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REGULATORY SANDBOXES AS CATALYSTS FOR FINTECH INNOVATION: EVALUATING THE IMPACT ON START-UP SUCCESS AND POLICY EVOLUTION

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ABSTRACT

Objective: Regulatory sandboxes have become a global instrument for managing the complexity of FinTech innovation while maintaining regulatory stability. This study aims to comprehensively evaluate regulatory sandboxes as a crucial policy innovation instrument in the FinTech landscape.

Research Design & Methods: This study adopts a qualitative methodology, combining an extensive literature review and comparative case studies. Data was collected from various sources, including legal documents, regulations from the OJK and Bank Indonesia in Indonesia, reports from global authorities such as the UK's FCA, and academic journal articles.

Findings: The study's results show that sandboxes are significantly positively correlated with the success of FinTech startups. Participation in sandboxes is associated with a 15% increase in capital raised and a 50% higher probability of fundraising. These benefits arise through reduced information asymmetry and regulatory costs, which particularly help smaller and younger companies. Additionally, sandboxes facilitate critical two-way dialogue between innovators and regulators, accelerate time to market, encourage competition, and contribute to banking stability.

Implications & Recommendations: Research confirms that sandboxes are valuable but not a silver bullet. The effectiveness of sandboxes depends on strategic design, resource support, and regulatory integration. Therefore, regulators need to encourage the adoption of adaptive regulatory approaches, adequate funding, and cross-jurisdictional cooperation.

Contribution & Value Added: This study presents a holistic evaluation that affirms the benefits while critiquing the limitations of sandboxes. It combines a global perspective and analysis of Indonesian regulations to provide evidence-based insights and practical recommendations for optimizing sandboxes as responsible and sustainable innovation drivers.

Keywords: Regulatory Sandbox, Financial Technology, Financial Innovation, Financial Regulation.

JEL codes: G20, G32, O33.

Article type: research paper

INTRODUCTION

The Fourth Industrial Revolution, triggered by information and communication technology advances, has brought a new paradigm to the financial sector, fundamentally changing the way financial services are provided (Alidha et al., 2024). This era is marked by the convergence of innovative business models that often fall outside conventional frameworks, triggering profound structural changes in the financial industry. The emergence of Financial Technology (FinTech), which encompasses a wide range of innovations from digital payment systems, peer-to-peer lending, to blockchain technology and artificial intelligence, has been widely recognized for its capacity to enhance financial development, inclusion, and efficiency, both at the domestic and global levels (APEC Economic Committee, 2021). FinTech offers increased access to financial services for previously underserved segments of the population, reduces transaction costs, and improves the speed and convenience of financial services (Tsakila et al., 2024). However, behind this transformative potential lies a series of unprecedented, complex challenges for regulatory authorities.

The rapid growth of FinTech presents new challenges for regulators, particularly in relation to data privacy, consumer protection, and operational risk (Judijanto et al., 2024). Innovative FinTech business models often operate in a regulatory gray area, where existing legal and regulatory frameworks struggle to adapt to the rapid pace of technological innovation (Asnawi, 2022). This phenomenon reflects the existence of unavoidable regulatory gaps, where existing regulations quickly become outdated or insufficient for emerging technologies. For example, many FinTech activities are not adequately covered by existing laws, requiring urgent adaptation of the legal and regulatory framework (Suryadarma and Faqih, 2024). This regulatory uncertainty creates significant barriers to the commercialization of new services, hinders innovation, and has the potential to cause systemic risk if not managed properly (Alaassar et al., 2023; Bagby and Reitter, 2019). Regulators are confronted with the dilemma of encouraging beneficial innovation without compromising financial system stability, market integrity, and consumer protection. Concerns have been raised about the potential for increased consumer vulnerability to cyber risks, data misuse, and unethical business practices, particularly for vulnerable population groups who may lack digital skills (Mapuranga, 2024). Furthermore, there is a risk of market distortion if new innovators do not have a clear path to regulatory compliance, while incumbents may feel intimidated by the changing regulatory landscape (Makarim and Mahardika, 2020).

Responding to dynamic changes and difficulties caused by strict regulations, governments around the world have actively implemented FinTech support policies, including the introduction of regulatory sandbox programs (Zetzsche et al., 2017). A regulatory sandbox is defined as a framework that allows private companies to test innovations (new products, technologies, or business models) on a small scale and directly in a controlled environment under regulatory supervision (Baskoro, 2024a). This concept, pioneered by the UK Financial Conduct Authority (FCA) in 2015, serves as an important bridge to address this regulatory gap. It is not just about enabling innovation, but also proactively managing regulatory gaps, preventing innovative ideas from being stifled by unresponsive legal frameworks, and providing regulators with crucial early exposure to new technologies and business models (Fáykiss et al., 2018). By providing a secure and time-limited testing environment, sandboxes enable companies to bring new products to market quickly and with lower risk, while giving regulators the opportunity to closely monitor the opportunities and risks associated with innovation (Jeník and Duff, 2020).

This approach marks a fundamental shift from reactive oversight to proactive regulatory learning. Traditionally, regulators often react to market developments or failures by imposing new rules. However, sandboxes represent a paradigm shift toward active learning, where regulators have the opportunity to improve related programs and regulations based on the results of testing (Ranchordas and Vinci, 2024). Sandboxes generate practical insights into the regulatory and supervisory frameworks appropriate for promoting innovation, enabling regulators to base their regulatory responses to innovation on the results of direct experimentation (Handoko et al., 2025).

This represents a shift from a static, prescriptive regulatory model to a dynamic, evidence-based, iterative process.

Sandboxes serve as learning laboratories for regulators, enabling them to build capacity and knowledge within regulatory institutions about FinTech trends and innovations, as well as to revise and shape regulatory and supervisory frameworks with agility (Jeník and Lauer, 2017). This evolution in regulatory philosophy is essential to remain relevant and effective in a rapidly changing digital economy, ensuring that innovation can flourish without compromising consumer protection and financial stability (Pratista, 2025). Although regulatory sandboxes have been widely adopted in more than 60 jurisdictions around the world, including Indonesia, their effectiveness and impact on the success of FinTech startups still require in-depth and comprehensive evaluation.

This study aims to provide an expert evaluation of regulatory sandboxes as a policy innovation tool, with a particular focus on their impact on the success of FinTech startups. This study explores the role of sandboxes in strengthening consumer protection and promoting financial inclusion, as well as their impact on banking stability, particularly in the Indonesian context. It will also identify and discuss the challenges, limitations, and criticisms inherent in the implementation of regulatory sandboxes. By drawing lessons from global experiences and focusing on the Indonesian context, this study contributes to a more nuanced understanding of the role of regulatory sandboxes in the complex FinTech ecosystem. The main contribution of this study is to present a holistic analysis that not only highlights the benefits of sandboxes but also their limitations, as well as proposing complementary approaches and future directions to maximize the potential of responsible.

The structure of this report is as follows. Section II, literature review, will present a comprehensive review of the literature on the definition, objectives, design principles, and global perspectives on regulatory sandboxes, including the framework in Indonesia. Section III, research methods, will describe the research methods used, namely a qualitative approach with a literature review and case study model. Section IV will present the research results, detailing the positive impact of regulatory sandboxes on the success of FinTech startups, supported by case studies and empirical data. Section V will discuss in detail the challenges, limitations, and criticisms of regulatory sandboxes, as well as propose complementary approaches and future directions for FinTech regulation. Finally, Section VI will present the conclusions of this research, summarizing the main findings and policy implications.

