United Nations | Department of Economic and Social Affairs

ESCAP Economic and Social Commission for Asia and the Pacific

▶ Policy Brief

DA2124B: Frontier Technology Policy Experimentation and Regulatory Sandboxes in Asia and the Pacific

REGULATORY SANDBOX FRAMEWORK FOR CENTRAL BANK DIGITAL CURRENCY IN THE MALDIVES

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United Nations | Department of Economic and Social Affairs

ESCAP Economic and Social Commission for Asia and the Pacific

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About the Maldives Monetary Authority

The Maldives Monetary Authority was established in 1981, under the mandate provided by the *MMA Act (1981)*. Up until the second amendment to the MMA Act in 2007, the cabinet minister in charge of the Ministry of Finance and Treasury served as *ex officio* Governor of the MMA, while the State Minister of Finance and Treasury served as the *ex officio* Vice Governor.

About the Ministry of Environment Climate Change and Technology, Maldives

The Ministry of Environment is responsible for implementing government policies, regulations, programmes and projects related to the provision of clean water and appropriate sewerage services, provision of clean and affordable energy services, provision of clean and healthy environment free from pollution, protection of the islands from coastal erosion, advocate for the rights of small islands states in the fight against climate change, mobilize finance to adapt and mitigate the negative impacts of climate change, coordinating sustainable development goals within the government, and protection and preservation of natural environment.

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Acronyms

AML	Anti-Money Laundering
CBDC	Central Bank Digital Currency
CRG	Governance, risk management, and compliance
DESA	Department of Economic and Social Affairs
FCA	Financial Conduct Authority
GFIN	Global Financial Innovation Network
IT	Information Technology
ESCAP	Economic and Social Commission for Asia and the Pacific
MMA	Maldives Monetary Authority

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I. Summary

The Division for Public Institutions and Digital Government (DPIDG) of the United Nations Department of Economic and Social Affairs (DESA), together with the Information and Communications Technology and Disaster Risk Reduction Division (IDD) of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), is collaborating with the Ministry of Environment, Climate Change and Technology, and the Maldives Monetary Authority (MMA) to implement a regulatory sandbox for testing Central Bank Digital Currency (CBDC) in the Maldives. [1]

This Policy Brief aims to discuss the benefits and risks associated with implementing a regulatory sandbox on CBDC in the Maldives. It also outlines the operationalization issues that the MMA needs to consider, including the assessment of regulatory sandbox applications, the establishment of an internal MMA organizational structure, and the responsibilities and potential implementation challenges that may arise.

A regulatory sandbox is established by a regulator to facilitate small-scale testing of innovative products and services under special conditions. These conditions often include exemptions from specific regulatory requirements, while the regulator closely supervises the testing process. Sandboxes function as regulatory laboratories that enable regulatory authorities to observe and evaluate the outcomes of small-scale tests, allowing them to make data-and evidence-informed decisions when developing relevant legislation.

This Policy Brief further provides recommendations to the MMA and other government authorities on promoting CBDCs and other financial technology (FinTech) services/products. These recommendations emphasize the importance of establishing a regulatory sandbox and reviewing domestic legislations and regulations, among other measures. The recommendations promote the development of CBDCs and FinTech innovations in the Maldives while ensuring effective regulation and oversight to safeguard the financial sector and protect consumers.

II. Innovation Facilitators

The rapid advancement of technology in the financial sector has given rise to innovative services and new business models. However, these innovations have also introduced regulatory risks that were previously unknown to the financial industry, posing challenges to traditional regulatory practices. Therefore, financial regulators face the task of striking a balance between promoting innovation in their markets and managing the risks associated with unexplored products, services, and technologies in the FinTech sector. The Financial Stability Board defines FinTech as technology-enabled innovation in financial services that can lead to new business models, applications, processes, or products that significantly impact the provision of financial services. [2]

Different countries have responded to this innovation in various ways, ranging from imposing restrictions on new services and products to developing specific regulations and issuing guidance to clarify the applicability of existing regulatory frameworks to innovative technologies. Prohibiting FinTech services often does not completely halt their provision in the country. Instead, such restrictions often lead to the emergence of unregulated markets and the establishment of firms operating from foreign jurisdictions, which offer restricted services across national borders. As a result, consumers are left with inadequate regulatory protection.

[1] https://www.unescap.org/sites/default/d8files/knowledge-products/ESCAP-2022-MaldivesNationalStudy-CBDC-Stablecoins-GordonClarke-EmiHrnjic_1.pdf
[2] https://www.fsb.org/work-of-the-fsb/financial-innovation-and-structural-change/fintech/

While providing guidance and clarification to regulators presents its own challenges, developing effective regulatory policies necessitates a comprehensive understanding of innovative business models and emerging technologies. Moreover, it requires strategies to mitigate the risks associated with these innovations. In response to these challenges, regulators have increasingly adopted innovative regulatory approaches through the establishment of "innovation hubs" and "regulatory sandboxes," collectively referred to as "innovation facilitators."

a). Innovation Hubs

Innovation hubs are often established by financial regulators or industry associations to provide support for innovators in navigating complex regulatory requirements. These hubs facilitate discussions that help FinTechs understand licensing and other regulatory obligations, as well as the expectations of regulators regarding compliance.

The primary purpose of innovation hubs is to enhance firms' understanding of the regulatory requirements associated with their innovative services or products. This is achieved through a dedicated contact point within the regulator, allowing firms to submit questions and engage in dialogue with the competent authority. As part of the innovation hub program, regulators often issue non-binding advice and guidance to assist firms in comprehending the legislative implications for their products and services.

