ii) **increased investment:** 11 fintech firms have been able to attract KRW 120 billion so far, and KRW 10 billion worth of additional investment is expected within the next year; and (iii) **global expansion:** 7 fintech firms have either expanded their business to overseas markets (Southeast Asia, United Kingdom, Japan, and Hong Kong) or are in discussions to do so.

Based on sandbox operations, the FSC recently announced plans to further improve the regulatory sandbox using the following regulatory measures, among others, to promote fintech industry scale-up:[142]

- Bring the total number of firms participating in the sandbox to over 100 by the end of 2020.
- Improve sandbox rules and practices:
    - Support protection of innovative ideas and technologies through intellectual property rights (e.g., provide legal advice or expedite patent dispute resolution).
    - Minimize the additional requirements imposed on the designated cases; and
    - In cases of mergers and acquisitions of the designated services, grant continuation of designation status.
    - Provide budgetary support for testing, security inspection, office space, etc., as well as one-on-one mentoring from designation to commercialization of innovative financial solutions.
    - Set up a supervisory framework tailored to supporting fintech firms.

4.2 Regulatory Outcomes

This level should include regulatory outcomes from innovations operating within the sandbox or from knowledge and intelligence gathered that impacts regulation, supervision, or policy. While direct regulatory change (as seen, for example, in Malaysia's change in its eKYC regulation) is simple to measure, knock-on effects and dependencies prove more difficult.

The metrics should test regulatory assumptions. For this, a clear understanding of the policy questions that each applicant raises is critical; for instance, should peer-to-peer lenders be considered as collective investment schemes and hence receive the same treatment? Do crypto exchanges pose undue risks to consumers? Clear questions will enable the policy makers to design indicators that test the corresponding implications of a new technology or digitally enabled business model.

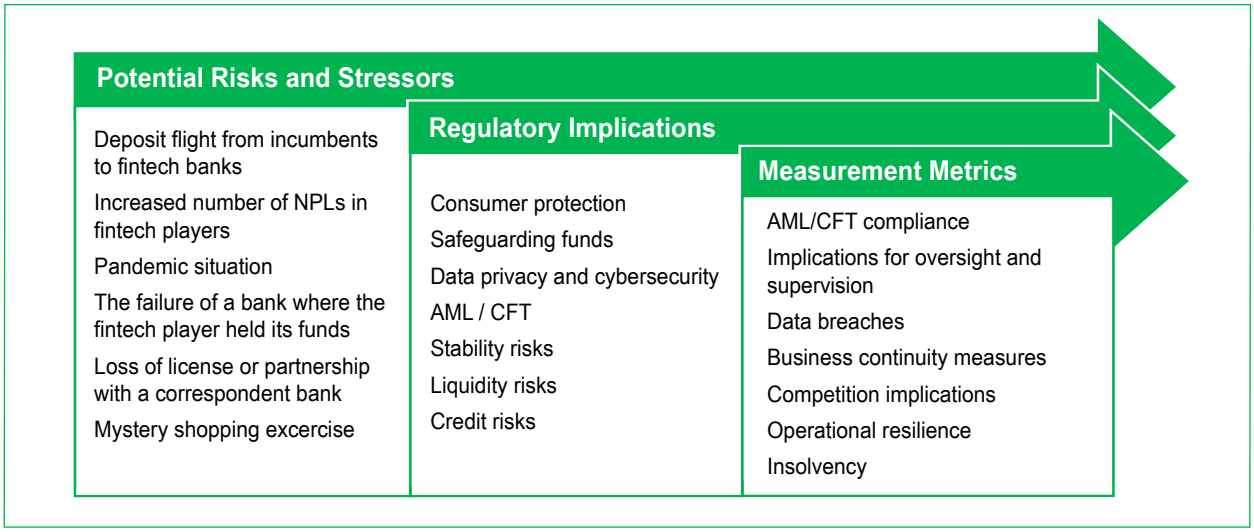
Key considerations to developing policy-led indicators include assessing risk, micro and macro shocks, behavioral reactions, sector-wide interactions, and contagion. One way to establish a universe of possible policy indicators is to use "stress scenarios" (see Figure 4.2) to test market responses that in turn can inform regulatory policy or oversight.

Figure 4.2: Sample stressors, regulatory implications, and their corresponding measurement metrics

Following are some examples that policy makers can consider when assessing metrics to test particular regulations or policy frameworks:

- Policy indicators:
    - Introducing new regulation or amendments to existing regulation to support digitization. This could include laws and acts, regulations, directives, circulars, guidelines, or explanatory notes. For instance, a new law to license payment system providers (PSPs), regulate crowdfunding, or support eKYC would constitute a change.
    - Contributing to policy projects through analytical insights.
    - Supervision indicators:
    - Adapting the supervisory process in response to market developments.
    - Implementing proportionate regulation to lower the barrier to responsible innovation that might have been faced with unduly burdensome regulatory requirements.

Figure 4.2. Sample Stressors, Regulatory Implications, and Their Corresponding Measurement Metrics



- Including certain types of innovations within the regulatory perimeter, as a direct consequence of assessment of risk posed.
- Reviewing and addressing consumer protection issues that may arise with new innovations.
- Interacting fairly and transparently with new entrants.
- Improving inter- and intra-regulator coordination.
- Assessing imbalances in level playing fields (i.e., monitoring of market distortion, anticompetitive behaviors, etc.).
- Adjusting or thoroughly evaluating current frameworks based on sandbox tests.

4.3 Firm and Cohort-Level Outcomes

As with other indicators, both qualitative and quantitative indicators should be considered when looking at the firm-level outcomes. Aside and beyond business metrics collected through firms, such as number of consumers, value of transactions, and so on (see Box 9), the sandbox framework should also develop metrics to assess the sandbox's impact on the market and market players.

Metrics to test such hypotheses may be nuanced, but here are a few examples:

- Case studies demonstrating the response of incumbents to new entrants to the market.
- The nature of the support provided by the sandbox that may have contributed to greater regulatory certainty for firms.
- Evidence of how the sandbox has helped firms establish themselves in the market.
- Number of new innovations, products, or services that have entered the market.
- Increased volumes or values of particular services, like e-lending, wealth management through robo-advisory services, online accounts, etc.
- Increased number of financial service providers competing in the market and hence bringing in more competition and consumer-centric products.
- Increased access to regulatory expertise to get innovative ideas to market.
- Ratio of firms adapting to existing regulatory frameworks, compared to those requiring new or greatly modified regulation.
- Firm reports around increased regulatory certainty, guidance, and engagement from authorities.

Box 10. Sample Quantitative Indicators to Measure the Operations and Functioning of a Sandbox

The following list provides examples of indicators that policy makers can consider when assessing the firm benefits and operational efficiency of a sandbox. While these metrics may not provide a holistic measurement of a sandbox's impact, they shed light on its efficiency and operational elements:

- Number of applicants and number of applicants accepted into the sandbox.
- Average length of time to accept applicants into sandbox, to test offerings, and to exit.
- The time to come to market with and without a sandbox.
- Number of sandbox tests (successful and unsuccessful).
- Number of companies graduated from the sandbox or successfully completing testing.
- Number of firms formally registered or with formal authorization to operate in the market following successful testing.
- Number of firms successfully graduated from the sandbox that are currently still in operation.
- Number of non-sandbox firms operating in the market under an adjusted legal or regulatory framework based on sandbox test.
- Number of firms receiving investment as a result of the sandbox program.
- Number of new consumers receiving financial services or products under the sandbox tests.

