REGULATORY SANDBOX IN PERSPECTIVE ECONOMIC ANALYSIS OF LAW

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Abstract

The development of the digital economy, characterized by rapid innovation in financial technology, demands a regulatory framework that is both adaptive and responsive to market dynamics. One of the approaches used to bridge the need for innovation and legal certainty is the regulatory sandbox, a limited trial mechanism for innovative products, services, and business models under regulatory oversight. This article analyzes the regulatory sandbox from the perspective of Economic Analysis of Law (EAL) as developed by Richard Posner, emphasizing the principles of value, utility, and efficiency. Through a juridical-normative approach enriched with economic analysis, this study shows that the regulatory sandbox functions as an instrument capable of lowering transaction costs, reducing legal uncertainty, and supporting evidence-based policymaking. This study also compares regulatory sandbox practices in Indonesia with several other countries, such as the United Kingdom, Singapore, and South Korea, to evaluate the empirical impact on innovation, licensing, and economic welfare. The results confirm that although implementation challenges remain, the regulatory sandbox is still relevant as an efficient and progressive policy instrument. With proper design, this mechanism has the potential to be implemented across various sectors as a means for building inclusive, adaptive, and public welfare-oriented innovation governance.

Keywords: Regulatory Sandbox, Economic Analysis of Law, Finance

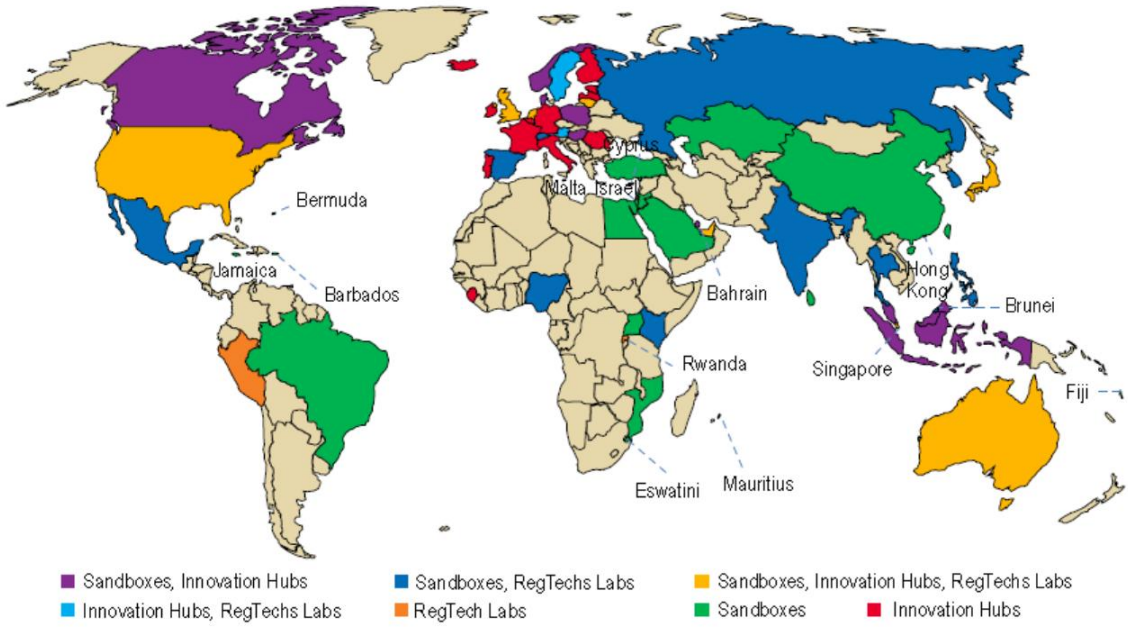
INTRODUCTION

In an era of exponentially growing digital economy, technological innovation in the financial and business sectors has become the primary driver of structural transformation in the global economic system. The integration of technologies such as financial technology, artificial intelligence, and digital payment systems not only enhances operational efficiency and expands access to financial services, but also reconstructs conventional business models and creates new economic value through more inclusive and decentralized mechanisms. These developments open up significant opportunities for increasing national productivity, fostering digital entrepreneurship, and accelerating economic recovery, particularly in developing nations.