The establishment of innovation hubs typically does not require specific legal powers, as regulators' objectives of promoting effective competition protecting financial market stability and consumer interests are usually sufficient. Although innovation hubs share similar functionalities, their operating models distinguish them from one another. For instance, some regulators assign a dedicated team of experts from existing regulatory and supervisory departments to focus primarily on innovation hub work, while others establish a communication channel through which different experts across the authority engage on an ad-hoc basis.

Participants in innovation hubs can be categorized into three groups:

1. Existing market players who possess licensing permissions from the regulator and are launching innovative products.
2. Potential market players, such as startups.
3. Tech companies that offer solutions to financial entities.

b). Sandboxes

Originally, sandboxes were prevalent in the IT industry. For instance, an information technology IT 'sandbox' was utilized to explore computer viruses and test programs within a protected shell referred to as a 'sandbox.' Many antivirus software developers incorporate sandbox technology in their products to proactively safeguard users against unknown threats. For example, Kaspersky's laboratory employs a 'safe environment' technology that enables users to launch suspicious applications within the sandbox.

The practice of utilizing sandboxes has transitioned from the IT industry to the financial sector. The United Kingdom was the pioneer in launching the first regulatory sandbox, which has now expanded to other

industries. Singapore, for instance, employs sandboxes in the energy sector. In the fintech industry, various types[3] of 'sandboxes' have emerged (see Box 1).

Box 1: Sandbox types

1. **Regulatory sandbox**: Special schemes allow firms to test and develop innovative financial products and services under a particular regulatory regime with tailor-made requirements applicable to each firm or group of firms.
2. **Industrial (sectoral) sandbox**: The industrial (sectoral) sandbox provides an open and interactive IT environment where participants can access data, systems, and infrastructure while receiving consulting support to test innovative ideas. An industrial sectoral sandbox can be established for the entire industry or to address specific industry development issues. Its purpose is to exchange knowledge, data, and technologies to develop innovative solutions and establish new standards and processes. Unlike the regulatory sandbox, the industrial (sectoral) sandbox operates outside the real market and does not involve direct interaction with consumers.
3. **Umbrella sandbox**: An "umbrella" sandbox is created through the establishment of a non-profit organization that receives permission from the regulator to carry out a particular activity. Firms wanting to test their solutions can act as representatives of the umbrella organization and offer services under the umbrella regulatory license, eliminating the need for an additional license for the umbrella representative. Umbrella sandboxes typically focus on testing processes in easily scalable businesses, such as compliance and risk management spheres, which have a high potential for implementing RegTech solutions. For example, the United Kingdom has implemented an umbrella sandbox regime, allowing firms to run regulated financial activities without obtaining a license from the UK Financial Conduct Authority (FCA) by acting as an agent for a directly authorized financial firm. Using a single umbrella for testing can be beneficial for small firms as experiments can be conducted with multiple customers. Additionally, the "Umbrella" sandbox allows the monitoring functions of participants in the sandbox to be outsourced to an operator.
4. **Digital sandbox**: This scheme explores computer viruses and tests applications within a protected shell. It also allows for testing programs through open Application Programming Interfaces (APIs).
5. **Corporate sandbox**: Companies establish corporate sandboxes for developing, piloting, and launching innovative solutions. Corporate sandboxes typically focus on testing in-house developed solutions and do not involve regulators.
6. **Global sandbox**: The concept of a global sandbox, also known as cross-border testing, was initially proposed by the UK Financial Conduct Authority (FCA) in its Consultation Document in August 2018. The purpose of the global sandbox is to create a framework that allows firms to trial and scale new technologies, products, or business models consecutively or concurrently across multiple jurisdictions. Participants of the global sandbox benefit from a single application process, submitting only one application to multiple jurisdictions. However, it should be noted that the global sandbox does not aim for regulatory harmonization, meaning that applicants must satisfy the regulatory requirements of each jurisdiction separately. Additionally, the global sandbox acts as a network for regulators to exchange ideas and experiences in the regulation of FinTech services and as an information desk for firms, providing information on each regulator's jurisdiction, the types of innovation services offered, specific requirements for cross-border testing, and key contact information.
7. **Jurisdictional sandbox**: Smaller jurisdictions often offer more flexibility in responding to changes.

[3] International experience in the use of "sandboxes"
http://www.eurasiancommission.org/ru/act/dmi/workgroup/materials/Documents/Международный%20опыт%20применения%20песочниц.pdf

For example, many island economies have flexible corporate structures, simple taxation, and appropriate regulations. Fintech businesses operate in the sandbox mode in locations such as the Virgin Islands, the Cayman Islands, Guernsey, and Jersey. In 2014, the Jersey Financial Services Commission licensed the first bitcoin-focused regulated fund, introducing bitcoin as an asset class. As a result, the island has experienced a surge in crypto/fintech funds and has developed unique competencies and expertise in raising capital through innovative tools. In addition, the DIFC, an independent jurisdiction under the Constitution of the United Arab Emirates, may serve as the jurisdiction for piloting innovative projects and developing corresponding legislation with the potential to be implemented in the mainland later.

III. Introduction to regulatory sandboxes

The results of the National Study on CBDC in the Maldives suggest that the CBDC project would be conducted entirely within a regulatory sandbox. The project aims for a longer-term launch through a Proof-of-Concept and Pilot process, which will enable the trial of add-on FinTech products. Therefore, this section of the policy paper will primarily explore the concept and implementation of the regulatory sandbox framework.

a). What are regulatory sandboxes?