Country Example: Evolving Sandboxes to Meet Industry Needs — The Case of Hong Kong

The Hong Kong Monetary Authority (HKMA) initially launched its fintech supervisory sandbox (FSS) in September 2016 as a program for incumbent banks. During the first year of operation, however, HKMA received applications from technology firms requesting direct access to the FSS and soliciting feedback on emerging fintech projects. Against this backdrop, HKMA upgraded to FSS 2.0 in 2017. This version includes expanded access for both incumbents and nonbank technology firms; an FSS Chatroom to provide streamlined access, feedback, and support for market participants; and increased formal coordination between HKMA, the Insurance Authority, and the Securities and Futures Commission on tests that may cut across multiple regulatory perimeters. By the end of August 2018, HKMA had received around 170 requests to access the chatroom. Nearly 70 percent of these requests were made by nonbank technology firms from Hong Kong and overseas.

4.4 Operational Outcomes

At the operational or institutional level, indicators should assess the ongoing appropriateness of the sandbox internally, analyze the resources and capacities used during implementation, and evaluate if the sandbox is contributing to overarching institutional goals. For instance, a regulator may hypothesize that a sandbox will strengthen an institution's capacity to regulate fintech. To test this hypothesis, a regulator may want to consider indicators that herald particular institutional changes such as the following:

- Widespread buy-in and catalytic change across the institution.
- Increased regulatory capacity in certain areas (e.g., data analytics) in response to market trends.
- Improved knowledge of the fintech sector and gaps identified in business areas' fintech knowledge and know-how.
- Signaling and market perception of regulator's openness to enabling fintech.

- The establishment of new, related units or increased departmental capacity of the sandbox.
- New staff hired with backgrounds more aligned to regulating or supervising particular elements of fintech, per sandbox recommendations.
- An understanding of information flows from sandbox trails, and how the information is used and acted upon.
- Cost-benefit analysis of capacity and resources used by the sandbox compared to policy outcomes.
- Assessment of whether a sandbox was the most appropriate tool or if other approaches (e.g., an innovation hub) could have yielded similar results for the regulator (or for firms, with respect to providing regulatory certainty).
- Sufficient information provided by the sandbox for departments to re-evaluate and, in some cases, adjust their regulatory frameworks.
- New regulatory initiatives developed in part from the results of the sandbox.
- Adjustment of the sandbox itself, based on feedback and lessons learned.
- The infrastructural and operational cost of sandbox to regulators.

Box 11. Evaluation — Review of the Regulatory Sandbox Framework

In October 2017, the U.K. Financial Conduct Authority became the first regulatory agency to publicly release metrics concerning its sandbox framework and lessons learned.[143] The analysis provides a thorough overview of the first year that the sandbox was in operation.

The four main objectives of the FCA's sandbox framework are:

- Reducing the time and, potentially, the cost of getting innovative ideas to market;
- Enabling greater access to finance for innovators by reducing regulatory uncertainty;
- Enabling more products to be tested and, thus, potentially introduced to the market; and
- Allowing the FCA to work with innovators to ensure that appropriate consumer protection safeguards are built into new products and services.

The analysis established that the sandbox reduced the time and cost of getting innovative ideas to market, enabled firms and regulatory officials to understand how receptive consumers are to innovative products and services, and allowed the FCA to work with innovators to build appropriate consumer protection safeguards into new products and services.

An additional benefit, but also a risk, is that the sandbox helped facilitate access to finance for innovators, hence potentially influencing investment outcomes that could be construed as potential conflicts of interest. It is understandably difficult to set wholly transparent and objective criteria for accession and graduation from the sandbox. The risk remains that the sandbox gives market power to the first candidates, allowing them to automatically gain a regulatory approval premium when seeking new investors.

The FCA also noted numerous challenges to its sandbox framework, several of which sit outside the FCA's purview to address. For instance, the FCA stated that certain firms' access to banking services, including obtaining a bank account, was particularly problematic. Further, the smooth integration with APIs between start-ups and financial institutions is challenging. The FCA also noted that firms with certain business models had a greater difficulty meeting the initial regulatory requirements to become authorized, causing small-scale testing to be particularly difficult. The FCA has used the insights gained to inform future sandbox development and to feed into the FCA's broader regulatory work.

5. Concluding Notes

Regulatory sandboxes have become synonymous with fintech innovation and offer the unique benefit of providing the empirical evidence needed to substantiate decisions. However, they have more often been used as a signaling mechanism to show that the regulator is open to dialogue. In addition, as we have observed, although sandbox designs can differ widely, the degree of institutional or, rather, country-based isomorphism is hard to ignore.

Sandboxes have had some vital direct benefits, such as introducing regulatory change and variations to the regulatory perimeter, and they have also influenced future supervisory methodology and, in rare cases, have supported the regulator's competition mandate. For firms, sandboxes have been known to offer a faster route to market and a better understanding of the regulatory hurdles they need to cross. Moreover, from the lessons learned globally we can surmise that sandboxes have a number of indirect, often intangible, benefits, such as catalyzing the ecosystem, encouraging intra-regulator cooperation, and identifying or attracting firms, both local and further afield, to the market. But are these effects enough to validate the need for a sandbox?

The answer lies in having clear, tightly defined objectives and conducting a cost-effectiveness threshold by comparing the costs and outcomes of alternative policy options. Despite successes, implementing a sandbox, particularly in EMDEs, is not always the right solution for unlocking financial innovation, and it can potentially pose unexpected burdens on regulators, as well as risks, such as creating unlevel playing fields in the market. Before embarking on creating a regulatory sandbox, authorities should step back and objectively review the environment in which they operate, specifically, (i) the existing legal and regulatory framework within that jurisdiction; (ii) the capacity and resources available to the regulator; (iii) the maturity and pervasiveness of the fintech market; and (iv) broader market conditions, including competition criteria. These factors require careful consideration and should be evaluated[144] (along with other criteria) to understand whether a sandbox approach is the most appropriate for the given country context.

Once set up, the supervision of sandbox firms' operations should be supplemented by frequent monitoring of the sandbox's continued relevance and its ability to be agile and fail-fast and contribute directly and indirectly to the wider policy and regulatory environment. A sandbox should contribute to the design of, but cannot replace, an adequate legal and regulatory framework: Sandboxes don't decrease — but rather, they increase — the need for skillful supervision.

APPENDIX 1.
Methodology, Definitions, and Data Sources Employed

This report in intended to complement "How Regulators Respond to Fintech: Evaluating Different Approaches — Sandboxes and Beyond" (2020)[145] and was spurred by requests for further detail on the form, focus, and operation of the different sandbox approaches adopted. The analysis here is based on a number of inputs, including interviews with supervisory authorities, desk-based research and literature reviews, analysis of the survey by the World Bank Group (WBG) and the Consultative Group to Assist the Poor (CGAP) on innovation facilitators as well as the global fintech survey by the WBG and the International Monetary Fund (IMF).

