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Mapping the Actors, Documents and Flows Constituting an EU AI Act Regulatory Sandbox

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1 The Regulatory Sandbox under the EU AI Act

The EU Artificial Intelligence Act (Regulation (EU) 2024/1689, short: AIA) requires every Member State to have at least one AI regulatory sandbox in operation by 2 August 2027. It defines an AI regulatory sandbox as "a controlled framework set up by a competent authority which offers providers or prospective providers of AI systems the possibility to develop, train, validate and test, where appropriate in real-world conditions, an innovative AI system, pursuant to a sandbox plan for a limited time under regulatory supervision" (AIA Art. 3(55)). Sandboxes aim to improve legal certainty, share best practices, foster innovation, contribute to evidence-based regulatory learning and accelerate market access, particularly for SMEs, including start-ups, and SMCs (AIA Art. 57(9)).

Much of what happens in a sandbox happens through documents: an application, a sandbox plan, guidance, an exit report, written proof and annual reports. These documents carry the sandbox's legal effects for AI system providers and its contribution to regulatory learning in the EU. Yet, the provisions that call them into being are scattered across the AI Act, its amendment by the Digital Omnibus on AI (Regulation (EU) 2026/1744) and the Commission's Implementing Regulation on AI regulatory sandboxes (Commission Implementing Regulation (EU) 2026/2487).

Our earlier work showed that regulators and other involved stakeholders imagine sandboxes very differently (Lanamäki et al., 2025a), and that many questions about how sandboxes are constructed and entered remain open (Lanamäki et al., 2025b). This article contributes a conceptual map of the documents the legal texts require, as a shared basis for supporting the sandbox implementation across the EU. We present the model in two complementary views: an overview of the actors and documents across the EU, Member State and public levels (Figure 1), and a detailed view of a single regulatory sandbox process (Figure 2).

2 Building a Map: Approach and Structure

To create the document-centred map of how AI Regulatory Sandboxes are constituted under the EU AI Act, we build on conceptual modelling. By making complex socio-techno-legal relationships explicit, conceptual modelling allows

stakeholders to create a common reference point, an approach already applied successfully to the AI Act's governance structures (Stratmann et al., 2026). Our Figure 1 and Figure 2 map the documents that the legal texts require for AI regulatory sandboxes. They show which documents exist, who creates and holds them, to whom they flow, when they appear in the sandbox process, whether they are always or only sometimes produced, and which provisions define them.

The figures draw on the AI Act as amended by the Digital Omnibus and the Implementing Regulation. Figure 1 also indicates that national sandbox legislation may exist or come to exist, and that potential national legislation may provide additional information about actors, documents, document contents and flows. We focused on the EU-legislation that is common to all Member States. The figure is structured in three levels. The EU level comprises the Parliament and Council, the Commission with the AI Office, the Commission's Single and Dedicated Interface (AIA Art. 57(17)) and the AI Board. The Member State level comprises the competent authority or authorities (AIA Art. 57(1)); the provider or prospective provider, possibly with deployers or third parties (AIA Art. 58(2)(b)); and relevant AI ecosystem actors such as AI Factories (AIA Art. 57(4); IR Art. 4(5)). The Public level shows what is made publicly available.

To read the figures, it helps to distinguish between its elements and relations. The elements are the documents, shown as document symbols. Below each symbol, the figures indicate where in the legal texts the document is defined or described in more detail. The figures distinguish between two types of documents. Some documents relate to the main regulatory sandbox (short: RS) testing process, where the participant, the competent authorities and other relevant actors "meet" (the large grey arrow in Figure 1). Others are not part of this process but are linked to the competent authorities' reporting responsibilities towards the EU level. The relations are the document flows: the arrows show how documents move between stakeholders, again with the corresponding legal references. Tables 1 – 4 provide an overview of these documents.