A regulatory sandbox is a regulatory regime established by a regulator that allows small-scale testing of innovative products and services under special conditions, including exemption from regulatory requirements, while being closely supervised by the regulator.

Regulatory sandboxes define specific boundaries for participating firms, known as testing parameters. These parameters are applied on a case-by-case basis at the discretion of the regulator. For example, restrictions may include a maximum number of clients and transaction limits. In addition to mitigating the potential impact of test failures on clients and other market players, regulators often require enhanced customer safeguards, such as compensation arrangements, risk warnings, and disclosure requirements.

Most regulatory sandboxes share the following common characteristics:

1. Established for a limited period and are usually geographically limited.
2. Flexible regulatory requirements, except for those that could pose risks to consumer protection and financial stability. This balanced approach allows for safe testing of innovative offerings in the marketplace.
3. Regulatory amendments are made based on the opportunities and risks identified by regulators through studying the results of regulatory sandbox testing.
4. The results of regulatory sandbox testing can help in identifying and implementing appropriate regulatory measures for customer safeguards. Additionally, these results can contribute to improving regulatory transparency and clarifying regulatory requirements.

b). Objectives and benefits

Regulators establish regulatory sandboxes with the following objectives:

1. Improve firms' understanding of the regulatory framework and expectations of authorities, including the applicability of regulations to innovative products or services.
2. Enhance regulators' knowledge of innovative services/products and, most importantly, improve customer safeguards.

3. Establish communication with the FinTech market and promote a culture of compliance from the early stages of innovation development and design.
4. Open the market to innovations and reduce the time and costs required to enter the market. Due to regulatory uncertainty, innovative services that are not fully regulated or partially regulated may not even be tested in the market. The launch of a sandbox signals to the market that the development of innovations is a top priority for regulators.
5. Regulatory sandboxes are beneficial as they enable regulators to learn about innovative products and services and explore the associated risks. Additionally, regulatory sandboxes allow firms to understand the rules and regulations applicable to their innovative offerings. The launch of a regulatory sandbox should lead to better outcomes for firms and the market, resulting in increased availability of new services, reduced costs, and improved access to such services. However, it is crucial for regulators to ensure that adequate customer protection measures are built into the innovations.

Given that piloting products and services will be available to real clients, risks should be carefully explored and mitigated, and compliance with constraints and regulatory requirements should be closely monitored.

c). Potential risks

Establishing regulatory sandboxes has raised a few concerns. One prevalent issue is regulatory arbitrage, where regulators compete to attract FinTech firms and potential economic benefits, potentially compromising consumer protection and financial stability. It is important to note that this risk is not specific to regulatory sandboxes but can occur through other regulatory measures. Another concern is the potential over-prioritization of innovations over regulations and consumer protection by regulatory authorities. Furthermore, sandboxes are resource-intensive programs that may divert regulators' attention from designing comprehensive policies and supervising the financial sector. There is also a risk of inadequate assessment of the risks posed by sandbox participants, which can harm consumers during tests and undermine trust in the jurisdiction and financial sector. To address these concerns, clear eligibility criteria and assessment procedures for sandbox applicants should be defined, and the sandbox regulatory team should have sufficient staffing and training.

Moreover, there is a risk of herding behavior among consumers and investors, where firms accepted in regulatory sandboxes are perceived as safe. To counter this, sandbox participants must disclose on their websites and client agreements the risks associated with their financial products and clarify that they are under a testing regime. Additionally, formal notices can be provided, stating that the competent authority is only monitoring the test within prescribed parameters, disclaiming responsibility for harm that may occur during the test, and clarifying that no financial guarantee or insurance is provided by the firm or regulator (if applicable).

These risks should be considered during the development and testing of regulatory sandboxes. Regular reviews of the implemented regulatory regime, incorporating feedback from sandbox firms and broader financial market players, can help address some concerns. It is also crucial to communicate the objectives, entry criteria, and assessment procedures of the sandbox to ensure transparency within the market.

d). Scope and access

The scope of the regulatory sandbox is often limited by the mandate and supervisory power of the competent authority. For example, in countries with multiple regulators, the regulatory sandbox may be restricted to a specific sector, such as the capital market or banking industry.

However, innovations often operate cross-sectoral, spanning multiple financial industries. For instance, mobile banking applications may offer investing options in the stock market or risk management solutions. Therefore, sandboxes limited to one industry may hinder the overall development of innovations, considering that FinTech benefits from economies of scale and can bring innovations to the entire financial and IT sectors.

In jurisdictions with multiple financial regulators where establishing a joint sandbox is not feasible, it is highly encouraged to promote automatic information sharing or close cooperation between authorities. This helps mitigate the risks of developing different regulatory practices in different financial industry sectors.

Therefore, it is recommended that countries with multiple regulators in the financial sector unify their efforts in operating regulatory sandboxes. This could involve developing a joint application submission and review process, allowing firms to submit one application to different regulators and receive a consolidated response regarding their admission status to the regulatory sandbox.

Equal access to the regulatory sandbox is crucial to maintain a level playing field. It is important to provide open access to all types of firms, regardless of their size or regulatory status. Limited access to certain types of applicants, such as regulated institutions, start-ups, or incumbent firms, can lead to unfair treatment and unequal opportunities for potential sandbox applicants.

In the European Union, innovation hubs and sandboxes generally welcome all innovative firms, irrespective of their size or regulatory status. This approach promotes innovation and competition while ensuring that all firms have an opportunity to participate and benefit from the sandbox. However, it's important to note that access to the sandbox alone does not guarantee success, and firms must still meet certain criteria and comply with applicable regulations to thrive in the market."