Defining sandboxes. This report defines sandboxes as a *controlled, time-bound, live testing environment, which may feature regulatory waivers at regulators' discretion.*[146] However, we have included all frameworks referred to as sandboxes by the jurisdictions in which they were created.

The focus of this report is on sandboxes that support fintech or fintech-enabled innovations. Hence, the analysis in this report is limited to sandboxes operated by financial sector regulators with specific regard to enabling fintech innovations. Hence, sandboxes created by information and communication technology (ICT) or utilities authorities or any that are sector agnostic or not run by regulators have not been considered.

In keeping with the WBG-IMF Bali Fintech Agenda (BFA), "fintech" refers to the "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."[147]

Defining the status of sandboxes. A comprehensive compilation of fintech sandboxes was undertaken as part of this report, with each sandbox categorized as either "announced" or "operational." For this report, a regulatory sandbox is considered "announced" if the relevant authorities have not only stated their intention to open it but have also offered publicly available information on the sandbox process, relevant laws, and other details. To be categorized as "operational," publicly available information must indicate that firms are already enrolled in the sandbox.

Quantitative data sources employed. Two main sources of quantitative data were used for the analyses presented in this report.

- The World Bank and CGAP Innovation Facilitator Survey (2019), conducted jointly between February and April 2019, gathered information on regulatory innovation facilitators, including accelerators, sandboxes, and innovation hubs. Approximately 31 responses were collected from regulatory agencies in 28 countries, including jurisdictions in Africa, the Americas, Asia, and Europe.
- The IMF and World Bank Global Fintech Survey (GFS 2019) collected responses from nearly 100 member countries on progress in relation to the 12 elements of the BFA. Collated data was drawn from the FSB-BCBS survey and the CCAF-WBG study on alternative finance.

Other reports and papers from standards-setting bodies, individual jurisdictions, and international organizations have also informed this paper and are referenced in the endnotes.

APPENDIX 2.

Further detail on Innovation Hubs[148]

An innovation hub, or innovation office or lab as they are sometimes called, can provide a dedicated point of contact where firms can raise inquiries with competent authorities on fintech-related issues or seek nonbinding guidance on regulatory and supervisory expectations, including licensing requirements. Most commonly, hubs provide support, advice, guidance, and even, in some cases, physical office space, to regulated and unregulated firms.

Single points of contact, a dedicated unit, an identified network of experts, or similar organizational arrangements can all be considered innovation hubs. In essence, an innovation hub can take any form that will be beneficial and suitable to the regulator while signaling to the market that the regulator is keen to interact with and enable the emerging field of fintech. Although providing guidance tends to be its most common function, a hub's functions can range, for instance, from hosting and attending industry events to providing assistance in applying for authorization on new products. Hubs facilitate engagement between regulators and innovators, acting as forums for mutual learning as well as for policy and regulatory guidance. Supervisors may use innovation hubs to understand and monitor new business models and technologies as well as to identify regulatory and supervisory challenges associated with fintech.

The Australian Securities and Investments Commission (ASIC) provides an example. It set up an innovation hub in 2015 to assist fintech start-ups in navigating the regulatory system and its laws, including by providing informal guidance from senior regulatory advisers about the overarching regulatory framework and questions relating to ASIC's relief powers. For the regulator, this interaction provides information about emerging fintech issues that are potentially relevant to policy development. Other regulators, such as, Malaysia (Digital Finance Innovation Hub) and Thailand (OJK Infinity),[149] have set up innovation hubs with players beyond the financial sector that not only provide regulatory clarity but also enable collaboration among service providers, including financial institutions, fintech start-ups, and academics.

An innovation hub can be particularly useful for jurisdictions considering a new approach to fintech, since the hub can be less resource-intensive to establish than a sandbox. Hubs can complement other approaches and are a good way for regulators to gauge the interest and maturity of the market. In addition to requiring fewer resources, according to the WBG-CCAF survey on Regulating Alternative Finance,[150] respondents report that innovation offices supported a much larger number of firms than regulatory sandboxes.

Recognizing the common challenges and the cross-border nature of fintech, hubs have also been set up on a global level to support and encourage coordination among international regulators and to pool resources. An example of this is the Bank of International Settlements (BIS), which established innovation hub(s) with the explicit intention of supporting central bank collaboration on research and innovation in financial technology and of accelerating the banks' digital efforts while pursuing their statutory objectives.

APPENDIX 3.

Database of Global Sandboxes

Data collected from the 73 sandboxes around the globe is tabulated on page 56. However for a more interactive experience, please go to Key Data from Regulatory Sandboxes across the Globe.

Database of Sandboxes Currently Announced or in Operation (Up-to-date as of November 2020)

General Information			Nature of Regulator/Operator		Legal System		Eligibility Criteria					Features of Sandbox								
WBG Region	Type of Economy (AE/ EMDE)	Country	Name of Regulator/ Operator	Type of Regulator	Civil Law/ Common Law/ Hybrid System/ Religious Law	National Financial Inclusion Strategy	Innovation Provides Consumer Benefit	Need Authorization to Participate in Sandbox	Ready to Test	Genuinely Innovative	Location of Firm	Description of Sandbox	Type of Sandbox	Current Absence of Governing Regulation?	Financial Inclusion Focused	Operational Status	# of Firms in Sandbox	Status of Firms in Sandbox	Testing Period	Date Established
East Asia & Pacific (1)	AE	Australia	ASIC	Securities Regulator	Common Law	-	✓	✓	✓	✓	-	DFS related to Securities (phase 1); financial advice, issuing credit contracts and crowdsourced funding (phase 2)	Product	-	-	Operational	7	"Fintechs can obtain 'class waiver' to test without a license"	12-24 months	Jun-16
Middle East & North Africa (2)	EMDE	Bahrain	CBB	Central Bank	Civil Law	-	✓	-	✓	✓	-	General innovations in DFS	Thematic, Cross-border	-	✓	Operational	11	-	9-12 months	Jun-17
Latin America & Carribean (3)	EMDE	Barbados	CBB, FSC	Central Bank	Common Law	-	-	✓	-	✓	-	General DFS (only one firm- Bitt Digital Inc.- participated + graduated. Tested digital wallet using blockchain tech.	Product	✓	-	Operational	1	-	8 months	Oct-18
Latin America & Carribean (4)	EMDE	Bermuda	BMA	Central Bank	Common Law	-	✓	✓	✓	-	-	"InsurTech innovations"	Product/ Policy	-	-	Operational	2	Modified license in Sandbox	-	Sep-18
Latin America & Carribean (5)	EMDE	Brazil	BCB	Central Bank	Civil Law	✓	✓	✓	-	✓	-	"Laboratory of Financial and Technological Innovations (LIFT)"	Product/ Policy	-	✓	Operational	18	-	3 months	May-18
Latin America & Carribean (6)	EMDE	Brazil	CVM	Central Bank, Securities Regulator, Ministry of Finance	Civil Law	✓	✓	✓	-	-	-	Specific for cryptocurrency and digital token issuance	Product	-	-	Announced	-	Will receive temporary authorization	-	Jan-20
East Asia & Pacific (7)	EMDE	Brunei	AMBD	Central Bank	Common Law	-	✓	✓	✓	✓	✓	General innovations in DFS	Product	-	-	Operational	5	-	6-24 months	Mar-17
Europe & Central Asia (8)	EMDE	Bulgaria	MOF	Ministry of Finance	Civil Law	-	-	-	-	-	-	Sofia Regtech Sandbox	-	-	-	Announced	-	-	-	Feb-20
North America (9)	AE	Canada	CSA	Securities Regulator	Common Law	-	✓	-	✓	✓	✓	Securities focused sandbox	Product/ Policy	-	-	Operational	10	-	Varies	Feb-17
East Asia & Pacific (10)	EMDE	China	PBOC	Central Bank	Civil Law	✓	-	-	-	-	-	General innovations in DFS	Product/ Policy	-	-	Operational	6	-	-	Dec-19
Latin America & Carribean (11)	EMDE	Colombia	SFC	Financial Sector Regulator	Civil Law	-	✓	✓	-	✓	-	innovaSFC- Fintech product/policy innovation	Product/ Policy	✓	✓	Operational	6	Granted license	-	Oct-19