Documents that are not directly related to the regulatory sandbox testing process are of greater relevance to the competent authorities, AI Office and AI Board than they are for a sandbox participant (e.g., AI system provider organization) participating in the sandbox testing process (Table 1). On an EU-level, the AI Office publishes a list of regulatory sandboxes planned or established in EU Member States through a Single and Dedicated Interface. To ensure the Commission gets information from the EU Member States, competent authorities need to inform the AI Office and Board about the establishment of a regulatory sandbox on a national level. Finally, the Implementing Regulation (IR Art. 4(2)) requires competent authorities to provide the Commission with "all relevant information" related to regulatory sandboxes.

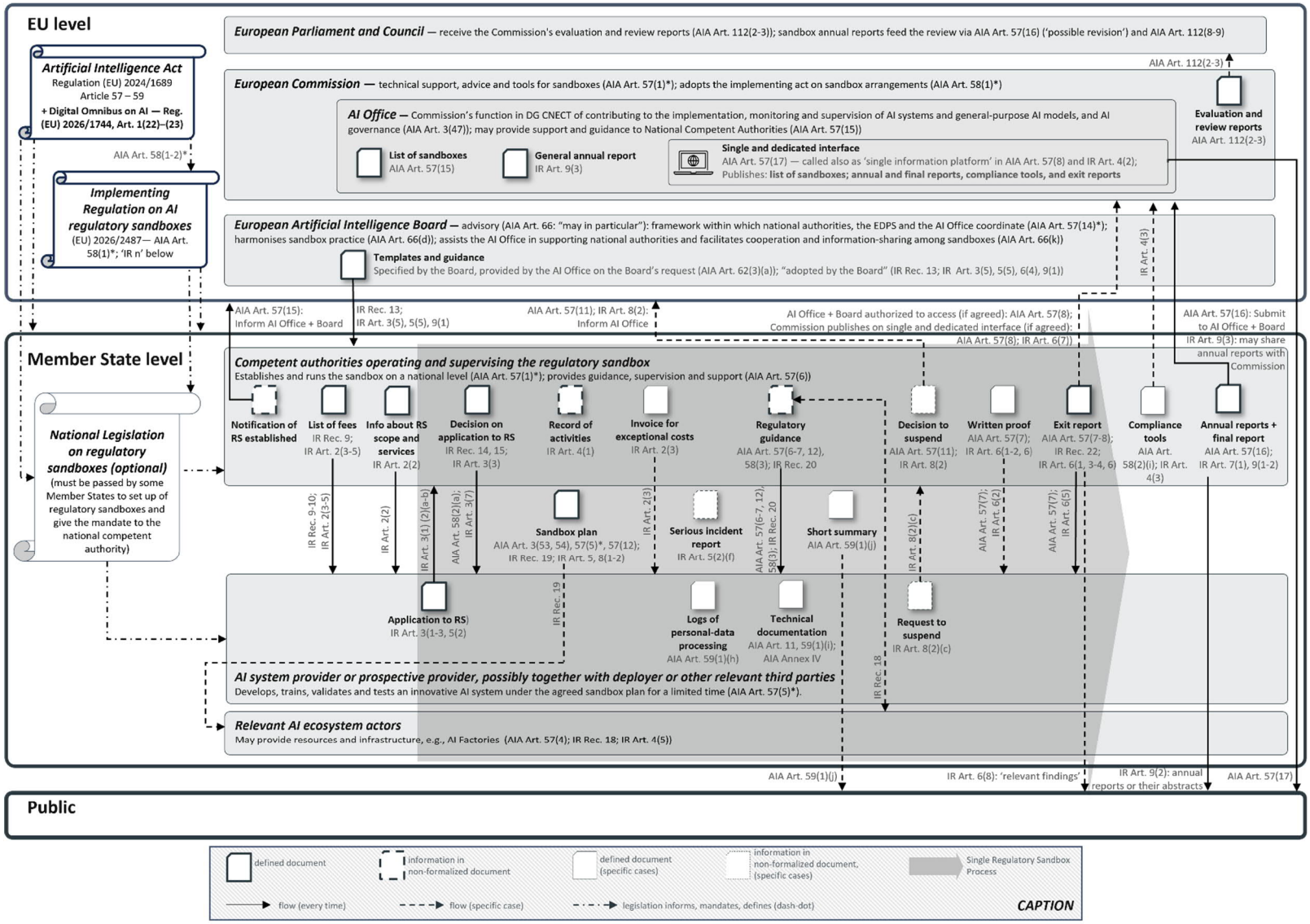


Figure 1. Actors and documents of an AI regulatory sandbox under the AI Act (Regulation (EU) 2024/1689, as amended by Regulation (EU) 2026/1744) and the Implementing Regulation on AI regulatory sandboxes (Commission Implementing Regulation (EU) 2026/2487). The large grey arrow indicates the sandbox testing process from application to exit. AIA = AI Act; IR = Implementing Regulation; Rec. = recital; * = amended or inserted by Digital Omnibus. "Defined documents" are such that are specified in the core legal documents. Documents situated between actor-lanes are produced by these actors together (Sandbox plan, Serious incident report, Short summary).