IV. Application phases

Most of the regulatory sandboxes have four phases: a). Application phase; b). Authorization phase; c). Testing phase; and d). Evaluation phase.

a). Application phase

During the application phase, the firm submits a pre-application and a full application to demonstrate to the regulator that it meets specific eligibility criteria for applying to the regulatory sandbox and to prove its regulatory maturity level.

Applications to the sandbox can be accepted at any time or on a cohort basis during the application period, which is usually 1-2 months. The cohort basis option allows regulators to utilize staff units more efficiently and is suitable for regulators that don't have a dedicated regulatory sandbox team on an ongoing basis. After the submission period ends, experts involved in the admission and review process may be allocated to other divisions or continue their supervision function for accepted applicants.

Some regulators may have different application windows depending on the type of activity the applicant intends to provide. This helps spread out applications more evenly over time and prevents the acceptance of too many applications at once.

However, the cohort option may not be suitable for firms that need to wait until the next window opens to submit their applications. Firms should have the opportunity to test their innovations once they have reached a sufficient level of maturity. Therefore, accepting applications on an ongoing basis is preferred,

especially in medium-scale environments, provided that the regulator has a dedicated regulatory sandbox team within its organizational structure.

(i). Pre-application

During the pre-application phase, the applicant submits a short application to demonstrate that it meets the minimum entry criteria, also known as eligibility criteria. The pre-application phase does not require information on the applicant's regulatory maturity level.

The pre-application phase serves to prevent applicants from submitting unnecessary extensive applications that include information on their level of regulatory compliance. This phase allows both the regulator and the firm to save time and human resources by filtering out applications that are not eligible for the sandbox. After submission, the regulator decides whether to accept the applicant into the next phase, which is the application phase, request additional information, or reject the pre-application. In certain jurisdictions, the pre-application phase is combined with the application phase.

The eligibility criteria, which are contained in the pre-application phase, are an integral part of the regulatory sandbox's design. During the pre-application phase, applicants are assessed against these criteria, and only firms that meet the innovation facilitator's objectives are accepted into the sandbox.

The most common and critical eligibility criterion is genuine innovation, which requires firms to demonstrate that their product brings innovative technology, a new/effective business model, or a new product/service to the market. In some jurisdictions, the regulatory sandbox is only open for new financial products that are not yet available in the market. Applicants are often expected to provide market research to prove their eligibility in the pre-application form.

Other eligibility criteria may include:

1. **Benefits to consumers and the financial system:** The proposed product/service should bring better outcomes for consumers or the overall market, such as new products, cost efficiency, increased availability, or market stability.
2. **Background research**: The applicant must demonstrate an extensive examination of the regulatory framework and show how their products comply with existing regulations. Some regulators may require applicants to define test and outcome scenarios, proposed boundary conditions, and testing limits.
3. **Project maturity**: The product, including the IT system, compliance controls, and human resources, should be ready for testing with real consumers. Accepting firms at an early stage of development may provide regulatory certainty, enabling them to establish business connections, open bank accounts, and attract investors.
4. **Need for support/testing**: The product genuinely needs help from the regulator, either because it doesn't fully meet regulatory requirements or it doesn't fit within the existing regulatory framework.
5. **Risk mitigation**: Risks associated with the proposed product and technology should be adequately assessed and mitigated. Applicants may need to demonstrate preliminary testing results and propose how substantial risks will be mitigated. Some regulators may also require cybersecurity tests for the proposed technology.
6. **Investor protection and compliance**: The applicant must demonstrate a commitment to protecting consumers and investors, as well as a compliance culture. They should also outline exit and transitional strategies in case of discontinuation of operations.
7. **Serving the domestic market**: The applicant should plan to offer its services in the domestic market. If offering services domestically is not economically viable, regulators may consider alternative ways in which the applicant can bring benefits to the market, such as training experts or developing the

IT ecosystem.

Assessing these criteria is a subjective task, which leaves room for interpretation and assessment by the regulator. Therefore, the application assessment process should be outlined in detail, and procedural processes for reviewing sandbox applications should be developed to minimize subjectivity where possible.

Subjective assessment criteria can lead to adverse outcomes, such as prioritizing FinTech development and innovation at the expense of consumer protection. Additionally, prescribing tight deadlines for reviewing applications may result in inadequate risk assessment and missed opportunities. To address these concerns, eligibility criteria should be specified and publicly available. A clear procedural framework, consistently applied, can reduce the subjectivity in assessment and establish a level playing field.

(ii). Full application

After the firm is accepted through the pre-application and application phases, specific criteria need to be developed, discussed, and agreed upon between the firm and the regulator. Without these criteria, the firm will not be permitted to begin testing.

