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Report

Update on the functioning of innovation facilitators – innovation hubs and regulatory sandboxes

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List of abbreviations and definitions

AI	Artificial Intelligence
DLT	Distributed Ledger Technology
EEA	European Economic Area
EFIF	European Forum for Innovation Facilitators
ESAs	European Supervisory Authorities – the European Banking Authority (EBA), the European Insurance and Occupational Pensions Authority (EIOPA) and the European Securities and Markets Authority (ESMA)
FinTech	Technologically enabled innovation in financial services that could result in new business models, applications, processes or products with an associated material effect on financial markets and institutions and the provision of financial services.
Firm	Participant to an innovation hub or a regulatory sandbox
Innovation facilitator	Innovation hub or regulatory sandbox
Innovation hub	A dedicated point of contact for firms to raise enquiries with NCAs on FinTech-related issues and to seek non-binding guidance on the conformity of innovative financial products, financial services or business models with licensing or registration requirements or regulatory and supervisory expectations
KPIs	Key Performance Indicators
ML	Machine Learning
NCA	National Competent Authority
Regulatory sandbox	A scheme to enable firms to test, pursuant to a specific testing plan agreed and monitored by a dedicated function of the competent authority, innovative financial products, financial services or business models. Sandboxes may also imply the use of legally provided discretions by the relevant supervisor (with use depending on the relevant applicable EU and national law), but sandboxes do not entail the disapplication of regulatory requirements that must be applied as a result of EU law
RegTech	Regulatory Technology

Executive summary

Following the 2019 Report of the European Supervisory Authorities (ESAs) on innovation hubs and regulatory sandboxes (herein referred to as innovation facilitators)¹, this report provides an updated overview of the design and operation of innovation facilitators, observed practices, challenges and limitations faced by competent authorities. The report sets out a series of considerations and recommendations for further enhancing the role of innovation facilitators and their effectiveness.

The outcome of the ESAs' analysis suggests that innovation hubs and regulatory sandboxes continue to be the main types of solutions preferred by the regulators and supervisors to facilitate innovation in the financial sector across the EEA. As of October 2023, there were 41 innovation hubs, with at least one in all 30 EEA countries, and 14 regulatory sandboxes in 12 EEA countries. The majority of innovation hubs have been established between 2016 and 2019, while most of the regulatory sandboxes have been launched between 2020 and 2021.

In this report, the ESAs describe new emerging activities and features, for example, virtual sandboxes, hackathons/TechSprints, or discussion forums with representatives of the FinTech sector. Several EU-wide sandbox-related initiatives have also been put in place, for example, the European Blockchain Sandbox, the DLT pilot regime and upcoming AI regulatory sandboxes.

As already noted in 2019, innovation hubs offer the FinTech sector an opportunity to maintain dialogue with NCAs and to benefit from the expertise of subject matter experts and their perspective on innovation within financial services. Overall, the main objectives of such innovation hubs remain unchanged and focus on enhancing firms' understanding of the regulation and supervisory expectations, providing guidance on the conformity of proposed business models with regulatory requirements, and getting insights on potential needs to adjust the regulatory framework. Innovation hubs that have been running for several years seem to fulfil their objectives and, as a result, the NCAs do not plan any significant changes to the concept of innovation hubs.

Regulatory sandboxes offer the FinTech sector an environment to test their business ideas and concepts, and gain better visibility to their projects, ultimately enhancing funding opportunities. They improve the FinTech sector's understanding of how financial regulation applies to firms' business models and help the firms to become familiar with the existing regulatory and supervisory regime. Running the regulatory sandboxes also brings benefits to the NCAs as they help the NCAs to increase their knowledge about financial innovations, the risks and opportunities they entail, foster the uptake of innovation in the financial sector in the country, and improve the identification of areas that may need regulatory adjustments.

¹ Joint ESAs Report – Fintech: Regulatory sandboxes and innovation hubs (JC 2018 74), <https://www.eba.europa.eu/esas-publish-joint-report-on-regulatory-sandboxes-and-innovation-hubs>

Based on the information and assessment provided by NCAs, in this report the ESAs have identified a number of benefits and challenges in the operation and design of innovation facilitators in the financial sector across the EEA.