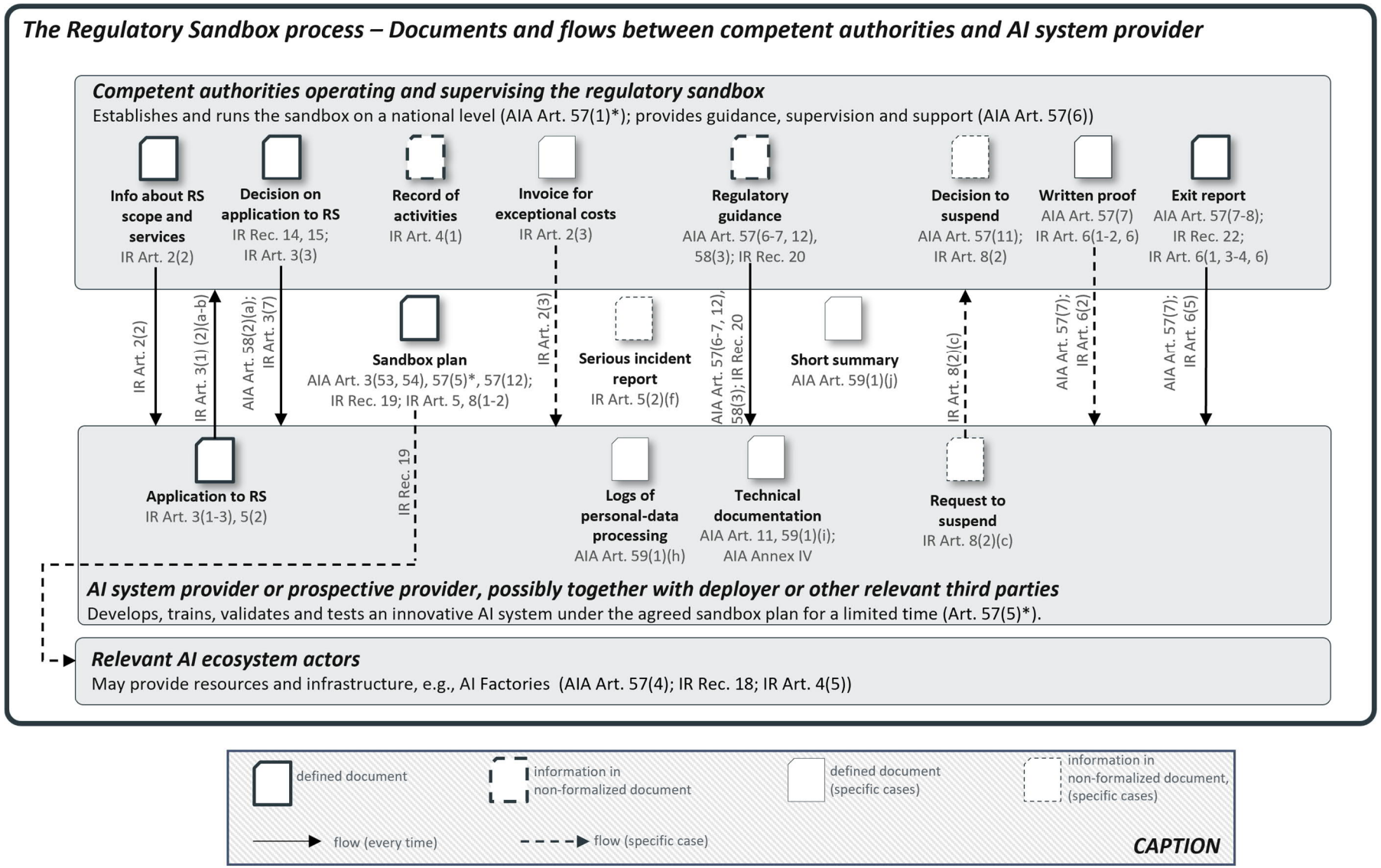


Figure 2. Zooming in on a single regulatory sandbox process, from application to exiting the sandbox, focusing on national competent authorities and (prospective) AI system providers. AIA = AI Act; IR = Implementing Regulation; Rec. = recital; * = amended or inserted by Digital Omnibus. "Defined documents" are such that are specified in the core legal documents. Documents situated between actor-lanes are produced by these actors together (Sandbox plan, Serious incident report, Short summary).

Regulatory sandboxes include also reporting duties. Competent authorities (for simplification, we use the term in plural, see Section 3) are required to produce and submit annual reports to the AI Office and Board, and a final report at the time of the shutdown of a regulatory sandbox. These reports are meant to provide information on the progress and results of the implementation of the regulatory sandboxes on a national level. The AI Office will also produce general annual reports. While the IR (IR Art. 9(1-2)) requires competent authorities to publish the annual reports or abstracts of those online and says they "may share" them with the Commission to be published on the Single and Dedicated Interface, the AI Act (AIA Art. 57(16)) requires national competent authorities to submit the annual reports to the AI Office and AI Board – indicating a potential contradiction between AIA and IR. The annual and final reports or their abstracts, and general annual reports from the AI Office, are meant to be published through a Single and Dedicated Interface to the public. Templates and guidance material is adopted by the AI Board, and competent authorities must use these provided templates with limited permission to modify them.

Table 1. Documents related to reporting responsibilities about and operational guidance for regulatory sandboxes

Document	Description
Notification of RS established	Competent authorities must submit information about the establishment of a sandbox on the national level to the AI Office and AI Board. This information is used by the AI Office to publish a list of AI Act regulatory sandboxes established (AIA Art. 57(15)).