Reference

1. (a) https://www.bakermckenzie.com/en/-/media/files/insight/publications/2018/12/guide_intlguideregulatorysandboxes_dec2018.pdf; (b) https://techwireasia.com/2020/02/australian-government-makes-amendments-to-fintech-regulatory-sandbox/; (c) http://download.asic.gov.au/media/4112096/licensing-exemption-for-fintech-testing-infographic.pdf
2. https://www.tamimi.com/law-update-articles/central-bank-bahrain-cbb-launch-regulatory-sandbox-fintech-firms-2/
3. (a) http://www.centralbank.org.bb/regulatory-sandbox/sandbox-participants; (b) https://www.ft-legal.com/resources-and-news/2019/07/16/barbados-regulatory-sandbox-approves-first-participant/
4. https://cdn.bma.bm/documents/2019-03-28-05-10-19-BMA-Insurance-Regulatory-Sandbox-Innovation-Hub-Guidance-Note.pdf
5. https://www.liftlab.com.br/docs/Regulamento_LIFT_en.pdf
6. https://www.coindesk.com/brazil-financial-authorities-announce-regulatory-sandbox-for-blockchain
7. (a) https://www.ambd.gov.bn/development/fintech; (b) https://www.ambd.gov.bn/SiteAssets/fintech-office/FTSG%20v1_final.pdf
8. https://emerging-europe.com/business/bulgaria-to-launch-first-regtech-sandbox-in-balkans/
9. (a) https://www.securities-administrators.ca/industry_resources.aspx?id=1588; (b) https://www.securities-administrators.ca/industry_resources.aspx?id=1626; (c) https://www.osc.gov.on.ca/en/NewsEvents_nr_20170223_regulatory-sandbox.htm
10. (a) http://www.chinabankingnews.com/2020/04/28/china-to-expand-fintech-sandbox-trials-to-six-more-cities/; (b) http://www.chinabankingnews.com/2020/01/15/first-batch-of-trial-applications-for-beijings-fintech-sandbox-revealed/; (c) http://www.chinabankingnews.com/2019/12/06/beijing-launches-fintech-regulatory-sandbox-with-central-bank-backing/
11. https://www.colombiafintech.co/novedades/superfinanciera-lanza-sandbox-para-el-desarrollo-de-fintech

General Information			Nature of Regulator/Operator		Legal System		Eligibility Criteria					Features of Sandbox								
WBG Region	Type of Economy (AE/ EMDE)	Country	Name of Regulator/ Operator	Type of Regulator	Civil Law/ Common Law/ Hybrid System/ Religious Law	National Financial Inclusion Strategy	Innovation Provides Consumer Benefit	Need Authorization to Participate in Sandbox	Ready to Test	Genuinely Innovative	Location of Firm	Description of Sandbox	Type of Sandbox	Current Absence of Governing Regulation?	Financial Inclusion Focused	Operational Status	# of Firms in Sandbox	Status of Firms in Sandbox	Testing	Date Established
Europe & Central Asia (12)	AE	Denmark	DFSA	Financial Supervisory Authority	Civil Law	-	-	-	-	-	-	General innovations in DFS	-	-	-	Operational	-	-	6-8 months	Dec-19
Middle East & North Africa (13)	EMDE	Egypt	CBE	Central Bank	Civil Law	In development	✓	✓	✓	✓	-	General innovations in DFS	Product/ Policy	-	-	Announced	-	-	-	Jul-19
Africa (14)	EMDE	Eswatini	CBE	Central Bank	Hybrid System	-	✓	✓	✓	✓	-	General innovations in DFS	Product/ Policy	-	-	Announced	-	-	-	Mar-19
East Asia & Pacific (15)	EMDE	Fiji	RBF	Central Bank	Common Law	✓	✓	✓	✓	✓	Specifies that foreign entities are included in 'intended participants'	General innovations in DFS	Product/ Policy	-	✓	Operational	-	-	Upto 12 months	Jan-20
Europe & Central Asia (16)	EMDE	Georgia	NBG	Central Bank	Common Law	-	✓	✓	✓	✓	-	General innovations in DFS + evaluation of regulation	Product/ Policy	In some cases	-	Announced	-	-	Varies	Feb-20
East Asia & Pacific (17)	EMDE	Hong Kong (China)	HKMA, SFC	Central Bank, Securities Regulator	Common Law	-	✓	-	✓	✓	-	Fintech Supervisory Sandbox	Policy	-	-	Operational	46	Sandboxes only open to regulated activities using fintech.	Varies	Sep-16
East Asia & Pacific (18)	EMDE	Hong Kong (China)	Insurance Authority	Other Govt. Body	Common Law	-	-	-	✓	✓	-	InsureTech Focus	Product	-	-	Operational	-		Varies	Dec-17
Europe & Central Asia (19)	EMDE	Hungary	MNB	Central Bank	Civil Law	-	✓	✓	✓	✓	-	General innovations in DFS	Product/ Policy	-	-	Operational	-	Receive Financial Innovation Testing Environment (FITE) license	-	Dec-19
South Asia (20)	EMDE	India	RBI	Central Bank	Common Law	✓	✓	✓	-	✓	✓	Retail Payments	Product, Thematic	✓	✓	Operational	-	-	6 months	May-19
South Asia (21)	EMDE	India	IRDAI	Other Govt. Body	Common Law	✓	✓	✓	✓	-	-	Focus on insurance products	Product	-	-	Operational	33	-	6 months	Oct-19
South Asia (22)	EMDE	India	SEBI	Securities Regulator	Common Law	✓	✓	✓	✓	-	-	Focus on securities related products/ services	Product	-	-	Operational	-	Firms will be granted limited certificate of registration	-	Feb-20
East Asia & Pacific (23)	EMDE	Indonesia	OJK	Financial Supervisor	Civil Law	✓	✓	-	-	✓	-	General innovations in DFS	Product/ Policy	✓	✓	Operational	1	-	Upto 12 months	Sep-18
East Asia & Pacific (24)	EMDE	Indonesia	Bank Indonesia	Central Bank	Civil Law	✓	✓	✓	-	✓	-	Payment System Innovations	Thematic	-	-	Operational	34	-	6 months	Dec-17