The application form usually includes the following information:

1. Identification of the proposed financial activity and whether it is regulated by the competent authority. If the activity is regulated, the applicable regulatory requirements will apply. If the firm intends to offer financial services but is not currently regulated, the authority will decide whether to accept the firm for testing.
2. In cases where the firm offers non-regulated activity within the regulatory sandbox, the regulator must invest significant human resources to establish regulation "from the ground up." Regulator experts research international practices, assess risks associated with the proposed activity and underlying technology, and determine necessary safeguards. This practice provides valuable insights for future regulatory policy based on empirical results and lessons learned from sandbox testing.
3. Operational readiness of the firm, including the ability to satisfy regulatory requirements and operate within the proposed testing parameters. The application may require submission of internal procedures, evidence of IT systems and controls, and copies of agreements with existing partners (e.g., banks and payment systems).
4. Compensation arrangements, which may be optional depending on the jurisdiction. Regulators may ask applicants to provide compensation arrangements to protect retail clients in case of harm during testing. This can take the form of insurance or a dedicated bank account with funds for compensation. However, meeting this requirement can be challenging and costly for start-ups.
5. Testing parameters, including transaction or aggregate limits, restrictions on serving specific customers, and the number of customers. Violating testing parameters may lead to regulatory sanctions or even the termination of testing. These parameters are developed on a case-by-case basis depending on the applicant's compliance and risk management maturity. The final decision rests with the regulator.
6. In jurisdictions with existing regulatory sandboxes, standardized testing parameters may already be available for certain activities. This allows firms to test their activities under predetermined conditions publicly before entering the sandbox. For example, Singapore has introduced a Sandbox Express initiative[4] for insurance brokers and the establishment or operation of an organized market.
7. Testing parameters should be included in the issued license, as it helps inform the market, firm counterparties, and regulators about the firm's regulatory status and potential violations of testing

[4] https://www.mas.gov.sg/development/fintech/sandbox-express

parameters.

8. Engagement plans with the regulator, including the periodicity and form of engagement.
9. Disclosure requirements, where the applicant discloses its regulatory status to partners and customers, typically indicating that it operates within a testing regulatory environment and that the regulator is not responsible for any harm that may occur during the testing phase. This information can be included in client agreements, legal documents with partners, and public websites.
10. Outsourcing arrangements, as many applicants rely on third-party service providers. The responsibility for the outsourced functions still lies with the applicant, necessitating effective management of service providers to minimize operational risks and ensure adequate service provision.
11. Financial soundness, ensuring that firms accepted into the regulatory sandbox are financially stable and capable of sustaining their operations throughout the testing phase. This may involve providing a description of investment and operational expenditures, available funds, and financial projections for at least one year in some cases.
12. Criteria for assessing testing results.
13. Exit plan, which prepares the firm for both early and planned exits. Early exits can occur due to serious violations of testing parameters, while planned exits happen when the testing period expires (typically 6-12 months). The exit plan covers scaling up operations, terminating relations with consumers/partners, and addressing harm to consumers in case of early or planned exits.
14. Based on the information mentioned above, a testing plan is formulated. The plan outlines critical information about the sandbox test

(iii). Application for CBDC testing

Given the early-stage development of CBDCs,[5] it is expected that the CBDC platform should be flexible enough to accommodate any unexpected demands. The regulatory authority should also maintain sufficient powers to change roles within the CBDC platform.

CBDC regulatory sandboxes are increasingly popular worldwide as central banks seek to explore the potential of CBDCs in a controlled environment while minimizing risk. The Bank of Thailand, the National Bank of Kazakhstan, and the Central Bank of Saudi Arabia have established regulatory sandboxes for testing CBDCs.

Therefore, it is recommended to initiate CBDC testing within a regulatory sandbox, which provides a space for central banks to experiment with and test the technology and infrastructure needed for CBDCs in a controlled environment. This allows for the identification of potential issues and risks, and enables regulatory adjustments to be made before launching CBDCs on a larger scale.

In regular sandbox tests for FinTech services/products, the regulator assesses the firm's regulatory maturity and financial soundness. Based on these criteria, special legal regimes are established for each participating firm. For example, firms providing the same services may operate under different regulatory parameters, such as different transaction limits or additional prescribed safeguards. In other words, special non-standard regulatory sandboxes are created for each firm.

Unlike FinTech sandboxes, the CBDC sandbox may prescribe unified criteria for participation. The primary difference between the purposes of FinTech and CBDC sandboxes is that the FinTech sandbox allows

[5] Central bank digital currencies: system design and interoperability https://www.bis.org/publ/othp42_system_design.pdf

testing and development of business models and technologies of innovative firms in a tailored "friendly" environment with relaxed regulatory requirements. On the other hand, the CBDC sandbox allows testing of payment-related products and technology of the central bank with the participation of existing payment institutions and banks under the same regulatory requirements.

The development of unified criteria and standards for entry into the CBDC sandbox is critical to maintaining the interoperability of the CBDC platform. In contrast, the FinTech sandbox, except for eligibility and Anti-money Laundering (AML) requirements, is expected to satisfy a limited range of regulatory requirements. Additionally, interoperability ensures the diversity of intermediaries and fosters competition, resulting in more options, greater availability, and enhanced efficiency for end users, such as broader access to different applications and devices, as well as smoother onboarding.

Further unified standards in the CBDC sandbox help achieve compliance with minimum safety criteria, such as personal data protection and cybersecurity standards.

Moreover, at the beginning of CBDC tests, it is encouraged to only accept licensed market players. These participants are already authorized and supervised by the regulator, meeting minimum regulatory standards. This streamlines the authorization process for accepting firms for CBDC tests and enhances the safety of such tests. Licensed market players have already established client relationships with end users, making it more convenient to initiate testing trials. Additionally, considering the higher level of security standards of banks, it is proposed to set higher limits for banks than for payment institutions in CBDC sandbox tests.

The subsequent phases of authorization and evaluation should not differ from a regular FinTech sandbox regime.

b). Authorization phase

Based on the information provided in the pre-application and full application, the regulator initiates the development of the applicant's risk assessment.

The risk assessment process is the most critical component of the application processing phase and, indeed, the entire authorization process. Its purpose is to create a comprehensive risk profile of the applicant. This profile serves as a crucial input for the key decision in the authorization process: whether to grant or reject the application for a regulatory sandbox license? Furthermore, the risk profile resulting from this process becomes the primary foundation for the ongoing supervision of the licensed firm.