List of sandboxes	AI Office publishes a list of planned or established regulatory sandboxes in EU Member States, based on the Member States' notifications of sandboxes established. A key purpose is to encourage more interaction in the AI regulatory sandboxes and cross-border cooperation." (AIA Art. 57(15))
Annual reports	Competent authorities provide to the AI Office and AI Board information on the progress and results of the sandbox implementation, including best practices, incidents, lessons learnt and recommendations on their setup and, where relevant, on the application and possible revision of regulation.
Final report	The final report is the last report that the competent authorities provide to the AI Office and AI Board, having a content similar to that of the annual reports.
General annual report	A report produced yearly by the AI Office and published on the Single and Dedicated Interface.
Evaluation and review reports	The Commission must report to the European Parliament and Council every four years (with the first report being made the latest by 2 August, 2028) about the need for amendments. This includes information about amendments to the AI Act suggested based on things learned from regulatory sandboxes.
Templates and guidance	The AI Board provides guidance and templates to support the operation and reporting responsibilities of regulatory sandboxes. A key purpose is "*to avoid fragmentation and to ensure that the necessary procedures, processes, and administrative requirements are clearly described, accessible, streamlined and easy to understand, as well as to ensure mutual recognition of the results*" (IR Rec. 13). Competent authorities can make changes to the provided templates only "*where strictly necessary and duly justified due to the specific needs and context of the AI regulatory sandbox*". (IR Rec. 13) Templates are provided for at least the application and selection process, sandbox plan, written proof, exit report, and annual report.