Regarding innovation hubs, the ESAs find that the establishment and operation of innovation hubs in the EEA have achieved a certain degree of maturity and that the FinTech sector perceives hubs as positively contributing to regulatory and supervisory clarity. The ESAs also observe that innovation hubs are often considered by the FinTech sector as an indication that regulators and supervisors in that jurisdiction are progressive and technology-friendly and open to financial innovation. The ESAs at the same time find that NCAs face challenges in the operation of innovation hubs, including the perception of risk of misalignment between the FinTech sector's expectations and the purpose of the hubs, or the NCAs not being able to give prompt and precise responses to the queries they receive.

With regard to regulatory sandboxes, the ESAs find that their main benefits for NCAs are to improve their awareness of new emerging innovations in the financial sector and recognise cases where a reassessment of the relevant regulatory perimeter may be needed. Additionally, the ESAs observe that regulatory sandboxes include consumer protection measures, and allow NCAs to terminate the testing if a firm fails to comply with the agreed testing plan or testing parameters. As a consequence, the ESAs observe that a large majority of NCAs operating regulatory sandboxes consider that their cost-benefit perception supports the continuation of the operation and activities they undertake.

Overall, the ESAs find that NCAs perceive reputational and legal risks as the key risks of operating innovation facilitators. The ESAs also observe that, despite the benefits of innovation facilitators, NCAs still face limitations in their ability to keep pace with developments in financial innovation. Ultimately, the ESAs find that the NCAs consider that the establishment of the EFIF has improved the effectiveness of knowledge-sharing activities between innovation facilitators.

Based on the outcomes of the analysis presented, in this report the ESAs identify several considerations and recommendations addressed to NCAs, ESAs themselves and the EC. These recommendations aim at improving the operation of innovation facilitators and enhancing the experience for the participating firms. In particular, the recommendations addressed to the NCAs aim to help them improve their understanding of the concerns and interests of participating firms, enhance the scope of innovations captured, including at the cross-sectoral level, ensure an effective collaboration and coordination with other NCAs operating innovation facilitators, and improve their assessment of the performance of innovation facilitators and the identification of future improvements.