However, behind these opportunities, non-negligible regulatory challenges have emerged. The high velocity of innovation is often disproportionate to available policy responses, creating a gap between technological advancement and the legal frameworks governing it. In this regard, regulators are required to not only maintain financial system stability and protect consumers, but also provide a safe experimental space for the development of innovation. An imbalance in addressing these matters can lead to systemic risks, legal uncertainty, and regulatory failure in responding to technological disruptions in a timely manner.

In response to these challenges, several countries have begun implementing a regulatory sandbox approach. According to the World Bank, a regulatory sandbox is a controlled and time-bound testing environment where companies can test new financial products or services live in the market under the close supervision of regulatory authorities. The objective is to create a dynamic and evidence-based regulatory approach toward emerging financial technologies World Bank, Global Experiences from Regulatory Sandboxes (World Bank, 2020). The regulatory sandbox approach has been implemented in several countries, including:

Figure 1. Global Implementation of Regulatory Sandboxes in 2020



Sources : Word Bank, 2020.

In Indonesia, the regulatory sandbox concept has been implemented by several institutions, such as the Financial Services Authority (OJK), which applies the regulatory sandbox to the financial sector as regulated under OJK Regulation No. 13/POJK.02/2018 concerning Digital Financial Innovation in the Financial Services Sector, in conjunction with OJK Regulation No. 3 of 2024 concerning the Implementation of Financial Sector Technology Innovation (ITSK). Additionally, Bank Indonesia (BI) implements a regulatory sandbox for payment systems regulated under the Regulation of the Board of Governors No. 19/14/PADG/2017 concerning the Financial Technology Limited Laboratory (Regulatory Sandbox). This program aims to strike a balance between fostering innovation and protecting consumers from potential risks that are not yet fully understood. By providing flexibility for innovators to test their products in an environment more relaxed than conventional regulation, the regulatory sandbox is expected to accelerate the growth of the digital industry without compromising market stability or consumer security.

The Economic Analysis of Law (EAL) approach, developed by Richard Posner, serves as a relevant analytical tool in evaluating the effectiveness of the regulatory sandbox. Posner argues that regulation should be designed to minimize transaction costs and enhance market efficiency (Posner, 1986, p. 325). In other words, good regulation is that which is capable of creating incentives for market participants to operate efficiently while maintaining a balance between innovation and public protection.

EAL plays a crucial role in bridging two legal values that are often in opposition: justice and legal certainty. Through this approach, it is possible to create harmony between the normative and functional dimensions of law in responding to socio-economic dynamics. EAL provides several key benefits. First, from a methodological standpoint, the economic approach offers a cross-disciplinary perspective for legal experts, allowing them to understand the law not merely from a dogmatic point of view, but also through economic logic. Second, within the normative dimension, economic theory helps unravel conflicts between legal values by demonstrating that achieving one value, such as justice or legal certainty, may require a trade-off in efficiency. Third, at the level of positive analysis, EAL offers a basis of justification for specific legal decisions by rationally examining their impact on social welfare (Sugianto, 2013, p. 45).

Furthermore, the principle of efficiency adopted in EAL is rooted in the logic of cost-benefit analysis, which posits that sound policy must yield benefits that outweigh the costs incurred to realize them. From a legal philosophy perspective, efficiency is not viewed solely through a quantitative lens but also as a reflection of justice itself. Efficient law is believed to be just law, as it provides maximum benefit with limited resources and strengthens legal legitimacy within a broader social context.

One critical aspect of the EAL analysis of the regulatory sandbox is its impact on transaction costs. Transaction costs refer to the expenses incurred during the exchange of goods and services, including regulatory compliance costs, information search costs, and enforcement costs. If a regulatory sandbox successfully reduces transaction costs for innovators, it can be concluded that this approach is effective in enhancing market efficiency (Posner, 1986, p. 325). Conversely, if transaction costs remain high or increase due to regulatory uncertainty, the effectiveness of the regulatory sandbox must be questioned.

Thus, the study of the regulatory sandbox from an EAL perspective is highly relevant for evaluating the extent to which this mechanism can strike a balance between innovation and effective regulation. This analysis will not only assist in understanding the economic

impact of the sandbox but also provide recommendations for regulators in designing policies that are more efficient and responsive to technological developments.

RESEARCH METHOD

This research employs a normative legal research approach by examining various documents, official reports, regulations, and literature relevant to the issue under study. The data analysis technique applied is descriptive-qualitative, utilizing secondary data obtained through the review of legislation, scholarly fatwas, Islamic academic journals, and previous research findings. Through this method, the study aims to identify the foundational considerations for determining the halal or haram status of cryptocurrency, examine the fiqh-based reasoning used in such assessments, and formulate their normative implications for developing Shariah-compliant financial policies that are both inclusive and adaptive to technological innovation (Fajar & Achmad, 2019, p. 34).