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Europe & Central Asia (25)	AE	Isle of Man	Digital Isle of Man	Other Gov't Body (Exec Agency within Dep't for Enterprise)	Common Law	-	-	-	-	-	-	Blockchain Sandbox	Thematic	-	-	Operational	-	-	-	Nov-19
Latin America & Carribean (26)	EMDE	Jamaica	BOJ	Central Bank	Common Law	✓	✓	✓	✓	✓	-	Delivery of payment services	Product	-	✓	Announced	4 (2 pending license)	Issued license	Up to 24 months	Mar-20
East Asia & Pacific (27)	AE	Japan	FSA, Govt. of Japan	Financial Supervisor, Other Govt. Body	Civil Law	-	✓	✓	-	✓	-	FinTech Proof-of-Concept (PoC) Hub: Customer identity verification + automating customer suitability determination	Thematic	✓	✓	Operational	1st cohort- 5 firms, 2nd cohort- 2 firms, 3rd cohort: 5 firms	-	5 months	Nov-17
Middle East & North Africa (28)	EMDE	Jordan	CBJ	Central Bank	Hybrid System	✓	✓	✓	-	✓	-	Specifies crypto-currencies, blockchain and DLT platforms, electronic payments, savings and financing, remittances, e-KYC and RegTech.	Thematic	-	✓	Operational	-	-	Upto 12 months	Apr-18
Europe & Central Asia (29)	EMDE	Kazakhstan	AFSA	Other Govt. Body	Civil Law	-	✓	✓	✓	✓	-	General innovations in DFS	Cross-border	-	-	Operational	22	-	-	Jul-18
East Asia & Pacific (30)	AE	Korea, South	FSC, FSS	Securities Regulator, Financial Supervisor	Civil Law	✓	✓	-	-	✓	-	General innovations in DFS + evaluation of regulation around blockchain technology	Policy	-	-	Operational	36	Partial authorization (upto 4 years (exemption from regulation after full authorization)	2 years	Apr-19
Africa (31)	EMDE	Kenya	KCMA	Securities Regulator	Common Law	-	✓	✓	✓	✓	✓	Innovation in Capital Markets	Product, Policy	✓	-	Operational	3	-	Upto 12 months	Mar-19
Middle East & North Africa (32)	EMDE	Kuwait	CBK	Central Bank	Hybrid System	-	✓	✓	✓	✓	✓	FinTech products or services for electronic payment of funds	Product, Policy, Thematic	-	-	Operational	-	-	12 months	Nov-18

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WBG Region	Type of Economy (AE/ EMDE)	Country	Name of Regulator/ Operator	Type of Regulator	Civil Law/ Common Law/ Hybrid System/ Religious Law	National Financial Inclusion Strategy	Innovation Provides Consumer Benefit	Need Authorization to Participate in Sandbox	Ready to Test	Genuinely Innovative	Location of Firm	Description of Sandbox	Type of Sandbox	Current Absence of Governing Regulation?	Financial Inclusion Focused	Operational status	# of Firms in Sandbox	Status of Firms in Sandbox	Testing	Date Established
Europe & Central Asia (33)	EMDE	Kyrgyzstan	BKR	Central Bank	Common Law	-	-	-	-	-	-	General innovations in DFS aimed to lower barriers for introducing innovative technologies in the banking sector and the payment systems landscape.	Product	-	-	Announced	-	-	-	Apr-20
Europe & Central Asia (34)	AE	Lithuania	BOL	Central Bank	Civil Law	-	✓	✓	✓	✓	-	Blockchain-based FinTech Solutions (LBChain Platform)	Product, Thematic	-	-	Operational	6	-	6-12 months	Mar-18
East Asia & Pacific (35)	EMDE	Malaysia	BNM	Central Bank	Common Law	✓	✓	✓	✓	✓	-	Digital ID Solutions	Thematic	-	✓	Operational	-	-	-	Oct-16
Europe & Central Asia (36)	AE	Malta	Malta Gaming Authority	Other Govt. Body	Hybrid System	-	-	-	-	✓	-	General innovations in DFS	-	-	-	Announced	-	-	-	Jan-19
Africa (37)	EMDE	Mauritius	EDB	Other Govt. Body	Hybrid System	✓	-	✓	-	✓	-	General innovations in DFS	Product, Policy	✓	-	Operational	9	Regulatory Sandbox license	-	Sep-18
Latin America & Carribean (38)	EMDE	Mexico	CNBV, MoF, and Banxico	Central Bank, Financial Supervisor, Ministry of Finance	Civil Law	✓	✓	✓	✓	✓	-	General innovations in DFS	-	-	✓	Operational	-	Regulatory Sandbox license	2 years	Oct-19
Africa (39)	EMDE	Mozambique	Bank of Mozambique, FSDMoc	Central Bank, Other Govt. Body	Civil Law	✓	-	-	-	-	-	General innovations in DFS	Thematic	-	✓	Operational	5	-	6 months	May-18
Europe & Central Asia (40)	AE	Netherlands	AFM and DNB	Central Bank, Financial Supervisor	Civil Law	-	-	✓	-	✓	-	General innovations in DFS	Policy	-	-	Operational	-	Partial authorization	Varies	Jan-17
Africa (41)	EMDE	Nigeria	CBN and NIBSS	Central Bank, Other Govt. Body	Hybrid System	✓	-	(only need to register with Financial Services Innovators to participate)	-	-	-	Fintech Industry Innovation Sandbox	Product	-	-	Operational	-	-	-	Mar-18
Africa (42)	EMDE	Nigeria	SEC	Securities Regulator	Hybrid System	✓	✓	✓	-	✓	-	Innovation in DFS related to Securities	Product, Policy	-	-	Announced	-	-	-	May-18
Europe & Central Asia (43)	AE	Norway	MoF	Ministry of Finance	Civil Law	-	✓	✓	-	✓	-	General innovation in DFS	Product	-	-	Operational	-	-	-	Nov-18
South Asia (44)	EMDE	Pakistan	Securities and Exchange Commission of Pakistan (SECP)	Securities Regulator	Civil Law	✓	✓	✓	✓	✓	-	General innovation in DFS	Product	-	✓	Announced	-	-	-	Feb-20