LITERATURE REVIEW

Definition and Purpose of Regulatory Sandbox

A regulatory sandbox is a framework established by financial sector regulators to enable the testing of innovations in products, technologies, and new business models on a small scale and directly by private companies in a controlled environment under regulatory supervision (Wijaya, 2023). This concept was first developed by the UK Financial Conduct Authority (FCA) in November 2015, which then became a global precedent (Mapuranga, 2024). The core objective of the regulatory sandbox is to balance the drive for innovation with maintaining financial stability and consumer protection (Yu, 2022). Specifically, the sandbox aims to foster new industries, encourage innovation, and promote competition and efficiency in the financial services market by reducing innovation costs and barriers to entry. In addition, the sandbox facilitates regulatory learning and adaptation, providing insights into how new innovations work for evidence-based decision making (Fáykiss et al., 2018). This ensures consumer protection and risk mitigation by identifying potential risks at an early stage, as well as promoting financial inclusion through innovations that benefit underserved customers (Jeník and Duff, 2020).

Main Design Principles

The regulatory sandbox design reflects efforts to create an environment that enables innovation while maintaining oversight and risk mitigation (Ringe and Ruof, 2020). The main principles include a controlled environment with defined limits (e.g., number of customers or transaction value); time-limited testing with varying durations across jurisdictions (e.g., up to 12 months in Japan, 6 months in Saudi Arabia, and 1 year in Indonesia's OJK) (Marangwanda et al., 2025); flexibility or temporary regulatory exemptions from standard requirements to reduce compliance burdens; active oversight and monitoring by regulators; and clear entry and exit criteria for participation and testing results (Zetzsche et al., 2017). These principles make sandboxes a mechanism for regulatory experimentation and evidence-based policymaking, where regulators collect real-world data to inform broader regulatory development (Yu, 2022).

Global Perspective and Indonesian Context

More than 60 jurisdictions around the world have announced regulatory sandboxes, with more than 50 central banks implementing the concept. The Bahamian Sand Dollar, for example, is a prominent example of the implementation of a retail CBDC, highlighting the potential of digital currencies to support financial inclusion and address monetary policy challenges (Wenker, 2022). Similarly, the People's Bank of China has been proactively developing Digital Currency/Electronic Payment (DCEP), commonly referred to as Digital Yuan (Buckley et al., 2021). Exploring regulatory and technical frameworks in this sandbox allows central banks to address operational challenges and regulatory implications associated with digital currencies (Boakye-Adjei et al., 2023). The adoption of CBDCs by central banks often focuses on improving domestic payment systems and providing broader financial services, especially in developing regions where financial exclusion is an ongoing problem (Nawaz et al., 2024).

Furthermore, regulatory sandboxes provide a path for central banks to refine their approach to cybersecurity, privacy, and cross-border interoperability of digital currencies, which are important considerations given the widespread nature of digital transactions and the potential for cross-border financial activity (Kumar et al., 2024). The implementation of sandboxes shows diversity in their design and operation, reflecting unique local market needs, such as broad FinTech coverage (payment systems, insurance, crowdfunding, etc.), variations in real customer participation (permitted in most jurisdictions, but with exceptions such as Indonesia and Russia initially), and differences in regulatory leniency (Lawrence et al., 2019). The importance of a goal-oriented approach is emphasized, as the success of sandboxes depends heavily on how their frameworks are structured and on market conditions.

In Indonesia, there is a unique dual regulatory system whereby Bank Indonesia (BI) regulates FinTech related to payment systems, while the Financial Services Authority (OJK) oversees FinTech related to lending and other financial services (Lawrence et al., 2019). This dualism extends to each regulatory sandbox, with different focuses and operational mechanisms. The OJK sandbox (based on POJK 3/2024 and POJK 13/2018) aims to test and develop innovations, ensure regulatory compliance, and serve as a filter for digital financial innovations (Abdurrahman, 2024). Innovations must be relevant to the financial sector, offer new solutions, provide benefits, be ready for testing, and require regulatory oversight. The maximum testing period is one year, with results classified as Pass or Fail. Since 2018, OJK has received 458 applications and simplified the FinTech cluster into innovative credit scoring and aggregators. Meanwhile, the BI sandbox (based on PADG 19/14/2017 and PBI 19/12/2017) is a limited testing environment for Financial Technology Providers and their products/services, with a focus on payment systems (Bank Indonesia, 2017). The aim is to encourage innovation while upholding consumer protection and risk management. The maximum trial period is 12 months, with the results being Successful, Unsuccessful, or another status (Bank Indonesia, 2017). In 2021, BI introduced Sandbox 2.0. Although sandboxes globally are intended to enable testing where existing regulations may not fully apply, the Indonesian model appears to define success primarily through compliance with the existing regulatory framework.

METHODS

This study adopts a qualitative approach to evaluate the impact of regulatory sandboxes on the success of FinTech startups. Qualitative methods were chosen because they allow for in-depth exploration of complex phenomena such as regulatory innovation and its impact on the business ecosystem, which cannot be fully measured quantitatively. This approach enables researchers to understand the nuances, context, and interactions between various actors in the FinTech and regulatory ecosystems. The research design combines two main methods: literature review and case study. A comprehensive literature review was conducted to collect, analyze, and synthesize information from various relevant scientific and policy sources. Data was collected from legal documents, regulations, previous research reports, indexed journal articles, reports from regulatory bodies (such as the OJK, Bank Indonesia, the UK Financial Conduct Authority (FCA), the Monetary Authority of Singapore (MAS), and the Saudi Central Bank (SAMA)), and publications from international organizations (such as the Bank for International Settlements (BIS), the World Bank, and CGAP). This data collection process ensures a broad and in-depth coverage of the regulatory sandbox concept, its global implementation, objectives, design principles, as well as its challenges and successes. Emphasis is placed on indexed journal articles to ensure the quality and validity of the information used.

A case study approach was used to analyze the specific implementation of regulatory sandboxes in certain jurisdictions, with a focus on Indonesia, as well as several successful case examples from other countries. These case studies allowed researchers to identify patterns, trends, and contextual factors that influence the impact of regulatory sandboxes on FinTech startups. For example, an analysis of the OJK and Bank Indonesia frameworks in Indonesia provides a deep understanding of regulatory dualism and its implications for innovation. Successful case studies such as WorldRemit in Malaysia and ADDX in Singapore, as well as general findings from the UK sandbox, provide empirical evidence of how sandboxes can facilitate access to funding, accelerate time to market, and enhance credibility.

Data analysis was conducted using a thematic and comparative approach. Data from the literature review were analyzed to identify key themes related to the definition, objectives, principles, benefits, and challenges of regulatory sandboxes. Comparative analysis was conducted to compare sandbox models across jurisdictions, highlighting similarities and differences in design, operations, and regulatory philosophy. This approach enabled the identification of best practices and areas for improvement. Additionally, policy analysis was conducted to evaluate how regulatory sandboxes function as policy innovation tools, as well as how they interact with broader regulatory frameworks. By integrating findings from the literature review and case studies, this research aims to present a holistic and evidence-based evaluation of the impact of regulatory sandboxes on the success of FinTech startups, as well as relevant policy implications.