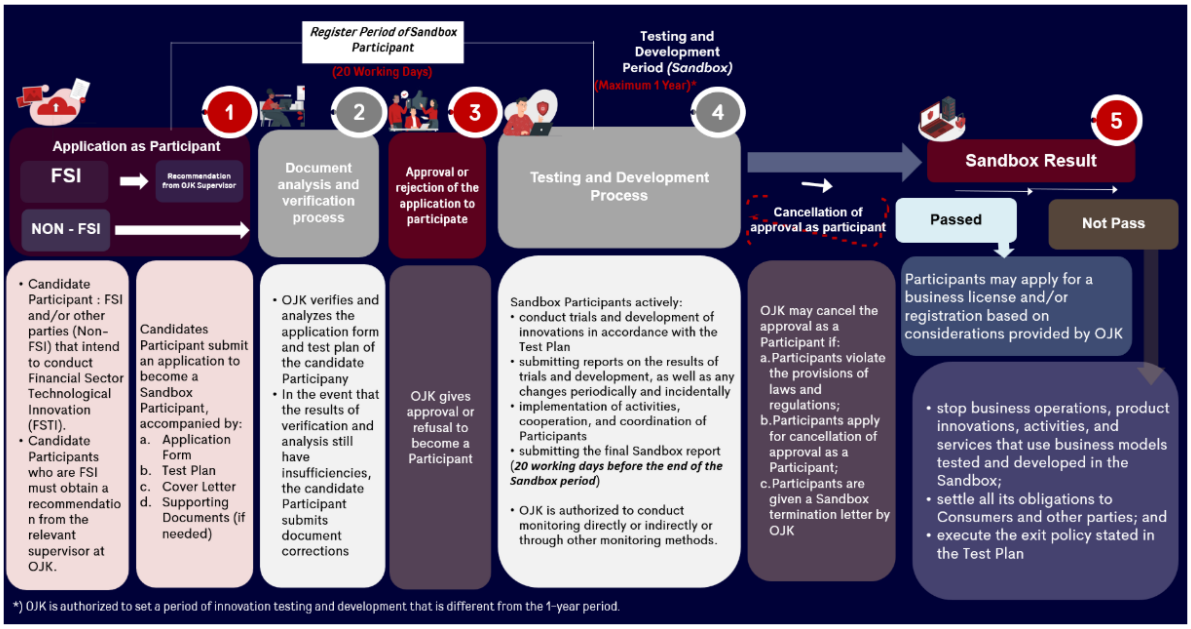
RESULT AND DISCUSSION

The term "regulatory sandbox" was popularized by the UK Financial Conduct Authority (FCA) through Project Innovate in 2016 to promote the sandbox concept as a means of supporting financial technology (Baskoro, 2024, p. 344). The primary objective of this program is to foster innovation driven by consumer needs while simultaneously enhancing competitiveness through technological development within the financial sector (Baskoro, 2024, p. 344).

OJK Circular Letter No. 5/SEOJK.07/2024 concerning the Mechanism for Trial Spaces and Innovation Development—as the implementing regulation of OJK Regulation No. 3 of 2024—defines the sandbox as a facility and mechanism to facilitate the testing and development of innovations provided by the Financial Services Authority to assess the feasibility and reliability of ITSK (Financial Sector Technology Innovation). Similarly, Bank Indonesia (BI), in the Regulation of the Board of Governors No. 19/14/PADG/2017, defines the regulatory sandbox as a safe, limited testing space for evaluating Financial Technology Providers along with their products, services, technologies, and/or business models. The objective is to provide room for Financial Technology Providers to further ensure that their products, services, technologies, and/or business models have met the criteria for Financial Technology.