Most of the documents form the main sandbox testing process, where the participant, competent authorities, and other relevant actors "meet" (Figure 2).

While some documents are provided or produced in each sandbox testing (see Table 2), others are not necessarily provided/produced every time (see Table 3).

Table 2. Documents related to the main AI Act regulatory sandbox testing process that are always present

Document	Description
List of fees	Competent authorities provide a list of applicable fees for participation in the sandbox. Participation by small- and medium-sized enterprises (SMEs), including start-ups, and small mid-caps (SMCs) is free of charge, but in some of these cases, exceptional costs may arise that can be charged for and must be informed about before participation starts.
RS Scope and services	Competent authorities must provide (prospective) providers with publicly available information about the RS scope and services offered by the competent authorities.
Application to RS	With this, a prospective sandbox participant applies to be admitted to the sandbox process. The application, which is sent by the applicant to the competent authorities, includes information about the applicant as well as the AI system.
Decision on application to RS	The decision on the application to the regulatory sandbox is to inform the applicant whether they are admitted to the sandbox. This decision includes information about the eligibility of the applicant, selection criteria defined in the AI Act, the regulatory and practical challenges of the proposed sandbox project, maturity and competitiveness of the AI system as well as the potential for and scalability of regulatory learning (sector specific and more broadly). Applicants can appeal the decision (IR Art. 3(7)).
Sandbox plan	The sandbox plan is the document that outlines what has been agreed on between the sandbox participant and the competent authorities. It describes objectives, conditions, timeframe, methodology and requirements for the activities carried out within the sandbox. The plan includes information about the applicant and AI system, estimated timeline, objective and scope of activities to be carried out, description of requirements and obligations in the AI Act that are in scope of the sandbox process, indication whether the process would involve processing of personal data (potentially a need for involving competent data protection authority), risk management safeguards, procedures related to serious incidents that may occur, and potentially a plan on testing in real-world conditions. The sandbox plan is provided also to other authorities and entities who have a role in the sandbox process.
Record of activities	The competent authorities must record activities and updates related to the participation in the sandbox and maintain records related to AI systems that are developed or tested in the sandbox, including additional information received from the sandbox participant.
Regulatory guidance	Regulatory guidance is something that the competent authorities provide to the sand-box participant during the sandbox process. In essence, it is guidance on the regulatory expectations and how to fulfil the requirements and obligations set out in the AI Act.
Exit report	The exit report, which is provided by the competent authorities to the sandbox participant – and potentially to the EU-level, if the participants permits it – contains information about the activities carried out in the sandbox and the related results and learning outcomes. Although the exit report does not have the same status or legal effect as a declaration of conformity has, it can be used by the AI system provider as supporting documentation to demonstrate compliance with the AI Act.

The process starts with the regulatory sandbox application being submitted by the applicant (e.g., AI system provider who wants to test certain aspects of their AI system). For that, competent authorities must inform the applicant about fees associated with their participation in case the applicant is not eligible for free participation. Competent authorities must deliver the decision to the applicant within three months, and this decision can be appealed by the applicant. Should the applicant be admitted (i.e., becomes a participant), the sandbox plan is formulated. This is the key document that defines the regulatory sandbox testing process. The testing process practically starts with the agreement of the sandbox

plan. As part of the testing process, the participant receives regulatory guidance from competent authorities and other relevant authorities. Last, the exit report and written proof are formulated based on the sandbox plan and testing process. The exit report is mandatory to create, but the written proof is produced only if the participant requests it. Throughout the testing process, the competent authorities are required to record all activities in the sandbox. After the sandbox process, competent authorities can produce compliance tools, and those may be published on the Single and Dedicated Interface if they demonstrate proven relevance for compliance with the AI Act and do not infringe intellectual property rights.