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East Asia & Pacific (45)	EMDE	Philippines	BSP	Central Bank	Civil Law	✓	✓	✓	-	✓	-	FinTech 'Test and Learn' Framework/ Sandbox	Policy	✓	-	Operational	-	Operators given letter of 'no objection'	Varies	Jun-01
Europe & Central Asia (46)	EMDE	Poland	PFSA/ KNF	Financial Supervisor	Civil Law	-	-	-	-	✓	-	General innovation in DFS	Product	-	-	Operational	8	-	-	Nov-18
Europe & Central Asia (47)	EMDE	Russia	CBRC	Central Bank	Civil Law	✓	✓	✓	✓	✓	-	DFS which require changes in legal regulation + blockchain pilot	Policy	-	-	Operational	15	-	-	Apr-18
Africa (48)	EMDE	Rwanda	BNR	Central Bank	Civil Law	In development	✓	✓	✓	✓	-	General innovation in DFS	Product, Thematic	-	✓	Operational	"Only 1 fintech enrolled to test mobile wallet solution"	-	6 months	Oct-18
Middle East & North Africa (49)	EMDE	Saudi Arabia	SAMA, SACMA	Central Bank, Securities Regulator	Religious law	✓	✓	✓	✓	✓	-	General innovation in DFS	Product, Policy	-	-	Operational	30	LOA-temporary restricted permission	6 months	Feb-19
Europe & Central Asia (50)	EMDE	Serbia	NBS	Central Bank	Civil Law	-	-	-	-	-	-	Innovations in Payment Services	Policy	-	-	Announced	-	-	-	Feb-20
Africa (51)	EMDE	Sierra Leone	Bank of Sierra Leone	Central Bank	Common Law	✓	✓	✓	✓	✓	-	General fintech innovations	Product, Thematic	-	✓	Operational	4 (winners of a fintech challenge)	-	12 months	Apr-18
East Asia & Pacific (52)	AE	Singapore	MAS	Central Bank	Common Law	-	✓	✓	✓	✓	-	Fintech product/ service innovation	Product/ Policy	-	-	Operational	3	-	6 months	Nov-16
East Asia & Pacific (53)	AE	Singapore	MAS	Central Bank	Common Law	-	✓	✓	✓	✓	-	Insurance Policy Bots	Product	-	-	Operational	-	-	Upto 9 months	Aug-19
Africa (54)	EMDE	South Africa	IFWG (collaboration)	Central Bank, Financial Supervisor, Ministry of Finance, Other Gov't Bodies	Hybrid System	-	✓	✓	✓	✓	-	General innovation in DFS	Policy, Cross-border	-	-	Operational	-	-	6 months	Apr-20
Europe & Central Asia (55)	AE	Spain	Ministry of Economy & Business	Ministry of Finance	Civil Law	-	-	-	✓	✓	-	General innovation in DFS	Product	-	-	Announced	-	-	-	Mar-20
South Asia (56)	EMDE	Sri Lanka	CBSL	Central Bank	Hybrid System	✓	✓	✓	✓	✓	-	General innovation in DFS	Product, Policy	✓	✓	Operational	-	-	9 months	Feb-20
Europe & Central Asia (57)	AE	Switzerland	FINMA, Federal Council	Financial Supervisor, Other Govt. Body	Civil Law	-	-	-	-	-	-	Innovations in Payment Services & Blockchain	Product, Thematic	-	-	Operational	-	Issued 'Innovator license'	Varies	Dec-18

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East Asia & Pacific (58)	AE	Taiwan	FSC	Financial Supervisor	Civil Law	-	✓	✓	-	✓	✓	General innovation in DFS	Product	-	-	Operational	6	-	Upto 12 months	Apr-18
East Asia & Pacific (59)	EMDE	Thailand	BoT (launched regulatory sandbox in Dec 2016 for FIs & NBFIs w/products related to lending, payments and fund transfers)	Central Bank	Hybrid System	✓	✓	✓	✓	✓	-	KYC and identity verification utility	Product, Thematic	-	✓	Operational	6	Operate under limited scope: provide cross-bank digital ID verification to only new savings accounts	6-12 months	Feb-20
East Asia & Pacific (60)	EMDE	Thailand	BoT	Central Bank	Hybrid System	✓	✓	✓	✓	✓	-	" Use of blockchain for letter of guarantee and cross-border fund transfer"	Product, Thematic	-	-	Operational	4	-	Up to 12 months	Dec-17
East Asia & Pacific (61)	EMDE	Thailand	BoT	Central Bank	Hybrid System	✓	✓	✓	✓	✓	-	QR code standard for e-Payment	Product, Thematic	-	✓	Operational	8 in sandbox, 5 graduated	-	Up to 12 months	Jun-17
East Asia & Pacific (62)	EMDE	Thailand	SEC	Securities Regulator	Hybrid System	✓	✓	-	✓	✓	-	KYC for e-trading platform	Product, Thematic	-	✓	Operational	10 (selected through fintech challenge)	-	Up to 12 months	Jun-17
East Asia & Pacific (63)	EMDE	Thailand	OIC	Other Govt. Body (Office of Insurance Commission)	Hybrid System	✓	✓	-	-	✓	-	"InsurTech innovations"	Product, Policy	-	✓	Operational	5	-	Up to 12 months	Jun-17
Middle East & North Africa (64)	EMDE	Tunisia	The Central Bank of Tunisia (BCT)	Central Bank	Hybrid System	-	-	-	-	-	-	General innovations in DFS	-	-	-	Announced	-	-	-	Jan-20
Europe & Central Asia (65)	EMDE	Turkey	Ministry of IT	Other Govt. Body	Civil Law	✓	-	-	-	-	-	Blockchain-based Solutions	Product, Thematic	-	-	Announced	-	-	-	Sep-19
Middle East & North Africa (66)	EMDE	UAE (Abu Dhabi)	ADGM	Other Govt. Body	Common Law	-	✓	✓	✓	✓	-	Digital Sandbox for DFS (API Solutions)	Product	-	✓	Operational	-	-	-	Nov-16
Middle East & North Africa (67)	EMDE	UAE (Abu Dhabi)	DFSA	Other Govt. Body	Common Law	-	✓	✓	✓	✓	✓	Innovation testing license: Fintech product/ service innovation	Product	✓	✓	Operational	6 (first cohort), 7 (second cohort)	Sandbox License: FinTech Startups granted Innovation-Testing License	6-12 months	Nov-17

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62. https://www.bakermckenzie.com/-/media/files/insight/publications/2020/05/a_guide_to_regulatory_fintech_sandboxes_internationally_8734pdf?la=en

63. (a) https://events.development.asia/system/files/materials/2019/04/201904-implementation-regulatory-sandboxes-global-overview.pdf; (b) https://dfsobservatory.com/sites/default/files/DFSO%20-%20The%20State%20of%20Regulatory%20Sandboxes%20in%20Developing%20Countries%20-%20PUBLIC.pdf; (c) https://www.bangkokpost.com/business/1452594/insurtech-hub-in-the-works-to-help-industry-integrate