The regulatory sandbox can be described as a mechanism for testing digital financial innovations within a controlled environment before full operational licenses are granted, with the aim of supporting companies in developing new products that might otherwise be difficult to develop under strict initial regulations. Its success can be measured through several aspects, such as regulatory efficiency, innovation growth, economic impact, and consumer protection. The workflow of the regulatory sandbox mechanism based on POJK No. 3 of 2024 is as follows:

Figure 2. Regulatory Sandbox Mechanism Workflow



Sources: Otoritas Jasa Keuangan

1. Application Stage to Become a Participant
   In this initial phase, prospective participants—both Financial Service Institutions (LJK) and non-LJK entities—submit applications to join the sandbox program to test financial sector technological innovations. Specifically for LJKs, the application must include a recommendation from the relevant OJK supervisor. This stage reflects an effort to reduce information asymmetry between the regulator and business actors. By screening prospective innovators through initial verification, this process minimizes selection costs and prevents the wasteful allocation of regulatory resources on ineligible or high-risk entities.
2. Document Verification and Analysis Stage
   Within a maximum of 20 (twenty) working days, OJK conducts an analysis of the application forms and supporting documents, including the prospective participants' testing plans. If deficiencies are found, applicants are given the opportunity to make corrections. This stage demonstrates the application of efficiency principles in the regulatory process, ensuring that only business models with high readiness and potential economic value proceed to the next phase. This serves as a method for saving regulatory transaction costs while mitigating risks from the outset.
3. Approval or Rejection Stage
   Based on the verification results, OJK issues a decision on whether the application is accepted or rejected. This stage reflects risk-and-benefit-based decision-making. It is a tangible implementation of the cost-benefit analysis principle, where only innovations rationally expected to provide benefits to the market and the public are permitted to enter the testing phase.
4. Testing and Development Stage
   Approved participants enter a testing period for a maximum of one year. Innovators carry out activities according to their plans, submit periodic reports, and remain open to monitoring by OJK, both directly and indirectly. This stage represents an

experimental regulatory approach, where policies are not fully enforced until the regulator has empirical data regarding the impact and effectiveness of the innovation. Regulation is tested under conditions that do not directly harm any party.

5. Result Assessment and Pass/Fail Decision Stage
   After the testing period concludes, OJK evaluates whether the participant is eligible for "pass" or "fail" status. Participants declared to have passed may proceed with the business licensing process, while those who fail are required to cease operations, settle obligations to consumers, and execute an exit policy.

OJK, as one of the regulators implementing the regulatory sandbox, recorded that as of April 2024, there were 108 providers participating in the testing within the regulatory sandbox framework (Otoritas Jasa Keuangan, 2024, p. 3), namely:

Table 1. List of Regulatory Sandbox Participants

No	Cluster Name	Recommended	Not Recommended	Recorded Withdrawal (Self-Resignation)	Recorded Withdrawal Due to Sanctions	Total Providers
1	Property Investment Management	-	-	1	-	1
2	Innovative Credit Scoring	10	7	1	2	20
3	E-KYC	-	6	-	-	6
4	Regtech - E-sign	5	-	-	-	5
5	Regtech - PEP	1	-	-	-	1
6	Insurance Hub	1	-	-	-	1
7	Insurtech	3	-	-	-	3
8	Online Distress Solution	1	-	-	-	1
9	Transaction Authentication	8	-	-	-	8
10	Tax & Accounting	2	-	-	-	2
11	Financial Planner	3	-	1	-	4
12	Aggregator	17	18	4	4	43
13	Financing Agent	5	2	-	1	8
14	Funding Agent	3	-	-	-	3
15	Wealthtech	1	1	-	-	2
	TOTAL	60	34	7	7	108

Of that total, 60 providers were recommended to proceed to the business license application stage. Meanwhile, 34 providers were not recommended, 7 providers withdrew, and 7 providers had their status revoked due to sanctions. The cluster with the highest number of participants was Aggregator, with 43 providers, of which 17 were recommended, 18 were not recommended, and the remainder faced cancellation either through withdrawal or sanctions.

The Innovative Credit Scoring cluster ranked second with 20 (twenty) providers, successfully recording 10 recommendations. Several other clusters, such as E-KYC, Insurance Hub, and Online Distress Solution, had fewer participants but were nonetheless recorded in the trials. These data demonstrate that the regulatory sandbox serves not only as a means for testing innovation but also as a rigorous selection instrument based on feasibility and compliance with applicable regulatory principles. The outcomes of this process provide

a solid foundation for formulating more accurate and efficient licensing and supervision policies for the financial technology sector.