RESULT

Regulatory sandboxes have demonstrated significant and diverse impacts on the success of FinTech startups, facilitating their growth within a regulated environment. These impacts are not limited to the sandbox participants themselves but also create positive ripple effects throughout the FinTech ecosystem.

Accelerated Time to Market Entry

One of the most immediate benefits of regulatory sandboxes is their ability to enable companies to bring innovations to market more quickly and with lower risk. Sandboxes accelerate go-to-market experimentation by providing a controlled testing environment where startups can test their products or services on a limited scale without having to immediately comply with all of the stringent regulatory requirements (Otoritas Jasa Keuangan, 2024). This streamlines the authorization process and potentially delays the significant upfront time and costs of full licensing

and registration until the innovation's commercial viability is confirmed. For FinTech startups, often with limited resources and pressure to scale quickly, reducing this initial barrier is crucial. They can identify and fix product and business model weaknesses in a secure environment before mass rollout, thereby reducing the risk of post-launch failure (Zetzsche et al., 2017).

A concrete example of the effectiveness of a regulatory sandbox is seen in the case of WorldRemit in Malaysia, which leveraged Bank Negara Malaysia's pilot framework to test its cross-border digital remittance service (Fenwick et al., 2018). Through this sandbox, WorldRemit can validate transaction security systems, ensure compliance with Anti-Money Laundering/Combating the Financing of Terrorism (AML/CFT) regulations, and test interoperability with local banking partners without first having to meet full licensing requirements. This approach significantly shortens the service's launch time from more than a year to just a few months (WorldRemit, 2017).

Similar efficiencies are also reflected in research showing that the sandbox run by the Insurance Regulatory and Development Authority of India (IRDAI) can accelerate the evaluation process for digital insurance innovations by up to 40% compared to the regular pathway. This acceleration is possible because companies can conduct live trials in limited markets while receiving real-time feedback from regulators, thereby reducing product iteration cycles and accelerating adaptation to market needs (Raut and Raut, 2024). Similarly, sandbox participation can reduce regulatory uncertainty, which is often a major obstacle for startups. This reduced uncertainty not only accelerates time to market but also increases investor confidence, thus facilitating access to the funding needed for rapid product expansion (Cornelli et al., 2020b). Thus, the regulatory sandbox serves as an accelerated path for FinTech innovation by combining safe market trials, efficient validation processes, and early regulatory engagement, enabling startups to commercialize their products in a shorter time while ensuring regulatory compliance and increased competitiveness in the market.

Improving Access to Funding

The impact of regulatory sandboxes extends to the economic domain, directly affecting startups' ability to obtain funding (Zetzsche et al., 2017). A study focusing on sandboxes pioneered by the Financial Conduct Authority (FCA) in the UK found strong empirical evidence. Participation in sandboxes was associated with a 50% increase in the probability of startups obtaining funding and an average increase of 15% in the amount of funding successfully raised (Cornelli et al., 2020a). This increase is particularly noticeable in the first eight quarters after a startup enters the sandbox. This increase in funding is triggered by a mechanism known as the quality signal or filtering effect. When a startup is accepted into the sandbox, this action serves as a form of validation or certification from the regulator, a credible and trusted entity. This validation fundamentally reduces information asymmetry between startups and investors, as well as regulatory risk in the eyes of venture capital investors (Cornelli et al., 2020a). Investors who previously had no connection or who were based overseas, who tended to face greater information friction, benefited greatly from this signal.

Empirical evidence from a study comparing nine countries that have adopted regulatory sandboxes shows a positive impact on fintech venture investment growth. Regulatory sandboxes can play an important role by reducing regulatory uncertainty, which is often a major barrier to venture capital inflows. As a result, this regulatory framework not only promotes the fintech ecosystem but also creates an attractive environment for investment (Goo and Heo, 2020). Furthermore, regulatory sandboxes are seen as part of a broader strategy, such as RegTech, to encourage a smooth transition between innovation and regulation. Regulatory sandboxes can provide a light regulatory environment, allowing fintech companies to operate with less regulatory burden while maintaining the necessary protections for consumers and the financial system. This approach facilitates sustainable growth and encourages more players to enter the fintech sector (Tsai and Peng, 2017).

The positive effect on capital raised is particularly noticeable for smaller and younger companies, which are typically more vulnerable to information friction (Cornelli et al., 2020a). This

also attracts first-time investors and international investors, who may face greater information asymmetry due to geographical distance or lack of prior relationships. In addition, acceptance into the sandbox enhances the company's credibility in the eyes of investors and customers, serving as a strong signal of legitimacy and risk reduction for startups (Hellmann et al., 2022). This seal of approval can significantly enhance a startup's reputation, attracting not only capital but also talent, strategic partners, and early adopters, all of which are essential for accelerating growth and achieving long-term success.

Improving Regulatory Clarity and Dialogue

Regulatory sandboxes play an important role in simplifying the navigation of complex financial regulations for FinTech innovators. This environment provides crucial clarity and guidance (Makarim and Mahardika, 2020). Offering a structured framework for experimentation, sandboxes reduce regulatory uncertainty and enable innovators to address regulatory shortcomings before their products come under full scrutiny (Baskoro, 2024b). A structured framework effectively helps companies understand how their innovations fit within the existing regulatory framework (Abdurrahman, 2024). For example, in Malaysia, Bank Negara Malaysia (BNM) allowed WorldRemit to implement remote customer identification technology after successful sandbox testing, and then developed e-KYC guidelines for other providers (UNSGSA, 2018). Successful testing in the sandbox can result in full or tailored authorization for the innovation, or even changes to existing regulations.

Indonesian Financial Services Authority (OJK), through POJK 3/2024, specifically allows participants to request temporary regulatory relief during testing if necessary (Conventus Law, 2024; Hamada et al., 2024). A significant impact of regulatory sandboxes is their ability to substantially reduce innovation costs and barriers to entry for new financial products and business models. These benefits are particularly felt by smaller and younger companies, which often face more severe information friction and lack the resources to navigate complex regulatory landscapes. A study of sandboxes in the UK shows a 15% increase in capital raising and a 50% higher probability of obtaining funding for companies entering the sandbox (Cornelli et al., 2020a). This improvement is associated with reduced information asymmetry and regulatory costs. In addition, sandboxes accelerate the go-to-market process for innovations, as they can defer the time and initial costs of licensing until the commercial viability of the innovation is confirmed.

The increase in funding and survival rates for companies participating in the sandbox, especially small and new companies, shows that the sandbox serves as a powerful market signaling mechanism. Its value lies not only in temporary regulatory relief but also in the credibility and validation provided by regulatory oversight, which in turn reduces information asymmetry and lowers risk perception in the eyes of investors, including foreign investors. Thus, sandboxes are not only instruments of regulatory compliance but also influence investor confidence and market dynamics. While offering calibrated regulatory flexibility, the sandbox is still equipped with strict safeguards to protect consumers and maintain financial system stability. The success of this scheme depends heavily on the regulator's ability to define a controlled testing environment and enforce safeguards consistently, ensuring that the flexibility provided does not turn into a dangerous loophole.