1. Introduction

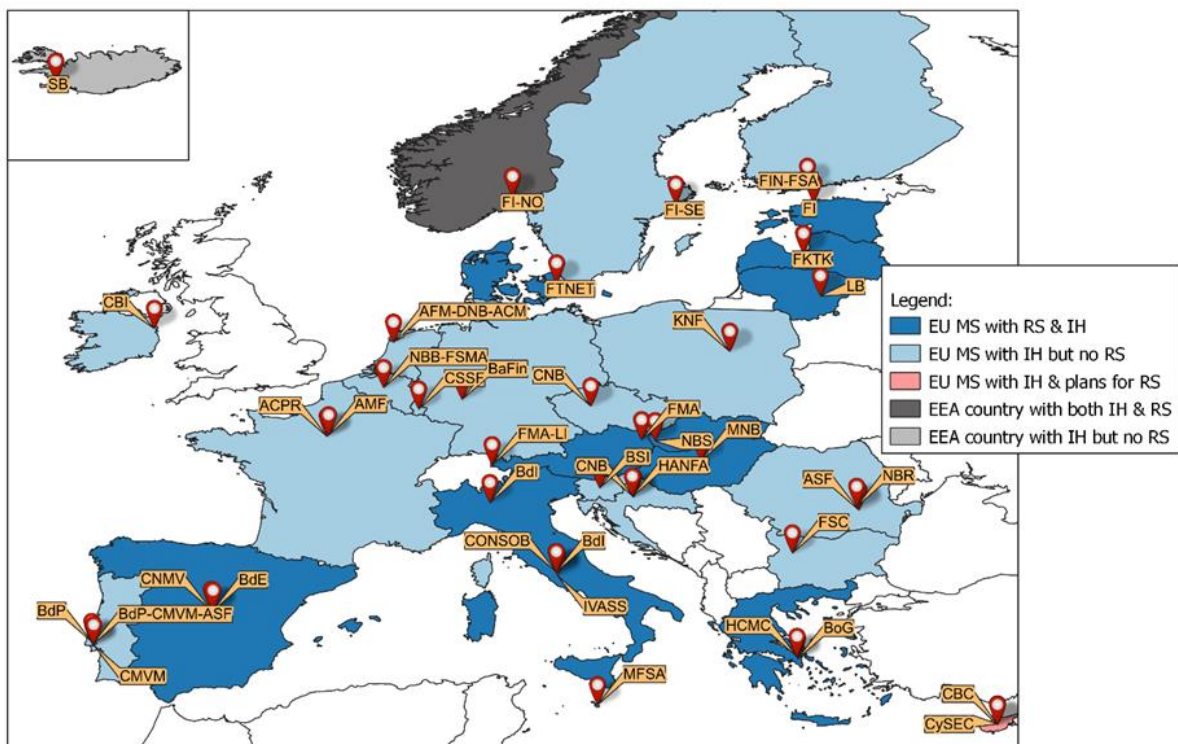
1. The ESAs contribute to the strengthening of communication and coordination between innovation facilitators (innovation hubs and regulatory sandboxes) across the Union via the European Forum for Innovation Facilitators (EFIF), which the ESAs chair under the framework of the Joint Committee of the ESAs. The main objective of the EFIF is to promote coordination and cooperation among innovation facilitators to foster the scaling up of innovation in the financial sector in the EEA and to promote a consistent approach towards FinTech.
2. As part of the work programme of the EFIF for 2023, the ESAs developed a report that updates the findings and considerations of the 2019 Joint ESAs report on innovation facilitators. This update aims to assist NCAs in further facilitating innovation across the Union and supporting the uptake of innovative applications in the financial sector. For that purpose, this report updates on the developments in the landscape of innovation facilitators in the EEA, analyses challenges, limitations and risks in the running of innovation facilitators, identifies NCAs' lessons learned from past activities, and highlights examples of how innovation facilitators support innovation and supervisors' understanding of innovation-related risks.
3. This report builds upon and complements the 2019 Joint ESAs report by considering the activities of innovation facilitators since 2019, and the work and information exchanges at the EFIF, which was launched in 2019 in response to the publication of the joint ESAs report.
4. This report has been prepared on the basis of relevant surveys answered by the EFIF members and the discussions held during the meetings of the EFIF in 2023. The responses received for innovation hubs cover 31 out of 41 hubs in 24 EEA countries, and for regulatory sandboxes – 12 out of 14 regulatory sandboxes in 11 EEA countries. The report has also benefited from bilateral discussions with NCAs on specific matters.
5. In the development of this report, the ESAs observe that only a small number of NCAs actually collect feedback from participants in the activities of innovation facilitators or establish indicators to track their performance. As a result of these limitations, the findings set out in this report mainly reflect the views of the regulatory and supervisory community, and not necessarily of the FinTech sector.

2. Landscape of innovation facilitators

2.1 A map and typology of innovation facilitators set up in the EEA

6. Innovation hubs are widespread across the EEA, while regulatory sandboxes are active in only a limited number of countries. As of October 2023, there are 41 innovation hubs and 14 regulatory sandboxes established across the EEA². All 27 EU Member States and three EEA countries currently operate at least one innovation hub. However, some of them offer limited functions, for example, representing a point of contact for firms to raise FinTech related enquiries with NCAs. 11 EU Member States and one EEA country operate regulatory sandboxes.