The regulatory sandbox approach is more than just a mechanism to accommodate financial innovation for testing within a controlled environment before widespread public implementation; when examined from the perspective of Economic Analysis of Law (EAL), it represents the application of economic theories to examine the formation, structure, process, and impact of laws and legal institutions (Veijanovski, 1990, p. 5). This approach is utilized to critically analyze whether a policy operates efficiently from an economic perspective, as well as to evaluate the extent to which that policy is capable of generating optimal benefits for the public. EAL also functions as a predictive tool, examining which types of policies ought to be enacted to maximize social welfare without diminishing the essence or primary function of the policy itself (Ibrahim, 2009, pp. 9–10).

Posner argues that EAL is based on three fundamental concepts: value, utility, and efficiency. Value can be defined as something of significance or the desirability of an object or outcome, whether in monetary or non-monetary terms. Consequently, its inherent nature is tied to human self-interest in achieving satisfaction (Sugianto, 2013, p. 51). A value can be identified by its inherent characteristics, namely the expected return or potential loss. Human judgment in determining a value is ultimately aimed at the relevance of wealth maximization (Wessels, 2006, as cited in Sugianto, 2013, p. 52). In the context of the regulatory sandbox, value manifests in the form of innovation opportunities that can be tested without the immediate hurdle of overly stringent regulation. The regulatory sandbox provides economic value for innovators by allowing them to test digital financial services without immediately facing the full burden of compliance. For regulators, value arises from the ability to gather empirical data on the impact of innovation before permanent regulations are implemented, ensuring that the resulting framework is more of an evidence-based regulation.

Utility in EAL is a measure of the satisfaction or fulfillment an individual derives from a good or an action. Posner discusses diminishing marginal utility, the concept that as a person possesses more of a specific good, the additional satisfaction gained from each subsequent unit decreases. In a legal context, the concept of utility is frequently associated with redistribution policies and social welfare (Posner, 1986, pp. 11–13). From the perspective of utility, the regulatory sandbox enhances market welfare by reducing overly stringent regulatory barriers at the initial stage. With the presence of a sandbox, financial technology companies can test their services in a safer and more controlled environment, while consumers remain protected from excessive risk. Posner emphasizes that effective law must maximize the welfare of as many individuals as possible, and the regulatory sandbox reflects this principle by allowing innovation to flourish without endangering market stability.

Efficiency is frequently associated with either Pareto Efficiency or Kaldor-Hicks Efficiency. Pareto Efficiency suggests that a policy is efficient only if no party can be made better off without making another party worse off, whereas Kaldor-Hicks Efficiency considers a policy efficient if the total gains exceed the total losses, even if some parties suffer a disadvantage. Posner argues that the law should strive to maximize efficiency not merely based on normative justice, but because an efficient legal system serves to increase overall economic welfare (Posner, 1986, pp. 11–13). The regulatory sandbox reflects the principle of Pareto Efficiency, as it allows innovation to flourish without directly disadvantaging other stakeholders, such as regulators and consumers. Furthermore, the

sandbox embodies Kaldor-Hicks Efficiency because, despite the initial risks associated with more relaxed regulation, the long-term benefits derived from successful innovation and data-driven oversight outweigh the potential costs of failed regulatory experiments.

Consequently, the regulatory sandbox is constructed in alignment with EAL approach, based on the following reasons:

a. Law and regulation must minimize transaction costs and avoid market distortions (Posner, 1986, p.325). The regulatory sandbox enables companies to test their innovations with lower regulatory costs before facing full-scale regulation, thereby aligning with this principle.
b. Flexible regulation can reduce the risk of uncertainty (Posner, 1986, p. 327). The regulatory sandbox provides a more flexible testing environment, allowing innovation to flourish without facing obstructive regulatory risks.
c. Competitive markets are more efficient at driving innovation than monopolies (Posner, 1986, p. 258). The regulatory sandbox creates incentives for startups and innovators to enter the market without immediately facing the stringent regulations that are typically only manageable for large corporations.
d. Effective regulation is that which yields greater benefits than the costs it incurs (Posner, 1986, p. 326). The regulatory sandbox enables regulators to evaluate the impact of innovation before implementing broader regulations, thereby reducing the likelihood of policies that might otherwise hinder economic efficiency.