To ensure consistency in the regulatory approach, the risk assessment process typically follows a standard template that is consistently applied to all sandbox applications.

The firm's risk assessment process involves various competencies within the regulatory sandbox staff units. For instance, the regulator may engage IT cyber risk experts to review the IT aspects of the applications, while experts in financial audit may be involved in assessing the applicants' compliance with prudential requirements. Risks assessment of regulatory sandbox applicants may involve the assessment of five main risk categories (see Box 2).

Box 2: Five main risk categories of regulatory sandbox

1. Business risks arise from the operations and business activities of the regulatory sandbox firm.

2. Environmental and external risks stem from external sources that affect the firm.

3. Technology risks arise from the reliance on technology platforms to deliver products and services.

4. Business conduct risks encompass regulatory compliance, meeting customer expectations, fair treatment of customers, and the risk of damaging trust or the firm's reputation.

5. Governance, risk management, and compliance (GRC) risks involve the potential failure of the GRC framework designed to mitigate business and other risks associated with the sandbox firm's operations.

These five risk categories consist of various risk groups that link together different areas of risk within the firm or risks it faces due to its business activities. The Business and Operations Risk category comprises financial, business, strategic, and external risks. Risk groups are further divided into risk elements, which are specific areas of risk that contribute to the overall risk group score. For example, within the Technology Risk group, cyber security risk, reliability and business continuity, scalability, obsolescence risk, and technical feasibility are relevant risk elements.

Annex 1 (Table 2) of this paper provides a comprehensive list of risks that should be considered when developing the risk assessment report.

Once the risk assessment report is completed, the regulatory sandbox team proceeds to develop a recommendation report. This report contains a proposal either to grant the applicant a license or to reject the application. Both the risk assessment and recommendation reports are then submitted to the authorization committee for review. The authorization committee can make one of the following recommendations to the CEO:

1. Approve the application and license conditions.
2. Direct further examination of the license conditions.
3. Reject the application.

c). Testing phase

During the testing phase, the firm offers its services and products under specific testing parameters. This enables the firm to achieve several objectives of smoothly offering and testing services/products; assessing the technology, new business models, or products/services; exploring the regulatory framework and its application to the firm's activities; understanding the supervision and expectations of the regulator; identifying and mitigating risks; demonstrating regulatory compliance to investors and counterparties; showcasing that the innovative product offered by the firm is regulated and licensed; and in some cases, test the local demand for the proposed service or product.

During this phase, the regulator closely oversees the firm, explores risks, identifies potential mitigation measures, and, if necessary, develops corresponding amendments or new legislation to address new risks.

The standard duration of the testing phase usually ranges from six to twelve months. For example, in the United Kingdom, the duration is six months. However, in certain cases, upon the firm's request and with sufficient explanation, the regulator may extend the testing period based on their decision. Additionally,

some competent authorities do not prescribe a standard period, and the duration varies on a case-by-case basis.

Throughout the testing phase, the firm operates in accordance with the testing plan, following testing parameters and gradually complying with prescribed regulatory requirements. The firm maintains regular communication with the regulator through reports and conference calls to discuss testing results, regulatory compliance matters, and progress made according to the testing plan.

In the event of major incidents such as technology infrastructure issues, data breaches, fraud, or any issues that may harm consumers, the firm must immediately report them to the supervisory team at the competent authority. Supervision within the sandbox is typically intense and requires more regulatory expert engagement compared to regular conventional supervision under the full regulatory regime.

During the testing phase, the regulator retains general supervisory powers, including the authority to issue written notices/warnings, impose fines, order remedial actions, or, in the case of serious incidents, suspend or terminate the testing phase based on the regulator's decision. Termination of testing may occur for the following reasons: (i). firm's request (e.g., lack of demand for the product or unviable business model); (ii). addressing consumer harm that occurred during testing; and (iii) mitigating new risks identified during testing.

d). Evaluation phase

Upon the completion of the testing phase, the firm has four options:

1. Request from the regulator to prolong the testing period, providing a sufficient explanation (e.g., if a change in business models prompts the firm to test a new hypothesis within the regulatory sandbox).
2. The firm may choose to continue operations outside the sandbox, transitioning to the full regulatory regime. In this case, the firm must apply for a standard license and be prepared to comply with the standard regulatory framework.
3. Cease all operations and close the business.
4. Cease operations with clients and continue developing the technology and business model off the market.

After the testing phase, the firm is expected to submit an evaluation report to the regulator. In some cases, the final evaluation report is developed jointly by the regulator and the firm. In the case of Bahrain, it is prepared by an auditor.

The evaluation report may cover the firm's progress during the testing phase, including satisfaction of regulatory requirements, reported incidents, non-compliance matters, and market reactions.

Following the submission of the final evaluation report, a regulatory sandbox team develops a Lessons Learnt Report, which is then submitted to higher-level colleagues such as the executive board team or the internal committee on regulatory matters. The Lessons Learnt Report can be developed individually for each firm or based on the aggregate testing experience of firms in the cohort.

The Lessons Learnt Report should provide essential information on the firm, authorization and supervisory matters, recommendations on procedural regulatory sandbox processes, and proposals to amend the regulatory framework. It may also be reviewed internally by colleagues from other divisions not involved in the regulatory sandbox work.

Once the Lessons Learnt Report is reviewed and approved, a public version can be published on the regulators' website to communicate the results of their work and gather market views.