Table 3. Documents related to the main AI Act regulatory sandbox testing process that are not necessarily present every time the process is conducted

Document	Description
Written proof	The written proof is provided by the competent authorities to the sandbox participant, should the participant request it. It includes information about the activities successfully carried out in the sandbox and shall be taken positively into account by market surveillance authorities and notified bodies.
Compliance tools	Compliance tools (e.g., technical specifications, benchmarks and testing tools developed in the AI regulatory sandbox) are developed by the competent authorities and published on the Single and Dedicated Interface, given they "*demonstrate proven relevance for compliance*" with the AI Act, confirmed by the Commission after consultation with the Board. (IR Art. 4(3)

Finally, some documents are related to special cases that might apply in a sandbox testing process. These special cases are:

(1) ***if the sandbox process causes exceptional costs***: The invoice for exceptional costs is only needed when competent authorities declare that the costs exceed what the competent authorities can reasonably expect from the sandbox plan associated with the specific sandbox project.

(2) ***if there are risks identified in the sandbox plan that require a formulation of a serious incident report***: In the sandbox plan, the competent authorities and sandbox participant must define risk management safeguards and procedures related to handling serious incidents that could occur during the participation in the regulatory sandbox. This is not mandatory and is only needed if considered necessary and appropriate given the risks that are likely to arise as part of the sandbox plan. As part of this, a serious incident report needs to be created, if such risks arise.

(3) ***the testing in the sandbox requires further processing of personal data***: Further processing of personal data as per AIA Article 59 provides regulatory relaxation for the further processing of personal data in regulatory sandbox. The regulation implies that the sandbox participant must meet conditions specified in AIA Article 59(1). The logs of personal data processing must be kept for the duration of the sandbox participation, and a short summary must be published

by the competent authorities on their website to describe the AI project developed in the regulatory sandbox, its objectives and expected results. The technical documentation becomes mandatory as part of the further processing of personal data. This is required regardless of the AI system's risk level in this case, even though outside a regulatory sandbox, the AI Act requires technical documentation only for high-risk AI systems.

(4) ***competent authorities decide to suspend the testing process due to certain reasons outlined in the AI Act***: Competent authorities can suspend the regulatory sandbox process, if parameters and conditions set in the sandbox plan were breached; significant risks to health, safety and fundamental rights are identified during the development and testing of AI systems that cannot be effectively mitigated; or at the motivated request to suspend from the regulatory sandbox participant. The competent authorities must inform the AI Office about the decision to suspend.

While most of the specified documents will be provided or produced should the special case apply, the "Request to suspend" the testing process might be made in the case of suspension of the testing case, but not necessarily so. Table 4 summarizes these documents that are linked to special cases.

Table 4. Documents that are related to the main AI Act regulatory sandbox testing process, but that are specific to special cases and always present in that special case

Special Case and Document	Description
Special case: if the sandbox process causes exceptional costs	
Invoice for exceptional costs	In case exceptional costs have occurred, the competent authorities provide an invoice for those costs to the sandbox participant.
Special case: risks in the sandbox plan that require formulation of a serious incident report	
Serious incident report	In case a serious incident occurs during participation in the sandbox process, the incident must be documented and reported by following the reporting procedures defined in the sandbox plan.
Special case: further processing of personal data	
Logs of personal data processing	The sandbox participant must retain personal data processing logs, if the further processing of personal data is necessary in the sandbox process.
Technical documentation	The technical documentation, to be created by the sandbox participant in any case as a key requirement the AI Act sets for providers of high-risk AI systems, provides information for the competent authorities and notified bodies (if involved). AI Act Annex IV provides more detailed information about technical documentation. This technical documentation becomes mandatory in the sandbox process, if further processing of personal data is conducted in the sandbox.
Short summary	The competent authorities and sandbox participant must create together a short summary of the AI project developed in the sandbox, its objectives and expected results. This summary is published by the competent authorities on its website.
Special case: suspension of testing	
Decision to suspend	The competent authorities can temporarily or permanently suspend the testing process and provides that decision to the AI Office.
Request to suspend (not mandatory)	In case it is not the competent authorities, but the sandbox participant that wants to suspend the sandbox process, the participant must make a request for suspension.