Encouraging Innovation and Competition

Regulatory sandboxes have become an increasingly important policy tool for promoting innovation and competition in the financial technology sector (Gumbo and Chude-Okonkwo, 2025). The regulatory sandbox concept provides space for startups to test their innovative products and services in a controlled environment with certain regulatory relaxations (Just et al., 2024). This approach allows startups to develop financial technology solutions without being burdened by complex regulatory compliance in the early stages of development (Ford and Ashkenazy, 2024).

The implementation of regulatory sandboxes has significantly influenced the dynamics of the fintech industry by creating an environment conducive to innovation (Goo and Heo, 2020). The incubation model through regulatory sandboxes offers a new approach to supporting the

development of fintech startups, where companies can experiment with new technologies while remaining within an adequate supervisory framework (Alaassar et al., 2021). This enables the creation of an innovation ecosystem that balances the need to encourage creativity with the need to maintain financial stability.

From a competitive perspective, regulatory sandboxes act as catalysts that encourage healthy competition among industry players (Just et al., 2024). The existence of sandboxes provides small startups with the same opportunities to compete with established financial institutions, thereby creating a more dynamic and innovative competitive landscape. A guided sandbox regulatory approach, as proposed in the context of the European Union, can optimize the balance between innovation and consumer protection (Ringe and Ruof, 2020).

The success of regulatory sandboxes in encouraging startup innovation lies not only in the technical aspects of regulation but also in their ability to create a culture of sustainable innovation. The discursive diffusion of the regulatory sandbox concept has opened up new business opportunities and changed the industry's perspective on financial innovation (Just et al., 2024). As such, regulatory sandboxes serve as a frontier for innovation and sustainability in the startup ecosystem, contributing significantly to the overall development of the financial technology industry (Gumbo and Chude-Okonkwo, 2025).

Enhanced Consumer Protection and Risk Mitigation

The actual objectives of Regulatory Sandbox differ from country to country, but the concept remains largely the same, such as reducing legal uncertainty for consumers, increasing investment flows, and creating new rules for new business models (Novianto, 2024). Indonesia has adopted the Regulatory Sandbox concept to harmonize market regulations in Financial Technology, which has been facilitated by various innovations. Bank Indonesia (BI), through Bank Indonesia Regulation (PBI) No. 19/12/PBI/2017 on the Implementation of Financial Technology, and reinforced by Bank Indonesia Board of Governors Regulation (PADG) No. 19/14/PADG/2017, has initiated a Limited Testing Environment or Regulatory Sandbox mechanism. A year later, OJK issued Financial Services Authority Regulation (POJK) Number 13/POJK.02/2018 concerning Digital Financial Innovation in the Financial Services Sector, which also covers norms related to the Regulatory Sandbox. OJK also regulates a regulatory sandbox based on the differences in types of fintech supervised by BI and OJK. The types of fintech under BI supervision are those related to payment systems, such as digital payment fintech. Meanwhile, the types of fintech under OJK supervision are those related to the provision of financial services, such as equity crowdfunding fintech and peer-to-peer lending (P2P Lending) fintech.

The legal definition of a regulatory sandbox, according to Article 1 point (4) of POJK Number 13/POJK.02/2018, is a testing mechanism carried out to assess the familiarity of business processes, business models, financial instruments, and the governance of operators. Meanwhile, under Article 1(4) of PBI No. 19/12/PBI/2017, a regulatory sandbox is a limited and secure testing environment for evaluating the implementation of financial technology, along with its products, services, technology, and/or business models. Fintech companies wishing to operate in Indonesia must first undergo a regulatory sandbox mechanism. The issuance of the above regulations takes into account several factors: (1) High levels of digital financial innovation need to be controlled and managed in order to successfully provide maximum assistance to the Indonesian people, (2) the impact of digital financial innovation on the traditional financial sector, (3) the use of digital technology in financial development needs to be regulated to foster financial innovation and sound risk mitigation plans, (4) Optimizing the benefits of digital financial innovation for Indonesians also guarantees consumer rights and data protection.

The implementation of regulatory sandboxes in equity crowdfunding systems is an important tool for mitigating risk and protecting consumers from potential illegal fintech practices. OJK, as the regulator, uses sandboxes to select and test platforms before granting them operating licenses, in accordance with SEOJK No. 21/SEOJK.02/2019. This mechanism includes a series of

stages: registration and designation as a prototype, presentation of business models and risk management, scenario testing, and a testing and trial phase lasting a maximum of one year (which can be extended by six months). During the trial period, companies can continue to operate as long as they do not harm consumers and comply with OJK regulations. The final stage involves evaluation and improvement, where the OJK makes a decision: recommended for business licensing, requires improvements with additional time, or not recommended. Through this process, the sandbox serves as a regulatory filter ensuring only viable and safe business models can develop, while also guaranteeing legal certainty and consumer protection in the fintech sector.

Broader Impact and International Perspective

Regulatory sandboxes have become a global phenomenon that has had a significant impact on the startup ecosystem in various countries (Kálmán, 2025). A comparative approach between countries such as the United Kingdom, Singapore, and Hungary shows that the implementation of regulatory sandboxes has diverse characteristics in accordance with the regulatory context and market conditions of each country (Kálmán, 2025). Global experience gathered by the World Bank demonstrates that regulatory sandboxes have become a widely adopted policy instrument to encourage fintech innovation while maintaining financial system stability (World Bank, 2020).

The international perspective shows that the success of regulatory sandboxes in supporting startups is not limited to domestic impact, but also creates opportunities for strategic cross-border collaboration (Bromberg et al., 2018). Initiatives such as the collaboration between the Monetary Authority of Singapore (MAS) and the International Financial Services Centres Authority (IFSCA) in developing cross-border fintech innovation demonstrate the evolution of regulatory sandboxes towards a more internationally integrated approach. From the European Union's perspective, memorandums of understanding and agreements with third countries facilitate cross-border applications for sandboxes, build stronger relationships between countries, and enable the exchange of information on the impact of regulatory measures (McCarthy, 2023).

The broader impact of regulatory sandboxes on startups is also evident in the context of developing countries, where this instrument has helped overcome complex regulatory barriers (Thakur, 2024). A comparative study between developed and developing countries shows that regulatory sandboxes provide different benefits depending on the level of development of each country's financial system and regulatory infrastructure (Vijayagopal et al., 2024). The international perspective shows that regulatory sandboxes have become a catalyst in the formation of global standards for financial innovation, where a tripartite approach in the evolutionary game analysis of regulatory sandbox experiments creates complex yet beneficial dynamics for the development of the fintech ecosystem (Zheng and Wu, 2024).

Case Study of Success

The London-based money transfer service provider successfully tested its remote customer identification solution in the Bank Negara Malaysia (BNM) sandbox in May 2017 (WorldRemit, 2017; Zetzsche et al., 2017). WorldRemit's technology allows customers to remotely verify their identity via their mobile phone by sending a photo of themselves with their official ID (UNSGSA, 2018). Previously, this approach was not permitted by the legal and regulatory framework in Malaysia (Wechsler et al., 2018). Following successful testing, BNM allowed WorldRemit to implement the innovation, with the effect of expanding access to services in remote areas (WorldRemit, 2017).

