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Better Sandboxes:

Building Blocks for Catalyzing Responsible Innovation

Working Paper

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About the Datasphere Initiative

The Datasphere Initiative is a think and do tank that catalyzes meaningful dialogues and co-creates actionable and innovative approaches to respond to data challenges and harness opportunities across borders. Our mission is to equip organizations to responsibly unlock the value of data for all.

 For more information, visit www.thedatasphere.org or contact info@thedatasphere.org.

Acknowledgements

About this Working Paper

This working paper is a preliminary research output to be used as input for discussions in the context of the inaugural meeting of the Global Sandbox Forum on 22-23 July, 2024. A final version will be published in September 2024 and will include insights of the exchanges, acknowledging additional contributors.

Executive Summary

Sandboxes are powerful tools to foster innovation within controlled environments, enabling safe exploration and development and effective utilization of data-driven technologies. Government regulators are implementing sandboxes worldwide, and these initiatives vary significantly in structure, purpose, and impact, tailored as they are to the specific needs and conditions of different jurisdictions. This diversity, while valuable, presents challenges in terms of harmonization and cross-jurisdictional learning. Common challenges in sandbox implementation include their resource-intensivity and inconsistent operational practices, which can hinder their effectiveness and scalability. Furthermore, the success of sandboxes largely depends on the extent to which the relevant government authority has set them up responsibly, adhering to minimum building blocks in areas such as data governance, stakeholder engagement, and transparency. Given the complexities and risks associated with sandboxes, there is a pressing need to learn from other countries' experiences. To optimize the potential of sandboxes and overcome existing challenges, it is essential to develop resources that enhance interoperability of learnings and practices and ultimately foster collaboration across jurisdictions. Key resources could include: establishing a common assessment framework to evaluate sandboxes; developing a Toolkit for responsible sandbox development; and creating a platform for decision-makers and practitioners to exchange best practices, address challenges and promote cooperation on sandboxes (the Global Sandbox Forum). These resources would help ensure that sandboxes provide a level playing field, enhance consumer protection, foster human rights and government transparency, and facilitate innovation.

Introduction

Data influences multiple facets of our life on the planet, shaping economic and social activities across public and private spheres. From environmental metrics tracking climate change to personal data captured in everyday transactions, the vast arrays of data collected present both immense opportunities and significant governance challenges. The multifaceted and nonrivalrous nature of data — where personal information can intertwine with broader community and group data, and multiple actors can use the same data simultaneously — calls for innovative and adaptive governance mechanisms to fully unlock its societal benefits.

As we navigate the complexities of modern data ecosystems, traditional governance methods often fall short. The fast-evolving, interconnected challenges require agile and adaptable frameworks that balance innovation with data protection. In this context, sandboxes emerge as essential tools for experimentation, providing secure environments in which organizations can test and refine new technologies and business models with more flexibility, and often without the full weight of regulatory or operational constraints. These platforms not only lower barriers for smaller firms but can also foster a more dynamic policymaking and stakeholder collaboration. By ensuring that participants comply with regulations, and by openly sharing outcomes and engaging with communities, sandboxes can enhance the acceptance of and trust in new data-driven technologies.

Governments worldwide have implemented a range of sandbox models, which vary significantly in purpose, scope, regulatory flexibility, and intended impact. There are two major types: first, *operational sandboxes*, collaborative data spaces which pool datasets and resources and provide a platform to access and use hosted data safely under controlled conditions. *Regulatory sandboxes*, meanwhile, allow innovators to collaborate directly with regulators to evaluate and refine new technologies within or outside existing regulations.[1] Some regulatory sandboxes aim to ensure regulatory compliance and to foster the development of innovative products and solutions within existing regulations, while others may suspend regulatory constraints temporarily to test new approaches, or are intended to feed back directly into the development of new regulations. Sandboxes for data can be narrowly focused on specific technologies or broadly aimed at spurring sector-wide innovation. While some are well-established, many are in developmental stages. The emergence of cross-border sandboxes introduces yet new dimensions and potential to what are typically national or local endeavors.