However, if the test is prematurely stopped due to regulatory issues discovered during the test, an exit plan should be implemented. The exit plan may involve ceasing the offering of services/products and taking actions to protect clients and address any harm caused to them.

V. Organizational structure considerations

The FinTech team is typically placed in a separate division within the regulator, necessitating changes in the regulator's organizational structure. For example, the team can be part of the payment or regulatory department, or it can be established as a separate department directly reporting to the Chief Executive Officer.

Given that the objective of the FinTech team is to promote innovative products and services, which can often be challenging within a conventional regulator, it is crucial to provide the team with clear objectives and mandates. The status of the new team should also be reinforced directly by the regulator's management.

Depending on the priority given to promoting innovation and the availability of financial resources, the FinTech team may either form a single sandbox division or two divisions:

1. Sandbox division: Responsible for the authorization and supervision of sandbox participants.
2. Innovation policy division: Formulates regulatory policy on innovations based on observations made during the regulatory sandbox tests.

The number of staff members may vary, but typically having three to five team members should be sufficient. Additionally, considering the size of the market, the regulator should consider establishing a committee with representatives from various departments within the organization to operate the sandbox. This committee can include representatives from legal, authorizations, supervision, and IT departments to ensure comprehensive coverage of all aspects of the sandbox.

Usually, regulators cannot allocate significant financial and human resources to the regulatory sandbox division. As a result, the sandbox team often consists of junior-level experts who are willing to participate in innovative regimes. However, operating a regulatory sandbox requires extensive knowledge in the regulatory field (authorization and supervision) as well as innovative technologies and business models. Thus, regulatory sandbox teams often lack the necessary expertise and knowledge to fulfill their functions.

Therefore, the FinTech division should receive continuous support from other departments within the regulator in reviewing applications and supervising sandbox participants. When the sandbox division lacks expertise in specific areas (e.g., crypto or crowdfunding spheres), a special committee consisting of regulatory and industry experts can be established, or external experts can be engaged on an ad hoc basis.

In terms of resources required to operate a sandbox, the majority of costs are related to salaries, which vary from country to country and are difficult to estimate accurately.

Internal processes should be clearly defined, and responsibilities should distribute between team members according to their knowledge and skills. To ensure smooth operation of the sandbox each sandbox employee should understand its responsibilities and functions.

To enhance flexibility, it is encouraged to develop internal manuals based on the review and supervision of several sandbox participants.

The following organizational structure scheme can be used to run the sandbox:

Table 1: Organizational structure scheme to run the sandbox.

№	Stage	Responsible division
1	Pre-application	Provided an extensive explanation of the evaluation processes of sandbox pre-applications, sandbox division employees (one or two employees may be sufficient) may determine whether the applicant meets eligibility criteria.
2	Full application	Reviewing applications and supervising innovative activities requires extensive knowledge of innovative technologies and business models. An internal committee of different departments of the regulator and external experts can be engaged in review and supervision processes. Certain regulators may wish to hire additional employees to the regulatory sandbox with specific knowledge, such as cybersecurity or cryptocurrency experts. Employment of experts should help increase the quality review of applications and develop corresponding legislative amendments. Following the application review, the authorization committee may recommend to the CEO of the regulator whether to accept/reject applications to the regulatory sandbox. Based on the recommendations, the CEO makes the final decision and issues the licence and licence conditions.
3	Supervision	
4	Review and evaluation	Review and evaluation can be divided into two stages. The first stage includes the development of a lessons learnt report. The report may consist from: - overview of participants (firm types, activities, region); - impact on the market resulting from the tests; - limitations and possible ways to overcome them; - recommendations on the enhancement of internal sandbox processes. The participating sandbox firms and the regulator's sandbox division are responsible for developing the lessons learnt report. The second stage on review and evaluation is the development of legislation to the regulatory framework. The regulatory framework can be developed in-house utilizing human resources from policy and/or sandbox divisions or through hiring external law firms or regulatory experts.

VI. Legal issues considerations

Regulatory sandboxes are typically established by central banks as a means to promoting competition, building trust in the financial sector, and protecting consumers. Based on interviews with regulators, these objectives are deemed sufficient to launch sandboxes in their jurisdictions.

Under the general legal powers to foster competition and confidence in the financial sector, regulators develop specific guidelines or rules that outline the objectives and principles of the sandbox. These guidelines also provide general information to applicants about the application process, entry requirements, and other relevant details.

To foster the development of FinTech and CBDC projects, the MMA is considering the introduction of regulatory sandboxes within its jurisdiction. As part of this initiative, existing legislation in the Maldives has been reviewed to understand the legal basis for introducing special regulatory testing regimes.

The Maldives Monetary Authority Act of 1981 is a high-level legislation that outlines the primary functions, objectives, and powers of the MMA in regulating the Maldives' financial sector, excluding capital markets. The primary objectives of the MMA are to maintain price and financial stability and support the government in achieving macroeconomic stability and economic growth.

The MMA has the authority to:

1. carry out development projects to develop the financial sector and promote financial inclusion, requiring participation from all financial institutions (excluding those regulated by the securities regulator).
2. issue regulations, circulars, and memorandums regarding licensing requirements, standards, licensing conditions, and prudential requirements that apply to all financial institutions (excluding those regulated by the securities regulator).
3. make decisions concerning individual cases or circumstances and issue corresponding instructions.

Under the Maldives Banking Act, the MMA can establish banking policies to foster competition in the Maldives banking system and ensure its responsiveness to the public's needs. The regulator also has the power to issue licenses with conditions.