As one of the early participants in the Monetary Authority of Singapore (MAS) sandbox in May 2019, the ADDX private market platform tested its blockchain technology directly (ADDX, 2020). With strong controls, the sandbox allows ADDX to test the viability of its technology at an early stage while mitigating the risks commonly associated with blockchain (Arner et al., 2020). As a sandbox graduate, ADDX continues to win the trust of customers around the world and has grown rapidly (ADDX, 2020). Through its sandbox experience, ADDX found key investors in Singapore Exchange (SGX) and Heliconia, and established partnerships with law firms and professional

services companies such as PwC Singapore ([Growbeansprout, 2025](#); [Hamilton Lane, 2021](#)). The company has anchored its product, engineering, and technology functions in Singapore, a strategic decision based on Singapore's strong governance, enabling digital infrastructure, and international FinTech cooperation agreements ([Buckley et al., 2020](#)).

Research shows that entering the UK sandbox is associated with higher fundraising probabilities, increased credibility with investors and customers, and positive effects on survival rates and patent activity for participating companies ([Cornelli et al., 2020a](#)). Globally, fully functional sandboxes exist in Hong Kong, China; Japan; Korea; Malaysia; Russia; Taipei, China; and Thailand ([APEC Economic Committee, 2021](#)). Some jurisdictions have strict time limits (e.g., Indonesia, Korea, Japan, Malaysia), while others, such as Hong Kong, China, and Singapore, do not have rigid time limits.

Table 1. The Main Impact of Regulatory Sandbox on FinTech Startups

Impact Area	Specific Benefits/Results	Supporting Evidence/Metrics
Market Entry	Accelerated time to market, reduced risk.	Enabling companies to bring innovations to market quickly and with lower risk (Jeník and Duff, 2020).
Funding Access	Significant capital increase (15% higher), probability of fundraising increased (50% higher).	A 15% increase in capital raised, the probability of fundraising increases by 50% (Cornelli et al., 2020b).
Regulatory Clarification	Clarity of regulatory direction, open dialogue with regulators.	Providing clarity and important guidance for navigating the complexities of financial regulation (InnReg, 2023).
Innovation & Competition	Encouraging new product development, expanding service coverage, and promoting competition.	Encouraging the development of new financial products, technologies, and business models, promoting competition and efficiency (Mapuranga, 2024).
Consumer Protection	Risk identification, solution adjustment, and appropriate protective measures.	Identify potential risks and impacts of policies prior to full-scale implementation (Mapuranga, 2024).
Financial Inclusion	Facilitating innovation for excluded/underserved customers.	Regulatory Sandbox plays an important role in promoting innovation that overcomes barriers to financial inclusion, a case study of WorldRemit in Malaysia (UNSGSA, 2018).
Banking Stability (Indonesia)	A positive and significant impact on banking stability, especially for small banks.	Has a positive and significant impact on banking stability (Mapuranga, 2024).

DISCUSSION

Although regulatory sandboxes have proven to be an effective tool in promoting innovation and the success of FinTech startups, their implementation is not without challenges, limitations, and criticisms that must be acknowledged and addressed to ensure their long-term effectiveness. This discussion will review these aspects in detail and propose complementary approaches and future directions to optimize the role of sandboxes in the regulatory ecosystem.

Challenges, Limitations, and Criticism of Regulatory Sandboxes

Regulatory sandboxes face a number of challenges that require serious attention. First, their implementation requires significant resources, both in terms of time and regulatory capacity. Limited resources can divert focus away from the development of a comprehensive legal framework, leading to suboptimal information exchange and delays in feedback. This makes sandboxes seem more formalistic, expensive, and intensive than alternative approaches, raising questions about the efficiency of regulatory resource allocation. In addition, the impact of sandboxes has not been proven to be universal, as their effectiveness is highly dependent on local factors such as the legal environment, regulatory framework, and level of openness to innovation in a jurisdiction. A model that is successful in one country may not necessarily be replicable in another without significant adjustments to the local context.

The sandbox isn't the only way to deal with the challenges of regulating innovation. There's a risk of misuse or mismanagement, which could make it just a symbolic program with no real impact. From a consumer protection point of view, innovation in the sandbox could also increase cyber risks and widen the digital divide, especially for vulnerable groups with limited tech skills. Additionally, sandboxes can distort the market if participants gain regulatory advantages that are not available to traditional providers or non-participants, thereby creating competitive inequality. Furthermore, the proliferation of cross-jurisdictional sandboxes without adequate coordination leads to global regulatory fragmentation. Differences in interpretation and procedures between countries actually hinder the international expansion of FinTech and reduce the benefits of regulatory cost reduction, which should be the main value of sandboxes.

In Indonesia, in particular, the sandbox approach tends to emphasize compliance with existing regulations rather than encourage the adaptation of new regulations. This compliance-first orientation can limit the emergence of disruptive innovations that challenge traditional regulatory paradigms. If the sandbox function is merely a compliance screening mechanism, its potential to encourage broader regulatory reform may be reduced. This risks creating a subtle form of regulatory entrapment, where innovation is directed only toward schemes approved by regulators, thereby inadvertently limiting the scope for more fundamental technological transformation.

Beyond the Sandbox: Complementary Approaches and Future Directions

The effectiveness of regulatory sandboxes cannot be separated from the broader regulatory framework that provides their operational context. Sandboxes will only function optimally if they are placed within a comprehensive and adaptive regulatory approach. Regulators need to think about other ways to manage innovation, like the test-and-learn approach seen in agent banking in Indonesia, Kenya, the Philippines, and Rwanda, where new ideas are tried out informally before getting formal approval. Additionally, more fundamental regulatory changes and broader policy reforms remain necessary to respond to the evolving dynamics of financial innovation. A wait-and-see strategy, which involves informally monitoring new trends before formal regulatory intervention, is also a relevant complementary instrument. Furthermore, regulators are establishing innovation centers, accelerators, and incubators as innovation facilitators to systematically strengthen the development of the FinTech ecosystem.

Furthermore, strategic integration and coordination are important aspects to ensure that the regulatory sandbox does not operate in isolation, but rather functions in synergy with other complementary instruments and programs. Regulators need to provide clear guidance on

fundamental drivers of innovation, such as the use of cloud computing, data protection, the implementation of tiered Know-Your-Customer (KYC) requirements, and the strengthening of open data access, which can expand opportunities for more industry players. The Indonesian context, which has dual authorities, namely Bank Indonesia (BI) and the Financial Services Authority (OJK), further underscores the urgency of sustained efforts to create a cohesive regulatory ecosystem for the development of FinTech within the scope of both authorities. Thus, the discussion on alternative sandboxes, the call for inter-agency coordination, and the emphasis on developing a fundamental regulatory framework collectively confirm that the effectiveness of FinTech regulation cannot depend on sandboxes alone. Instead, an ecosystem approach is needed that places sandboxes as one component in a broader, integrated, and layered set of policies, including innovation hubs, targeted legislative reforms, and international cooperation. This holistic perspective emphasizes that promoting innovation while maintaining financial stability is a complex challenge that requires a multi-dimensional strategy, rather than a single, stand-alone mechanism. The primary goal is to create a regulatory environment conducive to sustainable innovation, rather than merely testing individual products within a limited scope.