The diversity among sandbox initiatives reflects the varied needs and contexts of different communities and jurisdictions, offering valuable insights that could benefit other regions. However, this variation presents challenges in sharing learnings and replicating successes around the globe. The availability and transparency of information about sandbox operations varies widely, with some jurisdictions providing detailed public reports and others offering little to no information. This inconsistency complicates efforts to identify responsible practices, generalize findings and apply successful practices elsewhere. The

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[1] Datasphere Initiative (2022), *Sandboxes for data: creating spaces for agile solutions across borders*, Datasphere Initiative.

isolated development of many sandboxes also limits cross-sandbox knowledge exchange and collaborative problem-solving.

The expanding diversity of sandbox experiences across jurisdictions and cultural contexts has highlighted a critical gap: the absence of a common vocabulary, framework, or hub to facilitate understanding and evaluation of these initiatives. This gap hinders the effective aggregation of experiences and best practices, which is crucial for refining and expanding the deployment of sandboxes globally. While sandboxes are undoubtedly adding value within their local contexts, the lack of detailed, accessible information about their processes and outcomes suggests that opportunities for broader impact are being missed. Establishing common resources would also significantly enhance the capacity to leverage sandboxes for responsible innovation and data value creation across borders.

The Need for a Common Assessment Framework

Sandboxes, as experimental platforms for technology and governance innovation, face unique challenges due to their complexity and the extensive resources that are required for sustainable development and implementation. Policymakers implementing a sandbox must navigate significant risks such as cooptation and regulatory capture, which could skew developments in favor of specific entities, market distortion by providing unfair competitive advantages to participants, and potential compromises to human rights and consumer protection by exposing individuals and groups to untested technologies (see Box 1). Managing these risks requires a careful balance between encouraging innovation and protecting stakeholders.

Box 1: Risks in Sandbox Implementation

Information Asymmetries: Sandbox participants may gain a more comprehensive understanding of regulatory expectations or cutting-edge innovations than their competitors, creating disparities in the market. Other gaps can also emerge in the information available to regulators and consumers.

Market Distortion: Providing participants with regulatory exemptions can unfairly advantage them, distorting the market and potentially harming competition.

Regulatory Arbitrage: The presence of sandboxes emerging in a variety of regulatory environments can lead firms to "shop" for the most favorable conditions, undermining regulatory intentions and potentially leading to a "race to the bottom" in regulatory standards.

Regulatory Fragmentation: Disparate sandbox policies could lead to inconsistencies and complicate the harmonization of international standards.

Resource and Operational Overstretch in Startups: Firms at the beginning of their sandbox experience often underestimate the resources needed for sandbox testing, which can compromise outcomes when coupled with the need to manage regular business activities and client services simultaneously.

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> **Potential for Regulatory Capture**: Close collaborations between startups and regulators within sandboxes can lead to undue influence, where regulatory decisions might favor the interests of participants over the public, potentially compromising the integrity of the regulatory process.
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> **Risks to Consumer Protection**: In the rush to innovate within sandboxes, startups might deploy technologies that haven't been thoroughly vetted for consumer safety, potentially leading to risks to personal data or to under-tested technologies leaking into the wider economy.

These complexities and risks underscore the urgency of a framework to assess sandbox initiatives. Such a framework would streamline the setup and operational processes of sandboxes, significantly reducing the time and resources required. It would enhance understanding of how to maximize data value creation across different cultures and jurisdictions while providing a structure for mitigating risks and ensuring fair competition.

This framework would **guide the responsible development of sandboxes**, ensuring their viability in local contexts, providing a level playing field, and enhancing consumer protections across sandboxes by providing a set of guidelines for entry, operation, and exit. By setting a baseline for eligibility and testing criteria, it would further bolster human rights and consumer protections and **reduce barriers to entry** for small and medium-sized enterprises (SMEs), encouraging innovation at every level. Additionally, consistent guidelines for design and operation would **facilitate more coordinated management of emerging technologies** like AI and digital trade, which naturally cross international borders.

Furthermore, a harmonized assessment framework would **promote interoperability and knowledge sharing** among different sandbox models, helping stakeholders to identify best practices and avoid common pitfalls. The dissemination of generalized guidelines and specific insights, such as how authorities manage particular data processes within their sandboxes, would prevent duplicative efforts and enable broader application of successful strategies. Ultimately, this approach would optimize the effectiveness of individual sandboxes while upholding the principles of open, transparent governance, thereby maximizing the potential of sandboxes globally.