According to the Global Experiences from Regulatory Sandboxes report published by the World Bank in 2020, regulatory sandboxes have a significant impact on both regulatory institutions and financial service industry participants (World Bank, 2020, p. x-xii). From the regulator's perspective, the regulatory sandbox has served as a vital instrument for supporting evidence-based policymaking. Several jurisdictions have even reported that the outcomes of sandbox implementation have spurred policy adjustments, either through the reformulation of new regulations or the relaxation of provisions deemed no longer relevant. Furthermore, the implementation of a regulatory sandbox enhances the internal capacity of supervisory agencies by deepening their understanding of emerging technologies, innovative business models, and their accompanying risks. Direct interaction between regulators and industry players within the sandbox environment also strengthens regulatory dialogue and enriches institutional insights for developing adaptive regulatory frameworks.

On the other hand, from the perspective of business actors, the existence of a regulatory sandbox provides tangible practical benefits. Participating companies generally achieve a faster time-to-market and improved access to funding and strategic partnerships. Additionally, the regulatory sandbox contributes to increasing financial inclusion, although quantitative evidence for this remains limited and varies across countries. Some reports also mention that the regulatory sandbox can foster healthier market competition, despite findings in certain contexts of disparities between entities participating in the sandbox and those that do not. Consequently, the effectiveness of a regulatory sandbox depends heavily on the clarity of its objectives, appropriate policy design, and the readiness of the innovation ecosystem in the country implementing it (World Bank, 2020).

The regulatory sandbox has also recorded successes in several countries. In 2019, the FCA, as a pioneer of the regulatory sandbox, published a report regarding the implications of its effectiveness. The FCA stated that the regulatory sandbox is a useful tool with the following evidence (World Bank, 2020, p. 35):

a. The time required to obtain a license is 40% faster compared to standard procedures, allowing innovators to immediately launch their products into the market without being trapped in lengthy bureaucracy.
b. The development process for innovative products becomes faster due to regulatory flexibility that allows for direct testing and adjustment.
c. Access to investment funding becomes easier because participation in the Regulatory Sandbox program enhances project credibility, making it more attractive to investors.

In addition to the UK, Singapore has also achieved success in implementing a regulatory sandbox conducted by the Monetary Authority of Singapore (MAS). This program was launched in 2016 to encourage innovation in the financial sector and provide a controlled testing environment for financial technology companies. Several key factors contributing to the success of the regulatory sandbox in Singapore include:

a. MAS launched Sandbox Express to accelerate the approval process for low-risk innovations. Through this program, the application process can be expedited to just 21 days (World Bank, 2020, p. 42), compared to standard regulatory processes that usually take much longer. This approach enables fintech startups to test and launch their products into the market more quickly.
b. The MAS regulatory sandbox has attracted many international startups to enter and grow in Singapore. With a flexible regulatory environment and a strong financial ecosystem, Singapore has become a hub for financial technology innovation in Asia. This success is driven not only by the sandbox but also by government policies that support investment and global financial connectivity (World Bank, 2020, p. 42). The MAS regulatory sandbox has assisted companies using artificial intelligence to digitize insurance services.

South Korea introduced a multi-sector regulatory sandbox in January 2019 as part of its efforts to support innovation across various fields. One component of this initiative is the financial sector regulatory sandbox, officially launched by the Financial Services Commission (FSC) on April 1, 2019. To measure the effectiveness of this program in achieving broader policy objectives, South Korean authorities implemented evaluations based on their own success indicators. The 2019 evaluation results revealed several key achievements (World Bank, 2020, pp. 43-44):

a. Job growth in the fintech sector, specifically where 23 financial technology companies created 225 new jobs.
b. Increase in investment, where 11 financial technology companies successfully attracted investments worth KRW 120 billion, with an additional KRW 10 billion in investment expected within the next year.
c. Global expansion, where seven financial technology companies have expanded their operations into overseas markets, including Southeast Asia, the UK, Japan, and Hong Kong, or are currently in the process of negotiating international expansion.

Overall, the success of the regulatory sandbox in several countries confirms the core principle of EAL: that regulation which is flexible, data-driven, and considers the balance between benefits and risks will produce a dynamic innovation ecosystem without sacrificing economic stability and consumer protection.