Promoting cross-border cooperation is crucial given the transnational nature of FinTech, which requires harmonization of international legal standards and collaboration between jurisdictions to minimize legal fragmentation and uncertainty. Formal mechanisms such as Memorandums of Understanding (MoU) and bilateral and multilateral cooperation agreements are important instruments for ensuring the eligibility of companies to participate in various sandboxes, either simultaneously or sequentially. Regional cooperation, especially in the area of payment systems, plays a strategic role in facilitating cross-border transactions while addressing key challenges related to consumer protection and data sovereignty.

Global initiatives such as the Global Financial Innovation Network (GFIN) and various international agreements initiated by the Monetary Authority of Singapore (MAS) are concrete responses to the need for cross-sandbox interoperability. This effort aims to reduce procedural duplication, improve efficiency, and provide legal certainty for industry players. Thus, cross-border collaboration not only expands opportunities for innovation but also marks a new stage in regulatory evolution, where seamless cross-jurisdictional testing and policy alignment are key prerequisites for supporting the sustainable growth of global FinTech.

The continuous evolution and adaptation of the regulatory framework is an important aspect in ensuring the long-term effectiveness of regulatory sandboxes. The concept of a sandbox itself is not static, but rather continues to evolve in line with technological dynamics and market needs. For example, Bank Negara Malaysia (BNM) has updated its sandbox framework to accelerate testing, while Bank Indonesia has initiated Sandbox 2.0 as an improvement on the previous model. This change emphasizes that sandboxes should be viewed as a means to achieve broader objectives, namely maintaining the relevance of regulations amid the acceleration of FinTech innovation, facilitating market competition, while ensuring consumer protection. With the rapid pace of technological development, regulators are required to apply the principle of regulatory agility, which involves the flexibility to evaluate, adapt, and update regulatory instruments to remain responsive to new challenges and opportunities. This necessitates a shift in the regulatory paradigm from rigid rules toward a more dynamic, repeatable, and learning-oriented framework.

Regulators need to allocate adequate capacity, in terms of human resources, technology, and infrastructure, to ensure that the testing process runs effectively. Early and ongoing engagement with industry players is crucial, not only to obtain practical input but also to build trust and support from stakeholders. Encouraging collaboration between traditional financial institutions and third-party innovators is an important step in creating a more inclusive and collaborative ecosystem. Furthermore, regulators need to build street credibility in the eyes of FinTech companies through the implementation of pro-innovation policies, voluntary information sharing, and the creation of constructive dialogue spaces. With this approach, sandboxes will not only serve as regulatory testing tools but also as collaborative platforms capable of strengthening the financial innovation ecosystem in a sustainable manner.

CONCLUSION

Regulatory sandboxes have emerged as a significant policy innovation tool, adopted globally to navigate the complexities of FinTech development while upholding regulatory objectives. This study confirms the tangible positive impact of sandboxes on the success of FinTech startups. This mechanism provides a safe bridge for innovators to test their new ideas while ensuring consumer protection and financial system stability. The results of the study show that sandboxes are significantly positively correlated with the success of FinTech startups. Participation in sandboxes is associated with a 15% increase in capital raised and a 50% higher probability of fundraising. These benefits arise through reduced information asymmetry and regulatory costs, which particularly help smaller and younger companies. Additionally, sandboxes facilitate critical two-way dialogue between innovators and regulators, accelerate time to market, encourage competition, and contribute to banking stability in Indonesia. However, this study acknowledges inherent challenges and limitations, such as significant resource intensity, impacts that are not yet universally proven, the potential for regulatory focus to be diverted or misused, consumer vulnerability risks, potential market distortions, and regulatory fragmentation across jurisdictions.

The implication of this research is that effectiveness is highly dependent on strategic design, adequate resource allocation, and integration into the broader regulatory ecosystem. Recommendations include encouraging regulators to adopt a forward-looking, adaptive regulatory approach, allocate sufficient resources, and prioritize cross-jurisdictional cooperation to address global regulatory fragmentation. Regulators should view sandboxes as a means to an end, using them to stay up-to-date with fast-moving innovation and promote market competition without sacrificing consumer protection. This research makes a significant contribution by presenting a holistic evaluation that not only confirms the benefits of sandboxes but also critically identifies their challenges and limitations. By combining a global perspective with an in-depth analysis of Indonesia's dual regulatory landscape, this research offers nuanced, evidence-based insights and actionable recommendations for regulators and industry players to optimize the potential of regulatory sandboxes as drivers of responsible and sustainable innovation.

REFERENCES

- Abdurrahman, M. I. (2024, October 30). Sandbox in the Implementation of Financial Sector Technology Innovation. *siplawfirm.id*. <https://siplawfirm.id/sandbox/>
- ADDX. (2020). Singapore digital securities exchange ADDX and the democratisation of private asset investments. *Asian Wealth Management and Asian Private Banking*.
- Alaassar, A., Mention, A.-L., & Aas, T. H. (2021). Exploring a new incubation model for FinTechs: Regulatory sandboxes. *Technovation*, 103, 102237. <https://doi.org/10.1016/j.technovation.2021.102237>
- Alaassar, A., Mention, A.-L., & Aas, T. H. (2023). Facilitating innovation in FinTech: a review and research agenda. *Review of Managerial Science*, 17(1), 33–66. <https://doi.org/10.1007/s11846-022-00531-x>
- Alidha, M., Sar, A. P., Sopiattunnisa, R., Azzahra, A., & Nurhalizah, L. (2024). Analisis Dampak Digitalisasi Layanan Perbankan terhadap Loyalitas Nasabah di Era Revolusi Industri 4.0. *Contemporary Journal of Applied Sciences (CJAS)*, 2(3), 203–216. <https://doi.org/10.55927/cjas.v2i3.9681>
- APEC Economic Committee. (2021). FinTech Regulatory Sandboxes Capacity Building Summary Report. Asia-Pacific Economic Cooperation Secretariat, March. www.cbr.ru
- Arner, D. W., Buckley, R. P., Zetsche, D. A., & Veidt, R. (2020). Sustainability, FinTech and Financial Inclusion. *European Business Organization Law Review*, 21(1), 7–35. <https://doi.org/10.1007/s40804-020-00183-y>