3 Limitations and Invitation

Limitations. Figures 1 and 2 exclude real-world testing outside a sandbox (AIA Art. 60, 60a and 61), the sandboxes of the European Data Protection Supervisor (AIA Art. 57(3)) and the AI Office (AIA Art. 57(3a)*), and sandboxes under other Union or national law.

Figures 1 and 2 provide a simplified the view on competent authorities and condense them into one actor lane. The AI Act and the Implementing Regulation mention different types of authorities that may be involved in the regulatory sandbox: (1) a competent authority that would be responsible for operating and supervising the sandbox (AIA Art. 57(1), 57(6)), (2) a national competent authority responsible to do something within the regulatory sandbox with the AI system provider (this may be the competent authority that is also responsible for operating and supervising the sandbox), and (3) other authorities that may participate in the regulatory sandbox in a smaller capacity, such as a Market Surveillance Authority supervising the testing part or a Data Protection Authority if personal data is being processed during the sandbox process.

We also would like to point out that the AI Act and Implementing Regulation use inconsistent terminology regarding the authorities' roles and tasks. The AI Act specifies certain tasks explicitly for national competent authorities (AIA Art. 70), for example Article 57(11): "[..] *National competent authorities shall have the power to temporarily or permanently suspend the testing process, or the participation in the sandbox if no effective mitigation is possible, and shall inform the AI Office of such decision.*". In contrast, the Implementing Regulation (Art. 8(2)) assigns the same responsibility to competent authorities: "*[..] Competent authorities may temporarily or permanently suspend the testing process or the participation in an AI regulatory sandbox if no mitigation is possible. [..] The competent authorities shall inform the AI Office without undue delay of such a decision and the reasons thereof.*"

A more detailed analysis of terminology regarding authorities and their roles and responsibilities as outlined the AI Act and Implementing Regulation would be an interesting point for future conceptualization work.

Invitation for feedback. We hope the figures serve diverse stakeholders involved in AI regulatory sandboxes. Figure 1 can guide competent authorities in designing procedures or templates, and Figure 2 might be helpful for providers, deployers and other third parties anticipate what a regulatory sandbox participation involves and where to find more information in the legal documents. For researchers and educators, it might offer a structured foundation for understanding how sandboxes work in practice.

Your feedback will shape future versions of the figures, which we will update as Member State regulatory sandbox legislation may be passed and as regulatory sandboxes begin to operate in EU Member States. We would particularly like to know whether and how you have used the figures and tables, for example in designing procedures, preparing a funding application or teaching, and what you find missing, unclear or wrong. This also helps us understand how our research supports the implementation of AI regulatory sandboxes and how to make future work more useful.

More specifically, **we seek feedback through the following questions**:

1. How would you use these figures/tables?

2. What strengths do you see in such a representation?

3. What kind of problems do you see with it, and from what perspective?

4. Who do you think these figures are relevant/useful for?

5. What kind of information is missing? Any information that is irrelevant, and from what perspective?

6. Do you notice any mistakes?

7. What did you learn about sandbox processes from this figure that you did not know or had not considered?

8. Can you follow the process as a whole and in its individual steps? What is unclear?

For questions, feedback or a high-resolution version, please contact us using the details in the author information.

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9. **Erkki Tervo, Karin Väyrynen, Christian Kurtz & Arto Lanamäki** (2026, November). Mapping the Actors, Documents and Flows Constituting an EU AI Act Regulatory Sandbox.

8. **Sumita Sharma, Netta Iivari, Ole Sejer Iversen, Yasmin Kafai, Alissa N Antle, Marianne Graves Petersen, Marianne Kinnula, Christian Dindler, Fares Kayali, Elizabeth Bonsignore, Charu Monga, and Marie-Monique Schaper. (Eds.).** Special issue on Pushing the Boundaries of Computational Empowerment of Children.

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