However, a study conducted by the Center for Indonesian Policy Studies in 2023 revealed several significant challenges in its implementation (Rizki, 2024, p. 3). One of the primary issues identified is the emergence of an uneven playing field, where the sandbox tends to favor specific parties designated as "prototypes." This hampers more inclusive participation and restricts the exchange of information among industry players. Additionally, challenges include a lack of clarity in the implementation process, which affects both the expected outcomes and the exit strategy for participants. Such uncertainty can weaken the perceptions of investors and partners regarding the credibility of both the regulator and the sandbox participants themselves. Another major hurdle is the limitation of resources, in terms of both institutional capacity and technical expertise on the regulator's side. The success of a sandbox depends heavily on the regulator's competence in evaluating technology, providing guidance, and offering swift, comprehensive feedback. A lack of this support often leads to delays in evaluation and communication, ultimately impacting the overall effectiveness of the sandbox program.

Despite these implementational challenges, these obstacles do not automatically negate the strategic significance of the regulatory sandbox within an innovative policy framework. Through the identification and rectification of these challenges, the effectiveness of the regulatory sandbox can be further enhanced. From an EAL perspective, the regulatory sandbox remains a highly relevant and progressive instrument, as it enables policy efficiency, reduces transaction costs, and creates greater social value. With careful design, proportional supervision, and measurable objectives, the regulatory sandbox can serve as an effective policy tool to drive responsible innovation, strengthen regulatory legitimacy, and achieve sustainable public welfare.

The concept of the regulatory sandbox also holds great potential for application in various other sectors, such as health, education, transportation, energy, and digital government. For example, in the healthcare sector, sandboxes can be used to test telemedicine technologies or artificial intelligence in medical diagnosis within a temporary yet monitored regulatory framework. Similarly, in the education sector, the effectiveness of technology-based learning platforms, such as curriculum personalization, can be tested before being established in national education policy. In this way, the government can ensure that existing innovations benefit the public without posing unpredictable legal or social risks. Applying regulatory sandboxes across these non-financial sectors also reflects the government's growing role as a catalyst for cross-sector innovation. This is highly relevant as it provides a cross-sector evaluation framework for policy costs, benefits, and efficiency. An adaptive government will use the sandbox as a tool to accelerate the understanding of new policy impacts, minimize initial regulatory costs, and avoid the implementation of premature or counterproductive policies. Thus, a regulatory sandbox that applies an EAL approach can become a cross-sectoral method that strengthens the state's function as a facilitator in shaping inclusive innovation governance.

CONCLUSION

The regulatory sandbox is an innovative regulatory approach first popularized by the UK FCA in 2016, with the aim of fostering consumer-driven innovation and increasing the competitiveness of the financial sector. In Indonesia, this mechanism was adopted by OJK through SEOJK 5/2024 and by Bank Indonesia (BI) through PADG 19/2017, as a means to

test financial technology products and business models in a limited environment before becoming subject to full regulation.

From an EAL perspective, the regulatory sandbox reflects the principles of value, utility, and efficiency. In terms of value, the sandbox creates economic value by reducing regulatory barriers for innovators and increasing investor confidence. Regarding utility, the regulatory sandbox maximizes benefits for various stakeholders, including regulators, industry players, and consumers, by providing a balance between innovation and consumer protection. In terms of efficiency, the regulatory sandbox enables data-based regulation with lower transaction costs, ensuring that the rules implemented truly match market needs without hindering technological development.

Empirically, the regulatory sandbox has been successfully implemented in various countries such as the UK, Singapore, and South Korea. Its impacts include accelerating the licensing process, increasing access to funding, global expansion, and the creation of new jobs. Nevertheless, a number of challenges are still being faced, including inequality of participation, lack of procedural clarity, and limited regulatory capacity. However, these challenges do not diminish the relevance of the sandbox as a strategic instrument. On the contrary, through institutional improvements and adaptive policy designs, the effectiveness of the regulatory sandbox can continue to be enhanced.

Thus, the regulatory sandbox is not only relevant for the financial sector but also has the potential to be adapted in other sectors such as health, education, and energy. As an instrument aligned with EAL principles, the regulatory sandbox plays an important role in shaping a legal system that is responsive, efficient, and inclusive amidst the acceleration of digital innovation.

REFERENCES

Attrey, A., Lesher, M., & Lomax, C. (2020). The role of sandboxes in promoting flexibility and innovation in the digital age. *OECD Going Digital Toolkit Notes, 2*. OECD Publishing.

Baskoro, A. (2024). Transformasi kualitas legislasi: Regulatory sandbox sebagai sarana partisipasi publik dan evaluasi dalam pembentukan peraturan perundang-undangan. Jurnal Rechtvinding, 13(3).