- Asnawi, A. (2022). Kesiapan Indonesia Membangun Ekonomi Digital Di Era Revolusi Industri 4.0. *Syntax Literate Jurnal Ilmiah Indonesia*, 7(1), 398. <https://doi.org/10.36418/syntax-literate.v7i1.5739>
- Bagby, J. W., & Reitter, D. (2019). Anticipatory FinTech Regulation: On Deploying Big Data Analytics to Predict the Direction, Impact and Control of Financial Technology. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3456844>
- Bank Indonesia. (2017). Peraturan Anggota Dewan Gubernur Nomor 19/14/PADG/2017 tentang Ruang Uji Coba Terbatas (Regulatory Sandbox) Teknologi Finansial. <https://www.bi.go.id/id/tentang-bi/profil/uu-bi/Default.aspx>
- Baskoro, A. (2024a). Transformasi Kualitas Legislasi: Regulatory Sandbox sebagai Sarana Partisipasi Publik dan Evaluasi dalam Pembentukan Peraturan Perundang-Undangan. *Jurnal Rechts Vinding: Media Pembinaan Hukum Nasional*, 13(3), 333–355. <https://doi.org/10.33331/rechtsvinding.v13i3.1956>
- Baskoro, A. (2024b). Transformasi Kualitas Legislasi: Regulatory Sandbox sebagai Sarana Partisipasi Publik dan Evaluasi dalam Pembentukan Peraturan Perundang-Undangan. *Jurnal Rechts Vinding: Media Pembinaan Hukum Nasional*, 13(3), 118–126. <https://doi.org/10.29303/jtsw.v37i1.364>
- Boakye-Adjei, N. Y., Auer, R., Banka, H., Faragallah, A., Frost, J., Natarajan, H., & Prenio, J. (2023). Can central bank digital currencies help advance financial inclusion? *Journal of Payments Strategy & Systems*, 17(4), 433. <https://doi.org/10.69554/KSVN7890>
- Bromberg, L., Godwin, A., & Ramsay, I. (2018). Cross-border cooperation in financial regulation: crossing the Fintech bridge. *Capital Markets Law Journal*, 13(1), 59–84. <https://doi.org/10.1093/cmlj/kmx041>
- Buckley, R. P., Arner, D. W., Veidt, R., & Zetsche, D. A. (2020). Building FinTech Ecosystems: Regulatory Sandboxes, Innovation Hubs and Beyond. *Washington University Journal of Law & Policy*, 61, 55–98. <https://doi.org/10.2139/ssrn.3455872>
- Buckley, R. P., Arner, D. W., Zetsche, D. A., Didenko, A. N., & Van Romburg, L. J. (2021). Sovereign digital currencies: Reshaping the design of money and payments systems. *Journal of Payments Strategy & Systems*, 15(1), 7. <https://doi.org/10.69554/LYCQ4585>
- Conventus Law. (2024, March 19). Indonesia – The Updated Sandbox Regulation By FSA. *Conventus Law*. <https://conventuslaw.com/featured-content/indonesia-the-updated-sandbox-regulation-by-fsa/>
- Cornelli, G., Doerr, S., Gambacorta, L., & Merrouche, O. (2020a). BIS Working Papers No 901 Regulatory sandboxes and fintech funding: evidence from the UK. *EconPapers Economic at Your Fingertips*, 2020(901). www.bis.org
- Cornelli, G., Doerr, S., Gambacorta, L., & Merrouche, O. (2020b). Inside the Regulatory Sandbox: Effects on Fintech Funding. CEPR Discussion Paper No. DP15502, Available at SSRN: <https://ssrn.com/abstract=3753901>, 41 Pages. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3753901
- Fáykiss, P., Papp, D., Sajtos, P., & Törös, Á. (2018). Regulatory Tools to Encourage FinTech Innovations: The Innovation Hub and Regulatory Sandbox in International Practice. *Hitelintézet Szemle*, 2017(2), 43–67. <https://doi.org/10.25201/FER.17.2.4367>
- Fenwick, M., McCahery, J. A., & Vermeulen, E. P. M. (2018). Fintech and the Financing of SMEs and Entrepreneurs: From Crowdfunding to Marketplace Lending. In *The Economics of Crowdfunding* (pp. 103–129). Springer International Publishing. https://doi.org/10.1007/978-3-319-66119-3_6

- Ford, C., & Ashkenazy, Q. (2024). The Legal Innovation Sandbox. *The American Journal of Comparative Law*, 72(3), 557–600. <https://doi.org/10.1093/ajcl/avae029>
- Goo, J. J., & Heo, J.-Y. (2020). The Impact of the Regulatory Sandbox on the Fintech Industry, with a Discussion on the Relation between Regulatory Sandboxes and Open Innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, 6(2), 43. <https://doi.org/10.3390/joitmc6020043>
- Growbeansprout. (2025). ADDX Singapore: Unlocking access to private market investments. *Financial Technology Review*.
- Gumbo, L., & Chude-Okonkwo, U. A. K. (2025). Regulatory sandbox as a frontier for innovation and sustainability: a systematic review. *Cogent Business & Management*, 12(1). <https://doi.org/10.1080/23311975.2025.2510555>
- Hamada, M., Tisnadisastra, A. A., & Mokoginta, N. P. (2024, May 15). OJK Reg. No.3/2024: Balancing Promotions and Regulatory Oversight within Technology Innovation in the Financial Sector. *Lexologi*. <https://www.lexology.com/library/detail.aspx?g=c9b1b715-6eeb-4f4e-9e22-37242b60aa9c>
- Hamilton Lane. (2021). ADDX partnership to offer tokenized access to GPA fund. *Hamilton Lane Investment Reports*.
- Handoko, Y. D. A. P., Wibowo, A., Arrahman, Y. R., Fauziah, P., & Yuliani. (2025). Implementasi Regulatory Sandbox dalam Konteks Pengawasan Pangan Olahan di Indonesia. *Eruditio: Indonesia Journal of Food and Drug Safety*, 5(1), 10–25. <https://doi.org/10.54384/eruditio.v5i1.172>
- Hellmann, T. F., Montag, A., & Vulkan, N. (2022). The Impact of the Regulatory Sandbox on the FinTech Industry. *SSRN Electronic Journal*, August, 1–35. <https://doi.org/10.2139/ssrn.4187295>
- InnReg. (2023, November 30). Fintech Regulatory Sandboxes: A Tool to Innovate and Shape Regulations. *www.innreg.com*. <https://www.innreg.com/blog/fintech-regulatory-sandbox-tool-innovation-shape-regulations>
- Jeník, I., & Duff, S. (2020). How to Build A Regulatory Sandbox. *A Practical Guide for Policy Makers*, September.
- Jenik, I., & Lauer, K. (2017). Regulatory Sandboxes and Financial Inclusion. In *CGAP Working Paper* (Issue October). <https://www.cgap.org/sites/default/files/Working-Paper-Regulatory-Sandboxes-Oct-2017.pdf>
- Judijanto, L., Putri, P. A. N., Syamsuri, Dewantara, B., & Alfiana. (2024). Impact of Financial Technology (Fintech) Innovation on Traditional Banking and Finance Business Models. *Management Studies and Entrepreneurship Journal*, 5(1), 1020–1025. <http://journal.yrpiiku.com/index.php/msej>
- Just, S. N., Sivertsen, M. F., & Lewin, S. (2024). Open for business: the discursive diffusion of regulatory sandboxes for fintech innovation. *Journal of Cultural Economy*, 17(3), 360–378. <https://doi.org/10.1080/17530350.2023.2282131>
- Kálmán, J. (2025). The Role of Regulatory Sandboxes in FinTech Innovation: A Comparative Case Study of the UK, Singapore, and Hungary. *FinTech*, 4(2), 26. <https://doi.org/10.3390/fintech4020026>
- Kumar, P., Taneja, S., Bhatnagar, M., & Kaur, A. K. (2024). Navigating the Digital Paradigm Shift (pp. 59–75). <https://doi.org/10.4018/979-8-3693-1882-9.ch006>
- Lawrence, A., Wong, S. W., Kietduriyakkul, K., Fuggle, B., Mendoza, T., Magnus, S., Man, K., Chia, B., & Hu, H.-R. (2019). International Guide to Regulatory Fintech Sandboxes. In *Bakermckenzie*. <https://www.bakermckenzie.com/en/->