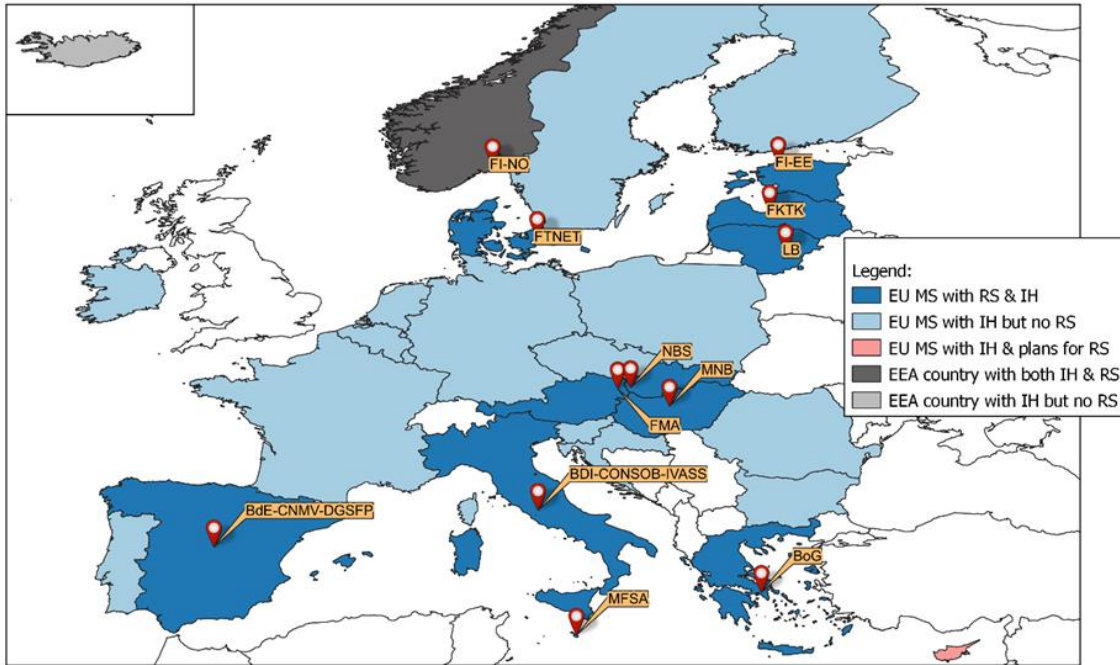
Figure 1. Innovation hubs³ in the EEA (as of October 2023)



² The full list of innovation hubs and regulatory sandboxes currently established across the EEA is provided in Annex 3.

³ If there is more than one innovation hub in a jurisdiction, please see full list provided in Annex 3.

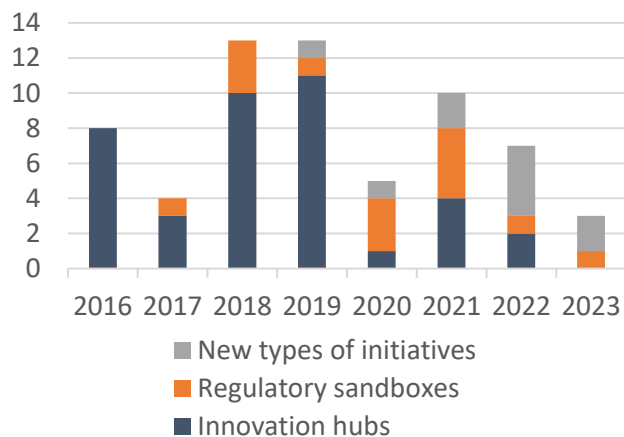
Figure 2. Regulatory sandboxes⁴ in the EEA (as of October 2023)



7. The majority of innovation hubs have been established between 2016 and 2019, while most of the regulatory sandboxes have been launched between 2020 and 2021 (see Figure 3). One regulatory sandbox was permanently suspended after two years of operation as the NCA that operated it identified operational and legal barriers⁵. Another country no longer has a sandbox because of the expectation gap that has arisen in the market when using this term, and continues only an innovation hub.

8. The ESAs observe that financial sector participants are increasingly interested in engaging with authorities via innovation hubs. A majority of EEA innovation hubs recorded an increase in the number of firms approaching the hub between 2018 and 2022 (see Figure 4).

Figure 3. Year when innovation facilitators became operational



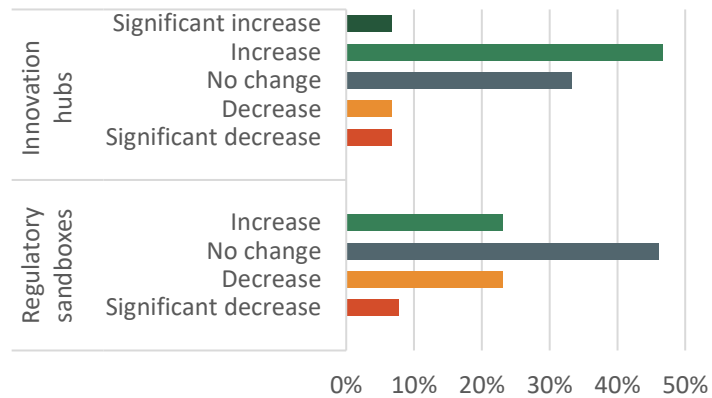
⁴ If there is more than one regulatory sandbox in a jurisdiction, please see full list provided in Annex 3.