Other legal acts, such as the National Payment System Act, explicitly outline the MMA's functions to add, modify, and waive any license conditions, enabling the authority to exercise its regulatory powers and instruments broadly.

Considering the above legislations, the existing provisions in the Maldives' financial legislation are sufficient to launch and operate FinTech and CBDC regulatory sandboxes. At this stage, the MMA may issue new guidelines or legislative acts to outline its approach to the regulatory sandbox and its functioning. These guidelines can cover aspects such as the target audience, eligibility criteria, application submission and review processes, supervision, and exiting the sandbox. Furthermore, regulations for CBDCs, digital assets (cryptocurrencies) as payment tools, and other FinTech activities can be developed following subsequent testing within the regulatory sandbox.

VII. Recommendations

The financial sector is rapidly evolving and transforming due to technological advancements and changing consumer preferences. Online financial services are gaining popularity, and traditional cash transactions are being replaced by digital forms of payment, such as e-money and mobile payments. Additionally, new forms of money, including cryptocurrencies and CBDCs, have emerged.

New FinTech services offer significant cost reduction, efficiency, and promote extensive financial inclusion. Regulators, recognizing the value of these innovations, are taking unprecedented approaches by establishing innovation hubs, launching regulatory sandboxes, enacting specific FinTech legislation, and developing technological platforms for CBDCs.

Against this backdrop, the following recommendations are proposed to the MMA and other government authorities in the Maldives to advance CBDC and other FinTech services/products:

1. With the primary objective of developing CBDCs, a logical first step for the MMA is to establish a regulatory sandbox for testing these new financial instruments.
2. The MMA needs to review its existing legislation and regulations to determine their suitability for CBDC testing, considering whether amendments or updates are necessary.
3. Given the potential risks associated with testing CBDCs, the MMA could choose to restrict participation to licensed market players during the initial testing phase. The MMA should also establish unified criteria for participants to streamline the authorization process for accepting firms in CBDC tests. This approach would provide greater assurance of regulatory compliance and help reduce risks associated with testing new financial products.
4. Based on the size of the market, the MMA may consider accepting applications for the regulatory sandbox on a rolling basis rather than using a cohort model.
5. The application process should be divided into two stages: a pre-application stage containing only eligibility criteria and essential information on the applicant, followed by an extensive full application stage.
6. The authorization process for regulatory sandboxes should be based on the applicant's risk profile, which will also serve as the primary basis for ongoing supervision of licensed sandbox firms.
7. The regulatory sandbox testing phase should be guided by a testing plan that outlines the main milestones, including regulatory ones, to be achieved throughout the testing period. Applicants typically develop the testing plan based on their specific needs, taking into account factors such as the nature of the product or service being tested, the target market, the regulatory environment, and available resources.
8. Following the conclusion of testing, a comprehensive evaluation should be conducted. The evaluation report should cover essential information on the firm, provide recommendations on the procedural regulatory sandbox processes, and propose amendments to the regulatory framework, if necessary.
9. Considering that the FinTech team's objective of promoting innovative products/services can be challenging, the team should be given clear objectives and mandates, with the new team's status directly reinforced by the regulator's management. Additionally, the FinTech division should receive continuous assistance from other regulatory departments in reviewing applications and supervising sandbox participants.
10. Since innovations operate across sectors, a regulatory sandbox should be open to all financial firms, except for capital markets firms, which fall outside the MMA's competence. It may be worth considering the MMA's participation in the Global Financial Innovation Network (GFIN) to collaborate with other regulators and stay updated with global best practices and regulatory standards.
11. Given that CBDCs and digital assets often operate across multiple sectors, it may be beneficial for the MMA to consider establishing a joint regulatory sandbox with the capital markets regulator in the Maldives. This would facilitate collaboration between regulators and ensure that innovative products and services are tested in a controlled environment.

Annex 1:

Table 2 sets out the factors to be considered by the sandbox authorization team, in assessing the risk profile of the sandbox firm and the firm's business model.

Table 2: Risk profile

Risk category	Risk group	Risk elements
Business Risk	Business and Strategic Risks	- Strategy - Nature of business - Products/services - Customers - Sources of business/ distribution
	Group and Organisation	- Clarity of legal ownership/structure - Controllers/close links/Group entities - Relationship with rest of Group
	Financial Risks	- Capital adequacy - Liquidity - Profitability and Viability - Credit Risk - Market Risk - Underwriting Risk
	Financial crime risks	- AML risks - CFT risks - Sanctions compliance - Fraud risk
Environmental or external risks	External Risks	- Political/ - Geo-political Economic risk - Disaster or catastrophe risks
	Regulatory and Legal Risks:	- Relationship with regulators - Coverage of home state supervision

		- Litigation risk - Tax policies - Data protection
Technology		- Technology platform - Memory storage - Reliability - System governance and audit trail systems - Cyber risk - Business continuity and - disaster recovery - Outsourcing risk
Business Conduct risks	Risks to Clients and Markets	- Compliance with conduct of business rules - Suitability and appropriateness - Fair dealing - Disclosures - Complaints handling and dispute resolution - Training - Remuneration - Conflicts management
Governance, risk management and compliance	Governance risks	- Board - Senior management - Internal controls - Internal audit - Reporting, documentation
	Management	- Senior management responsibilities – allocation and definition - HR policies and remuneration issues

	Risk management	- Risk management framework- ERM - Internal audit - Financial control - IT management information - Outsourcing - Professional advisors - Crime risk - Business continuity planning
	Compliance	- Compliance framework – structure, policies and procedures - Systems and controls - Compliance monitoring