/media/files/insight/publications/2018/12/guide_intlguideregulatorysandboxes_dec2018.pdf

- Makarim, E., & Mahardika, Z. P. (2020). Regulatory Sandbox: A Regulatory Model to Guarantee the Accountability of Electronics Financial Technology Implementation. *Proceedings of the 3rd International Conference on Law and Governance (ICLAVE 2019)*. <https://doi.org/10.2991/aebmr.k.200321.021>
- Mapuranga, D. (2024). Sandbox or Quicksand? An Analysis of Zimbabwe's Fintech Regulatory Sandbox. In *CEIP: Carnegie Endowment for International Peace*. <https://coilink.org/20.500.12592/0zpcf4v>
- Marangwanda, A., Mubanga, M., & Chaurura, P. (2025). The Dual Role of Regulation in the Insurance Sector: Protecting Consumers and Fostering Innovation. *International Journal of Advanced Business Studies*, 4(1), 38–50. <https://doi.org/10.59857/PTTC9900>
- McCarthy, J. (2023). From childish things: the evolving sandbox approach in the EU's regulation of financial technology. *Law, Innovation and Technology*, 15(1), 1–24. <https://doi.org/10.1080/17579961.2023.2184131>
- Nawaz, F., Aysan, A. F., Kayani, U., & Nasserredine, H. (2024). Do CBDCs promote financial inclusion and strengthen the monetary regulations? *Journal of Infrastructure, Policy and Development*, 8(8), 5870. <https://doi.org/10.24294/jipd.v8i8.5870>
- Novianto, M. R. (2024). Analisis Perlindungan Konsumen Dari Perusahaan Fintech Ilegal Melalui Pelaksanaan Mekanisme Regulatory Sandbox Sebagai Upaya Akselerasi Usaha Mikro Kecil dan Menengah. *UNES Law Review*, 6(3), 9605–9616.
- Otoritas Jasa Keuangan. (2024). Determination of Results of Regulatory Sandbox. <https://ojk.go.id/en/fungsi-utama/itsk/regulatory-sandbox/default.aspx>
- Pratista, B. N. (2025). Peran Regulasi dalam Mewujudkan Perlindungan Konsumen yang Efektif. *Postulat*, 3(1), 166–173. <https://doi.org/10.37010/postulat.v3i1.1882>
- Ranchordas, S., & Vinci, V. (2024). Regulatory Sandboxes and Innovation-friendly Regulation: Between Collaboration and Capture. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.4696442>
- Raut, A., & Raut, O. (2024). Balancing Innovation and Regulation: A Study on Irdai's Sandbox Framework for Fintech Startups. *ShodhKosh: Journal of Visual and Performing Arts*, 5(6). <https://doi.org/10.29121/shodhkosh.v5.i6.2024.1670>
- Ringe, W.-G., & Ruof, C. (2020). Regulating Fintech in the EU: the Case for a Guided Sandbox. *European Journal of Risk Regulation*, 11(3), 604–629. <https://doi.org/10.1017/err.2020.8>
- Suryadarma, F. R., & Faqih, M. (2024). Regulasi Fintech Di Indonesia: Mendorong Inovasi Dan Melindungi Konsumen Dalam Ekosistem Digital. *Jurnal Ilmiah Mahasiswa Perbankan Syariah (JIMPA)*, 4(1), 117–126. <https://doi.org/10.36908/jimpa.v4i1.320>
- Thakur, M. (2024). Compliance Related to Fintech: An Overview of the Indian Legal System. In *E-banking, Fintech, & Financial Crimes* (pp. 121–132). *Springer Nature Switzerland*. https://doi.org/10.1007/978-3-031-67853-0_10
- Tsai, C., & Peng, K.-J. (2017). The FinTech Revolution and Financial Regulation: The Case of Online Supply-Chain Financing. *Asian Journal of Law and Society*, 4(1), 109–132. <https://doi.org/10.1017/als.2016.65>
- Tsakila, N. F., Wirahadi, M. A., Fadilah, A. A., & Simanjuntak, H. (2024). Analisis Dampak Fintech terhadap Kinerja dan Inovasi Perbankan di Era Ekonomi Digital. *Indonesian Journal of Law and Justice*, 1(4), 11. <https://doi.org/10.47134/ijlj.v1i4.2787>
- United Nations Secretary-General's Special Advocate for Inclusive Finance for Development.

- (2018). Briefing on Regulatory Sandboxes (p. 3). https://www.unsgsa.org/sites/default/files/resources-files/2020-09/Fintech_Briefing_Paper_Regulatory_Sandboxes.pdf
- Vijayagopal, P., Jain, B., & Ayinippully Viswanathan, S. (2024). Regulations and Fintech: A Comparative Study of the Developed and Developing Countries. *Journal of Risk and Financial Management*, 17(8), 324. <https://doi.org/10.3390/jrfm17080324>
- Wechsler, M., Perlman, L., & Gurung, N. (2018). The State of Regulatory Sandboxes in Developing Countries. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3285938>
- Wenker, K. (2022). Retail Central Bank Digital Currencies (CBDC), Disintermediation and Financial Privacy: The Case of the Bahamian Sand Dollar. *FinTech*, 1(4), 345–361. <https://doi.org/10.3390/fintech1040026>
- Wijaya, T. (2023). Membedah Kerangka Regulatory Sandbox Industri Fintech Indonesia: Manajemen Risiko dan Pentingnya Privasi Data. *Center For Indonesian Policy Studies*, 60, 1–48.
- World Bank. (2020). Global Experiences from Regulatory Sandboxes. *World Bank Group*.
- WorldRemit. (2017). WorldRemit launches digital money transfers from Malaysia. In www.worldremit.com. *WorldRemit Press Release*. https://www.worldremit.com/en/news/worldremit-launches-digital-money-transfers-from-malaysia?utm_source=chatgpt.com
- Yu, H. (2022). Research on the Construction of Financial Technology “Regulatory Sandbox” Testing Consumer Loss Compensation System. *Frontiers in Humanities and Social Sciences*, 2(8), 76–86. <https://doi.org/10.54691/fhss.v2i8.1660>
- Zetzsche, D. A., Buckley, R. P., Arner, D. W., & Barberis, J. N. (2017). From FinTech to TechFin: The Regulatory Challenges of Data-Driven Finance. *European Banking Institute Working Paper Series*. <https://doi.org/10.2139/ssrn.2959925>
- Zetzsche, D., Buckley, R. P., Barberis, J. N., & Arner, D. W. (2017). Regulating a revolution: from regulatory sandboxes to smart regulation. *Fordham J. Corp. & Fin. L*, 23, 31. <https://doi.org/10.2139/SSRN.3018534>.
- Zheng, Y., & Wu, X. (2024). Fostering fintech innovation: A tripartite evolutionary game analysis of regulatory sandbox experiments. *International Review of Economics & Finance*, 92, 1302–1320. <https://doi.org/10.1016/j.iref.2024.02.060>