While various actors like the German Ministry for Economic Affairs and Energy,[2] OECD,[3] Chase India,[4] Open Data Policy Lab,[5] and Information Policy Centre[6] have made strides towards

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[2] Federal Ministry for Economic Affairs and Energy (BMWi) (2019), *Making space for innovation: The handbook for regulatory sandboxes*, BMWi.
[3] Organisation for Economic Co-operation and Development (2023), *Regulatory Sandboxes in Artificial Intelligence*, OECD iLibrary.
[4] Sharma et al (2023), *Regulatory Sandbox for Responsible AI,* Chase India.
[5] Kalkar, Saxena and Verhulst (2023), *Data Sandboxes: Managing the Open Data Spectrum*.
[6] Centre for Information Policy Leadership (2019), *Regulatory Sandboxes in Data Protection:*

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understanding and classifying sandboxes, their efforts often do not fully capture the complete sandbox experience. However, these efforts recognize the need for a common framework. The OECD, for instance, advocates for harmonized eligibility and testing criteria across sandboxes and calls for an international legal framework to harmonize legal liability for sandbox participants.[7] Such harmonization could lower barriers to entry for SMEs, prevent forum shopping, and promote cross-border compatibility of sandboxes.

Box 2: Spain's Proposal for a Harmonized Sandbox Regulatory Environment

The Spanish government has proposed a phased approach to developing a harmonized framework like that advocated by the OECD. In a 2022 OECD presentation, it outlined a National Phase, where national regulators collect data, refine practices, and issue guidelines to enhance legal certainty for firms within individual jurisdictions. This would be followed by an International Phase, which would establish mechanisms to encourage participation from both public entities and private actors across various countries, transcending origins, regulatory frameworks, or sectors. This progressive approach could lead to the creation of international clusters of [AI] sandboxes, enabling cross-testing and collaborative innovation on a global scale.[8]

Notably, the EU's AI Act, which harmonizes sandbox design and encourages joint initiatives among member states, is a step in this direction.[9] Spain was the first member state to act under this new legal framework, issuing the Royal Decree 817/2023 on 8 November 2023, establishing a new AI regulatory sandbox.[10]

Rather than seeking to harmonize sandbox efforts—which inherently need to be diverse and context-sensitive—the goal of the framework would be to enable responsible sandbox development. **A common assessment framework should thus be accompanied by a toolkit for how to responsibly set up a sandbox.** Such a toolkit would streamline the process of establishing a sandbox and ensure that policymakers can leverage global best practices for responsible innovation and data value creation. Learning from experiences abroad is crucial for ensuring that sandboxes are part of a wider, interconnected ecosystem that prioritizes collaborative capacity building, stakeholder engagement, and responsibly unlocking the value of data for all.

Constructive Engagement and Innovative Regulation in Practice, Centre for Information Policy Leadership.

[7] Organisation for Economic Co-operation and Development (2023), *Regulatory Sandboxes in Artificial Intelligence*, OECD iLibrary.

[8] Organisation for Economic Co-operation and Development. *Regulatory Sandboxes in Artificial Intelligence*, OECD iLibrary.

[9] EU Artificial Intelligence Act. "Artificial Intelligence Act – Article 57." https://artificialintelligenceact.eu/article/57/.

[10] Vidal (2023), *Spain legislates for first EU AI Act regulatory sandbox*, Pinsent Masons.

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Ultimately, developing an assessment framework and sandbox toolkit is essential for maximizing the potential of sandboxes.Together, these two resources would set out the basic building blocks and elements necessary for the responsible development of a sandbox. They would promote a more coherent and comprehensive understanding of sandbox environments, facilitate the sharing of best practices, and help government authorities set up sandboxes responsibly and with minimal friction. They would not only enhance the operational success of sandboxes but also amplify their strategic impact on global data governance and innovation policies.

Building Blocks for an Assessment Framework and Sandbox Toolkit

The diversity of sandbox experiences illustrates both the vast potential of these tools to foster responsible innovation and the need for a structured assessment framework and development toolkit to actualize that potential. The form such resources should take is yet to be determined, but there are several core components they would need to cover. In developing these resources, the developers should also leverage existing international analytical tools that have proven effective in evaluating technological and policy environments.

An effective sandbox assessment framework and development toolkit should be developed and implemented by an independent third party, in collaboration with governments. This ensures impartiality and credibility in the process. Developers of the assessment framework should adopt a **holistic and a mixed-methods approach** that does not rely solely on scoring sandbox experiences, but also relies heavily on qualitative indicators, and takes an evolving approach that contextualizes each sandbox initiative within its specific environment and compares it with similar efforts globally.