⁵ One of the legal barriers was no clear basis in the EU regulations for different treatment of entities intending to test their solutions. In this regard, Chapter 5 includes one consideration addressed to the European Commission to undertake a comprehensive reflection on the EU-wide strategy to support financial innovation and the operation of innovation facilitators, in particular regulatory sandboxes, is needed.

9. In turn, the ESAs observe that market participants' interest in regulatory sandboxes is more nuanced, with a few sandboxes indicating waning demand between 2018 and 2022.

10. A third of NCAs operating sandboxes have recorded a decrease, in some cases in significant proportion, in the number of market participants that have applied to regulatory sandboxes.

Figure 4. Firms' interest in participating in innovation facilitators



11. Section 2.2 provides additional information on the activities of the innovation hubs and regulatory sandboxes, including the latest trends and areas of focus. Box 1 below describes synergies between innovation hubs and regulatory sandboxes.

Box 1. Synergies between innovation hubs and regulatory sandboxes (based on insights from jurisdictions that have both innovation hubs and sandboxes)

Various NCAs have reported to the ESAs that innovation hubs help in bringing new projects to the regulatory sandbox, with market participants often contacting the hub as a prior step to deciding on the application to the sandbox. In the innovation hubs, firms get regulatory, legal and/or other guidance from NCAs. Where NCAs identify that a longer interaction may be needed, they search for synergies with a sandbox. For instance, NCAs may assess the fitness of the innovation for the sandbox, or help a firm prepare or improve their future application to the sandbox, including on the documentation to present. Innovation hubs also help NCAs build internal knowledge and share it within other units at NCAs, including those running a regulatory sandbox.

The three innovation facilitators established in Italy provide an example of how synergies can benefit both NCAs and market participants. The *Milano Hub* supports the development of projects before going live and the *Regulatory Sandbox* allows for the testing of innovations in a real but controlled environment. Additionally, the *Fintech Channel* provides general support and dialogue to market participants of different levels of maturity, and helps eligible firms apply to either the *Milano Hub* or the *Regulatory Sandbox*.

12. Among the various tools for facilitating innovation in the financial sector, **innovation hubs and regulatory sandboxes remain the most common phenomena in the EEA** (see Figure 5). The ESAs observe that Member States are investigating new types of activities or adding new features to

existing facilitators. For instance, a few NCAs launched virtual sandboxes, and other so-called ‘soft’ initiatives and activities, such as hackathons, TechSprints or discussion forums with industry participants. More detailed information about some of these initiatives is provided in Annex 2.

Figure 5. Mapping of innovation facilitators in the EEA



13. Additionally, the ESAs observed that the financial sector is increasingly impacted by EU-wide initiatives that include experimentation clauses, or directly promote the establishment of regulatory sandboxes for specific fields. The list of selected examples includes the European Blockchain Sandbox⁶, the DLT Pilot Regime Regulation⁷ and the proposed EU Artificial Intelligence Act (AI Act), which includes measures to encourage Member States to establish AI regulatory sandboxes⁸. While it may be necessary for financial sector regulatory sandboxes to coordinate with new sandboxes in other fields, most of the NCAs have not yet formed views on how they plan to coordinate their sandbox activities with those initiatives. Some NCAs intend to add additional services into the scope of existing financial sector sandboxes, while others expect to have projects in the regulatory sandbox that could start application processes in parallel, for example, to the DLT pilot regime. With regard to AI sandboxes, NCAs expect to ensure close coordination and collaboration between the financial sector NCA and the authorities who would oversee the

⁶ In February 2023, the European Commission launched the European Blockchain Regulatory Sandbox, to promote regulatory dialogue to increase legal certainty for innovative blockchain solutions. The sandbox is expected to run from 2023 to 2026 and annually support 20 projects (both in the private and public sectors). The sandbox will be facilitated by a consortium consisting of a legal firm, its consulting arm, blockchain experts and web-designers. More at: <https://digital-strategy.ec.europa.eu/en/news/launch-european-blockchain-regulatory-sandbox>

⁷ Regulation (EU) 2022/858 of the European Parliament and of the Council of 30 May 2022 on a pilot regime for market infrastructures based on distributed ledger technology (DLT Pilot Regime): <http://data.europa.eu/eli/reg/2022/858/oj>. The DLT Pilot Regime allows DLT market infrastructures to test innovative solutions in different segments of the value chain for financial services, benefitting from certain exemptions from the legal obligations under MiFID/MiFIR and CSDR.