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General Information			Nature of Regulator/Operator		Legal System		Eligibility Criteria					Features of Sandbox								
WBG Region	Type of Economy (AE/ EMDE)	Country	Name of Regulator/ Operator	Type of Regulator	Civil Law/ Common Law/ Hybrid System/ Religious Law	National Financial Inclusion Strategy	Innovation Provides Consumer Benefit	Need Authorization to Participate in Sandbox	Ready to Test	Genuinely Innovative	Location of Firm	Description of Sandbox	Type of Sandbox	Current Absence of Governing Regulation?	Financial Inclusion Focused	Operational Status	# of Firms in Sandbox	Status of Firms in Sandbox	Testing	Date Established
Europe & Central Asia (68)	AE	UK	FCA	Financial Supervisor	Common Law	✓	✓	-	✓	✓	-	General innovation in DFS	Product, Policy	-	✓	Operational	5 cohorts so far (29 firms accepted into the last cohort)	Restricted authorization	3-6 months	Jun-16
North America (69)	AE	USA	Bureau of Consumer Financial Protection	Other Govt. Body	Hybrid System	-	✓	-	-	-	-	General innovation in DFS	Policy	-	-	Operational	-	-	-	Jul-18
North America (70)	AE	USA	Arizona State Regulators	Other Govt. Body	Hybrid System	-	✓	✓	✓	✓	-	General innovation in DFS	Product	-	-	Operational	6	-	2 years	Aug-18
North America (71)	AE	USA	Kentucky State Govt.	Other Govt. Body	Hybrid System	-	✓	✓	-	✓	-	InsureTech Focus	Product	-	-	Announced	-	-	-	Jun-19
North America (72)	AE	USA	Nevada Department of Business and Industry	Other Govt. Body	Hybrid System	-	✓	✓	✓	✓	-	General innovation in DFS	Product	-	-	Announced	-	-	2 years	Jan-20
North America (73)	AE	USA	Utah Dept. of Commerce	Other Govt. Body	Hybrid System	-	✓	✓	✓	✓	-	General innovation in DFS	Product	-	-	Operational	-	-	2 years	Jul-19

68. https://www.bakermckenzie.com/-/media/files/insight/publications/2020/05/a_guide_to_regulatory_fintech_sandboxes_internationally_8734.pdf?la=en

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70. (a) https://www.consumerfinancemonitor.com/2019/06/11/utahs-new-regulatory-sandbox/#:~:text=Regulatory%20sandboxes%20are%20laboratories%20for,sponsor%20of%20Utah's%20legislation%2C%20Rep.; https://www.forbes.com/sites/astanley/2018/03/23/arizona-becomes-first-u-s-state-to-launch-regulatory-sandbox-for-fintech/#1db5e8621372

71. https://kentucky.gov/Pages/Activity-stream.aspx?n=PPC&prId=70

72. http://business.nv.gov/Programs/Nevada_Sandbox_Program/

73. (a) https://www.consumerfinancemonitor.com/2019/06/11/utahs-new-regulatory-sandbox/#:~:text=Regulatory%20sandboxes%20are%20laboratories%20for,sponsor%20of%20Utah's%20legislation%2C%20Rep.; (b) https://news.bloomberglaw.com/banking-law/utah-becomes-second-state-to-launch-fintech-blockchain-sandbox

Note: The sandboxes included in this list have the following characteristics:

(i) Sandbox is related to either only fintech innovations or fintech in combination with other sectors; and

(ii) There is publicly available information/evidence that the Sandbox has been officially announced, launched or operational (defined as open for applications, or there is information on firms that already enrolled in sandbox).

Glossary

Anti-money laundering and countering the financing of terrorism (AML/CFT): AML/CFT measures are defined by the Financial Action Task Force (FATF), the international standards setter in this area. The Basel Committee for Banking Supervision (BCBS) regularly issues guidance to facilitate banks' compliance with their obligations in this area.

Artificial intelligence (AI): AI is defined as an IT system that performs functions requiring human capabilities. AI can ask questions, discover and test hypotheses, and make decisions automatically, based on advanced analytics operating on extensive data sets. Machine learning (ML) is a subcategory of AI.[151]

Big data: Big data designates 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.

Crowdfunding: Crowdfunding is the practice of funding a project or venture by raising monetary contributions from a large number of people. It is often performed today via internet-mediated registries that facilitate money collection for the borrower (lending) or issuer (equity).[152]

Distributed ledger technology (DLT): DLT, such as blockchain, is a means of recording information through a distributed ledger, i.e., a repeated digital copy of data at multiple locations. These technologies enable nodes in a network to securely propose, validate, and record state changes (or updates) to a synchronized ledger distributed across the network's nodes.[153]

Fintech ecosystem: The fintech ecosystem is made up of consumers, financial institutions, fintech start-ups, investors, regulators, and educational institutions; its aims are to provide mutually beneficial cooperation among stakeholders to help deliver financial services at lower cost, higher speed, and better quality to more consumers.[154]

Fintech: Fintech offers advances in technology with the potential to transform financial services provision by spurring development of new business models, applications, processes, and products.[155]

Innovation facilitator: Innovation facilitators are public sector initiatives to engage with the fintech sector; they include regulatory sandboxes, innovation hubs, and innovation accelerators.[156]

Innovation hub/office: An innovation hub is an innovation facilitator set up by a supervisory agency to provide support, advice, or guidance to regulated or unregulated firms that are navigating the regulatory framework or seeking to identify supervisory policy or legal issues and concerns. Unregulated entities can engage with regulators to discuss fintech-related issues (share information and views, etc.) and seek clarification on conformity with regulatory frameworks and/or licensing requirements.

Letter of no objection: No objection letters allow firms to operate in the open market, without a specific license, but with the implicit sanction of regulators. These letters can include restrictions and reporting requirements as deemed necessary by the regulator.

Machine learning (ML): ML is a method of designing problem-solving rules that improve automatically through experience. Machine-learning algorithms give computers the ability to learn without specifying all the knowledge a computer would need to perform the desired task. ML also involves studying and building algorithms that can learn from and make predictions based on data and experience.[157]

New entrant: A new entrant is a prospective financial services provider that has not as yet been authorized by the regulator.

No-enforcement-action letters: No-enforcement-action letters provide assurance to firms that the regulator will not take enforcement action against them, as long as they comply with the conditions specified in the letter.

Peer-to-peer (P2P) lending: P2P is direct lending from savers to borrowers; traditionally the platform avoids intermediation by banks, but it also does not bear the risk of default.[158]

Reciprocal licensing: Reciprocal licensing allows firms with licenses in countries where the jurisdiction has a reciprocal license arrangement to easily passport into the country.

Regtech: Regulatory technology, or regtech, involves new technologies to help regulated financial service providers streamline audit, compliance, risk management, and other back-office functions to enhance productivity and overcome regulatory challenges, such as the risks and costs related to regulatory reporting and compliance obligations. Regtech can also refer to firms that offer such applications.

Regulatory accelerator or regtech lab: A regulatory accelerator is a partnership arrangement between fintech providers and central banks or supervisory agencies to accelerate growth or develop use cases, such as suptech or regtech, which may involve funding and/or authorities' endorsement or approval for future use in central banking operations or in the conduct of supervisory tasks.

Regulatory exemptions or waiver: Regulatory exemptions or waivers exempt a firm from requiring authorization to carry out a regulated activity or comply with a specific requirement.

Regulatory sandbox: A regulatory sandbox is a controlled, time-bound, live testing environment, which may feature regulatory waivers at regulators' discretion. The testing environment may involve limits or parameters within which firms must operate.

Restricted or temporary license: Restricted or temporary licenses give firms licenses but set limits on the authorization, limiting, for example, the type of service that can be provided, the number of customers that can be served, or the time for which the license is valid.

Sponsored licensing: Sponsored licensing allows firms to partner with existing license owners and to trade under that license.