The following section outlines initial thoughts on essential elements that could be included in a sandbox assessment framework and attendant development toolkit. This list is not meant to be comprehensive but aims to provide key aspects that should be considered, both in terms of evaluating and assessing existing sandboxes and in instituting new sandboxes by considering the relevant building blocks to be considered effective and responsible.

Why: Goals, Viability and Expected Outcomes

A critical element for both assessing and setting up sandboxes is understanding the "why" - the **goals and expected outcomes**. This involves clearly identifying the sandbox's immediate objectives as well as its long-term strategic aims. Considering that sandboxes are resource-intensive ventures, it is also important to assess viability, analyzing the goals of a sandbox to ensure they align with strategic objectives, optimize resource allocation, and maximize the potential for meaningful innovation and impact. The toolkit, meanwhile, could provide templates for defining objectives.

In that regard, it is key to assess the sandbox's **regulatory context**, and if such a context allows for enough flexibility to accommodate experimentation. An important consideration when setting up a sandbox is considering how it might influence the broader policy environment. This

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includes both intentional outcomes, such as driving regulatory changes and informing policy development, as well as potential unintended consequences. The resources should be agnostic to specific outcomes in order to facilitate a range of outcomes that align with local, national, and international goals.

Questions for a Sandbox Toolkit: What templates or guidelines are needed to help define and measure successful outcomes for sandboxes? How can the toolkit assist in recognizing and addressing failures?

Questions for a Sandbox Assessment Framework: How should the assessment criteria be structured to ensure they capture the diverse goals and outcomes of different sandboxes?

Diversity, Transparency and Participation

Resources for responsible sandboxes should prioritize **diversity, transparency and participation**. This involves ensuring stakeholder engagement throughout the sandbox's lifecycle. Transparency, particularly during the design phase, is another crucial building block of responsible design, to give both participants and observers a clear understanding of sandbox operations, participation processes, and means of engagement. The toolkit should include templates for transparent communication and best practices for stakeholder engagement. The framework should assess the extent to which the competent authority has prioritized open communication.

To combat fragmentation across different sandboxes and promote fairness, the framework should assess the clarity and openness of the selection criteria, while the toolkit should set out best practices for the development of these criteria. Similarly, the framework and toolkit should also account for **diversity**. A responsible sandbox should take active steps to ensure diversity among participants, tested projects, and evaluators themselves. This fosters a broader range of innovations and perspectives, ultimately enriching the sandbox's overall effectiveness.

Questions for a Sandbox Toolkit: What guidelines and templates are needed to facilitate diversity and transparency in sandbox operations? How can the toolkit support ongoing stakeholder engagement and fair selection processes?

Questions for a Sandbox Assessment Framework: How can we create metrics that effectively capture and promote diversity and transparency? How will we measure fairness in the selection process?

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9

Risk Mitigation

Risk mitigation is a crucial element for both the Assessment Framework and the Sandbox Toolkit. It involves ensuring that the competent authority has implemented or will implement mechanisms to proactively identify and reduce potential risks associated with the testing of new technologies and business models within sandboxes. This includes addressing potential issues such as cooptation and regulatory arbitrage.

The Assessment Framework should evaluate these risk mitigation strategies, while refraining from judging their effectiveness. It should also assess the safeguards in place to encourage innovation while protecting intellectual property (IP) and the rights of creators. Additionally, the framework should ensure that data protection strategies are in place, guaranteeing the security of sensitive information and compliance with all applicable data privacy laws.

The Sandbox Toolkit should provide practical resources and templates to help sandbox designers implement effective risk mitigation strategies. This could include tools for conducting risk assessments, guidelines for protecting IP, and templates for crafting robust data protection policies. The Toolkit should also offer illustrative case studies of successful risk mitigation efforts from other sandboxes.

> **Questions for a Sandbox Toolkit:** What tools and guidelines should be included to help sandbox designers identify and mitigate risks? How can the toolkit support robust data protection and IP safeguards?
>
> **Questions for a Sandbox Assessment Framework:** What risk assessment tools and methodologies should be included in the framework?