Butor-Keler, A., & Polasik, M. (2020). The role of regulatory sandboxes in the development of innovations on the financial services market: The case of the United Kingdom. Ekonomia i Prawo, 19. https://doi.org/10.12775/EiP.2020.041

Datasphere Initiative. (2022). *Sandboxes for data: Creating spaces for agile solutions across borders*. https://www.thedatasphere.org/

Fajar, M., & Achmad, Y. (2019). Dualisme penelitian hukum normatif dan empiris (4th ed.). Pustaka Pelajar.

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

Guio, A. (2024**).** Regulatory sandboxes in developing economies: An innovative governance approach. *Project Documents (LC/TS.2024/59)*. Economic Commission for Latin America and the Caribbean (ECLAC).

Halawa, A. P. (2022). Juridical analysis of money laundering crimes in financial technology based equity crowdfunding services in Indonesia. *International Journal of Economic*,

Technology and Social Sciences (INJECTS), 3(2), 249–254. https://doi.org/10.53695/injects.v3i2.785

Hapsari, R. A., Maroni, M., Satria, I., & Ariyani, N. D. (2019). The existence of regulatory sandbox to encourage the growth of financial technology in Indonesia. *Fiat Justisia: Jurnal Ilmu Hukum, 13*(3), 271–280. https://doi.org/10.25041/fiatjustisia.v13no3.1739

Hesekova Bojmirova, S. (2022). FinTech and regulatory sandbox – New challenges for the financial market: The case of the Slovak Republic. *Juridical Tribune, 12*(3). https://doi.org/10.24818/TBJ/2022/12/3.06

Ibrahim, J. (2009). Pendekatan ekonomi terhadap hukum: Teori dan implikasi penerapannya dalam penegakan hukum. Putra Media Nusantara & ITS Press.

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

Karo Karo, R. P. P., & Luna, L. (2019**).** Pengawasan teknologi finansial melalui regulatory sandbox oleh Bank Indonesia atau Otoritas Jasa Keuangan berdasarkan perspektif keadilan bermartabat. *Transparansi: Jurnal Ilmiah Ilmu Administrasi, 2*(2), 116–125. https://doi.org/10.31334/transparansi.v2i2.547

Markellos, R. N., Ennis, S. F., Enstone, B., Manos, A., Pazaitis, D., & Psychoyios, D. (2025). Worldwide adoption of regulatory sandboxes: Drivers, constraints and policies. https://doi.org/10.2139/ssrn.5097105

North, D. C. (1991). Institutions. *Journal of Economic Perspectives, 5*(1), 97–112.

Otoritas Jasa Keuangan. (2024). Penetapan hasil regulatory sandbox. Departemen Pengaturan dan Perizinan ITSK, Aset Keuangan Digital, dan Aset Kripto OJK.

Posner, R. A. (1986). Economic analysis of law (3rd ed.). Little, Brown.

Rizki, A. (2024). Indonesia's regulatory sandbox journey. Singapore Tech for Good Institute.

Sugianto, F. (2013). Economic analysis of law: Seri analisis ke-ekonomian tentang hukum. Kencana Prenada Media Group.

Truby, J., Brown, R. D., Ibrahim, I. A., & Caudevilla Parellada, O. (2022**).** A sandbox approach to regulating high-risk artificial intelligence applications. *European Journal of Risk Regulation, 13*(2), 270–294. https://doi.org/10.1017/err.2021.52

Tsai, C.-H., Lin, C.-F., & Liu, H.-W. (2021). The diffusion of the sandbox approach to disruptive innovation and its limitations. *Cornell International Law Journal, 53*(2), 261–296.

Veijanovski, C. (1990). The economics of law: An introductory text. Institute of Economic Affairs.

Wang, Y., & Zhou, Z. (2026). Effectiveness of regulatory sandboxes in financial services: A systematic review. *Regulation & Governance*. https://doi.org/10.1111/rego.70129

Wessels, W. J. (2006). Economics. Barron's Educational Series.

World Bank. (2020). Global experiences from regulatory sandboxes. World Bank.

Zamroni, M. A., Toha, M., Zuana, M. M. M., & Baiqun Isbahi, M. (2023). Exploring Zakat Distribution Via Blockchain in Indonesia Perspective of Maslahah Mursalah Wahbah Zuhaili. *Indonesian Interdisciplinary Journal of Sharia Economics (IIJSE), 6*(3), 3544-3555. https://doi.org/10.31538/iijse.v7i3.5821