Suptech: Suptech is the use of innovative technology by supervisory agencies to support supervision. It is intended primarily to help supervisory agencies digitize reporting and regulatory processes, resulting in more efficient and proactive monitoring of risk and compliance at financial institutions.[159]

Endnotes

1. The IMF, WBG Bali Fintech Agenda (2018) defines *fintech* as "advances in technology that have the potential to transform financial services provision, spurring the development of new business models, applications, processes, and products."
2. A *regulatory sandbox* is generally defined as "a controlled, time-bound, live testing environment, which may feature regulatory waivers at regulators' discretion." For the purposes of this paper, we have included all frameworks that the establishing authority refers to as a sandbox.
3. This signifies a small dedicated team (the hub) that can call upon satellite teams or personnel (the spokes) as needed.
4. The fear of contagion through contact has created incentives for increased use of digital financial services (DFS), which can be provided remotely and with no physical contact, often using mobile phones to access products and services. Fintech providers are a key part of this response.
5. WBG research; see Appendix 3 for full details.
6. For more on Innovation hubs please see Appendix 2; for a full list of all innovation facilitators by country, please see Annex 2 of Fintech Note No. 5, "How Regulators Respond to Fintech: Evaluating Different Approaches — Sandboxes and Beyond" (Appaya et al., World Bank, April 2020).
7. Ibid. This section draws on and summarizes elements from Fintech Note No. 5, which provides a more detailed analysis on types and definitions of sandboxes.
8. For a full list of all innovation facilitators by country, please see Annex 2 of Fintech Note No. 5, "How Regulators Respond to Fintech: Evaluating Different Approaches — Sandboxes and Beyond" (Appaya et al., World Bank, April 2020).
9. For the remainder of this document, unless stated otherwise, the term "sandbox" is used to refer to a regulatory sandbox.
10. https://www.hdruk.ac.uk/infrastructure/Sandbox/the-Sandbox-projects-2/.
11. See CFPB, *Project Catalyst Report: Promoting Consumer Friendly Innovation* (October 2016).
12. The sandbox has accepted 89 companies since its inception in 2016 and has just finished taking applications for its fifth cohort.

13. Another way to differentiate sandboxes is according to whether the market or the regulator drives demand. However, for the purposes of this report, and to show the learnings from country case studies, we refer to the four primary sandbox types.
14. https://www.unsgsa.org/resources/news/regulatory-sandboxes-not-always-answer-regulating-inclusive/.
15. This paper only references the fintech-related sandboxes. Those created with wider purposes in mind, including those created by nonfinancial regulatory bodies, have not been included.
16. This paper is complemented by the CGAP paper, How to Build a Regulatory Sandbox: A Practical Guide for Policy Makers.
17. While similarities exist between a sandbox and a test-and-learn approach, the latter is a bespoke operating framework based on individual business models and thus can have issues of scalability. Moreover, test-and-learn frameworks are primarily innovator driven, while sandboxes are more likely to be regulator led.
18. "Sponsored licensing" here refers to an approach that allows firms to partner with existing license owners and to trade under that license.
19. "Reciprocal licensing" allows firms with licenses in countries with whom a jurisdiction has a reciprocal license arrangement to easily passport into the jurisdiction.
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35. See Cryptoslate, "Binance's Bold Move to Usurp US Cryptocurrency Exchanges" (August 2019).
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37. Key considerations and guidance for policy makers to assess the feasibility of a sandbox can be found in our publication "How Regulators Respond to Fintech: Evaluating Different Approaches — Sandboxes and Beyond."
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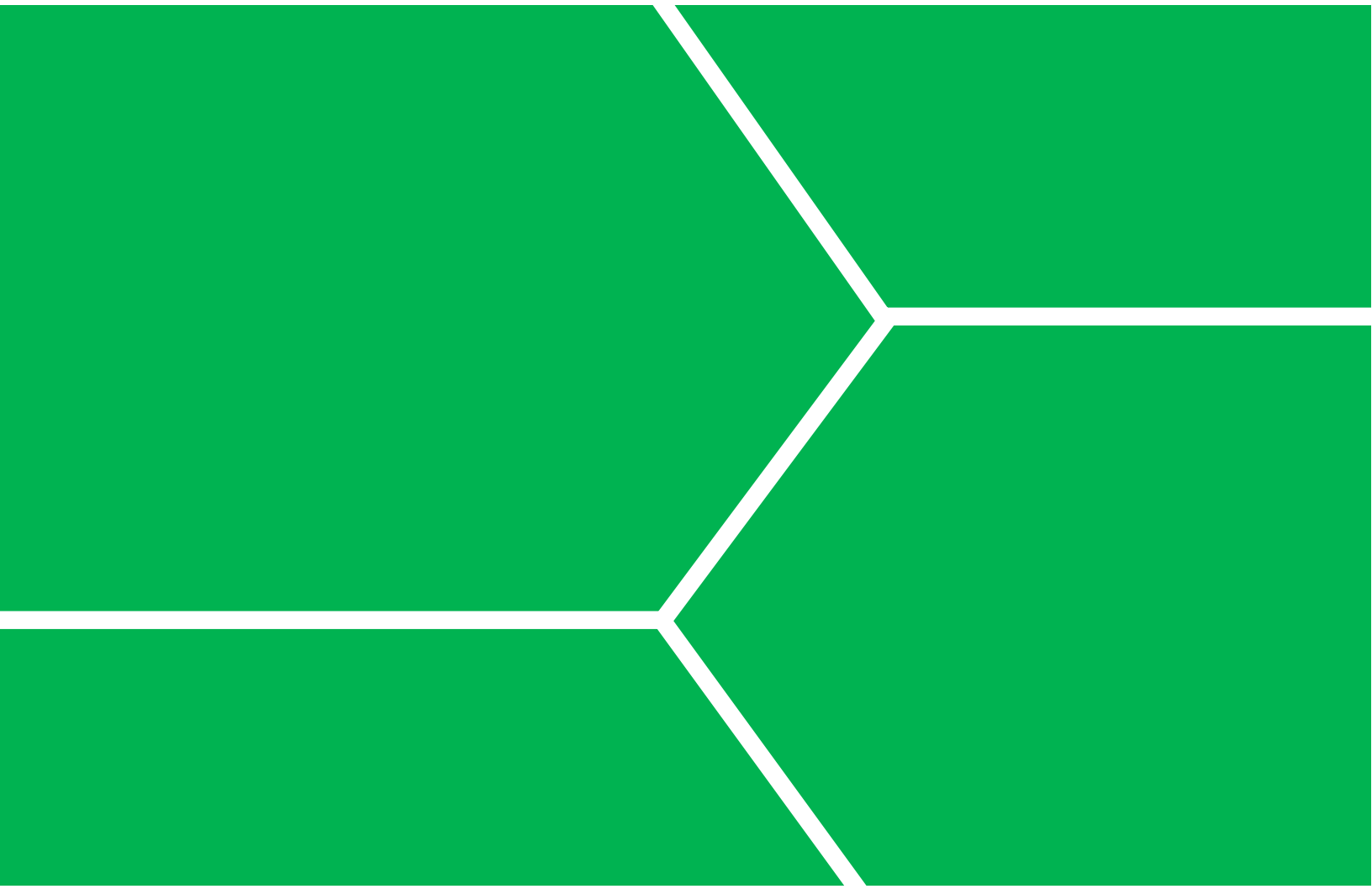

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