Resources and Sustainability

Another set of key considerations is around **resources and sustainability**. This involves ensuring the sandbox's financial and operational sustainability. The assessment framework should evaluate the availability and allocation of resources for testing and innovation. This includes analyzing the human resources, skills, and capabilities necessary to run the sandbox and produce the desired outputs. For operational sandboxes, the framework should also assess the types of data and technical resources available, ensuring the environment is well-equipped to support sandbox participants.

The Sandbox Toolkit should provide practical resources and templates to help sandbox designers plan and manage resources effectively. This could include interactive financial planning worksheets, step-by-step guides for operational logistics, or customizable templates for resource allocation.

Questions for a Sandbox Toolkit: What templates and tools can help sandbox designers plan for long-term sustainability? How can the toolkit assist in conducting effective cost-benefit analyses and resource assessments?

Questions for a Sandbox Assessment Framework: What criteria should be used to assess the resource requirements and sustainability of sandboxes? How can we ensure that sandboxes are designed to be scalable and adaptable?

Ecosystem Impact

Sandboxes are intended not only to benefit the participants themselves but also to contribute to the broader innovation environment through the publication of best practices and guidelines. An Assessment Framework should review whether the sandbox has facilitated success for innovators within and outside the sandbox. It should identify and document key success stories that have emerged and the ways in which data value has been created.

The Sandbox Toolkit, meanwhile, should offer a rich array of resources and templates to help sandbox designers identify the sandbox's likely impact on the broader ecosystem and effectively communicate sandbox activities and learnings. This could include templates for creating compelling success story narratives, comprehensive guidelines for measuring innovation impact, and best practices for fostering the diffusion of successful innovations.

Questions for a Sandbox Toolkit: What tools and guidelines should be included to help sandbox designers document and share success stories? How can the toolkit assist in capturing lessons learned and applying them to future initiatives?

Questions for a Sandbox Assessment Framework: What indicators should be used to measure the sandbox's impact on the broader ecosystem? How can we ensure that success stories are effectively captured and disseminated?

Conclusion

Sandboxes serve as important platforms for fostering innovation in a regulatory environment, enabling the safe exploration, development, and value extraction from data-driven technologies. However, their effectiveness can be limited by a lack of harmonization, insufficient stakeholder engagement, and fragmented practices across jurisdictions.

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Policy Actions and Recommendations

The following recommendations are designed to promote an integrated, cohesive, and efficient approach to responsible sandbox implementation and management:

1. **Establish a Common Assessment Framework**: Formulate a common assessment framework to facilitate the responsible development of sandboxes, ensuring that sandboxes maintain their diversity while maximizing the value they create. The framework should address pressing issues and the sharing of knowledge and practices, and encourage transparency around sandbox operations. It should cover operational aspects, including eligibility, application, selection processes, and exit strategies, as well as strategic aspects, such as long-term viability and impact assessment and alignment with the broader legal framework.

2. **Design a Toolkit for Responsible Sandbox Development**: Create and promote a toolkit that provides comprehensive resources and templates to support the responsible design and development of sandboxes worldwide. This resource should contain guidelines, templates, and best practices that collectively outline key principles, operational procedures, and ethical and practical considerations essential for creating and managing sandboxes that align with global best practices for responsible innovation and support data value creation in their relevant contexts.

3. **Launch a Global Sandboxes Forum:** In addition to the assessment framework and development toolkit, establish a forum that brings together policymakers, regulators, industry leaders, and academics from around the world to exchange best practices, address challenges, and share innovations. This forum should enhance communication and cooperation between sandbox regulators, relevant ministries, and international bodies, fostering harmonized efforts and promoting global cooperation in sandbox development and management. Through this forum, insights, best practices, and participant experiences can be broadly shared, supporting the responsible development of sandboxes across various regions and sectors. The forum can equip policymakers and practitioners with a variety of tools and a framework of responsibility, empowering them to use sandboxes and other policy experimentation mechanisms to address pressing issues such as the need for ethical AI and using data for sustainability.

To effectively implement the recommendations and establish a robust assessment framework and development toolkit for sandboxes, practical steps could include developing an evaluation form, creating a framework for peer review, assembling resources to comprise the toolkit, designing a questionnaire, outlining guiding principles, or establishing categories for a common database. These tools would facilitate the systematic assessment and sharing of best practices, ensuring that sandboxes are developed and managed responsibly, transparently, and effectively. The Datasphere Initiative will continue discussions on these topics as part of its Global Sandboxes Forum.

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