⁸ AI regulatory sandboxes aim to establish a controlled environment to test and validate innovative AI systems for a limited time pursuant to a specified plan before innovations are placed on the market. Such sandboxes may be established by one or more NCAs. Direct supervision and guidance from authorities should ensure compliance with requirements established in the EU Act and other national legislation, with particular attention to the interplay between AI sandbox and EU data protection rules.

application of the proposed AI Act; in particular, in relation to those AI systems used by financial institutions that may fall under the scope of the AI Act.

Box 2. EU Digital Finance Platform

In April 2022 the EC launched an **EU Digital Finance Platform**⁹, a collaborative space that offers practical tools designed to facilitate the scaling up of innovative firms across Member States by bringing together industry and public authorities. The EU Digital Finance Platform features an interactive mapping¹⁰ of the EU's FinTech sector and shows information about the registered firms. It also provides an overview of the latest policy developments, events, and calls for action. The EFIF Gateway¹¹ provides information about national licensing requirements, provides information about the work of the EFIF and offers a dedicated access point for entities interested in cross-border testing involving multiple national authorities.

In the second phase of development of the EU Digital Finance Platform, a new **Data Hub**¹² was created. This Data Hub will make available to participating firms specific sets of synthetic supervisory data¹³ for the purpose of testing new solutions and training AI/ML models. The Data Hub will make it easier to develop products that depend on data-intensive AI systems. The Data Hub will therefore complement national sandboxes and innovation hubs that typically focus on facilitating the dialogue between regulators and innovators.

2.2 Innovation facilitators – activity, insights into the latest trends and areas of focus

14. The ESAs' analysis suggests that the focus of the innovation facilitators' activities varies greatly.

Some innovation hubs are very accessible and open to innovators in the financial sector, and consequently experience a higher number of inquiries. Whereas other hubs are open only to a limited scope of entities, such as those within the boundaries indicated by program rules, providers of financial products or services that are innovative and sufficiently mature, or applicants with no previous contact with an NCA.

15. The ESAs observe that innovation hubs are contacted by various types of firms, including both FinTech start-ups and incumbents that already have an authorisation or license. These firms look for guidance on the applicable regulatory framework, on supervisory expectations, or seek

⁹ <https://digital-finance-platform.ec.europa.eu/>

¹⁰ <https://digital-finance-platform.ec.europa.eu/observatory/eu-fintech-map>

¹¹ <https://digital-finance-platform.ec.europa.eu/efif>

¹² Steered by DG FISMA's digital finance unit in collaboration with the European Supervisory Authorities (ESAs), <https://digital-finance-platform.ec.europa.eu/data-hub>

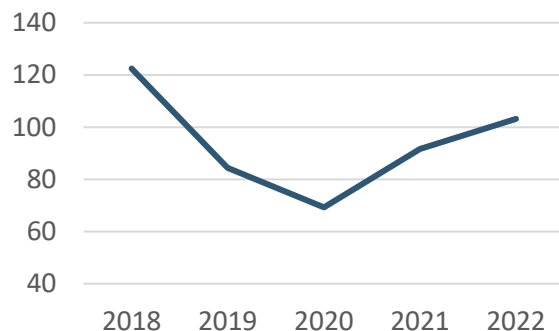
¹³ <https://digital-finance-platform.ec.europa.eu/data-hub/what-kind-of-data-available>

informal dialogue with the regulator. Firms also expect concrete support in the registration, authorisation or licencing process, or want to present innovative projects to an NCA. In a number of cases, firms were found to have presented immature projects that were not sufficiently developed from a legal and technical point of view to begin the authorisation process. However, the quality of submissions seems to be increasing over time.

16. Industry interest to submit inquiries to the innovation hubs follows certain patterns. For some innovation hubs, industry interest grew sharply during the first few years of operation and reached a plateau afterwards with a stable high number of inquiries in the last two to three years. Another NCA faced very high interest during the first two years of operation, especially from firms planning to start activity in the financial market or from already supervised firms aiming to implement innovative products or services based on innovative technology, but later the number of inquiries slightly decreased.

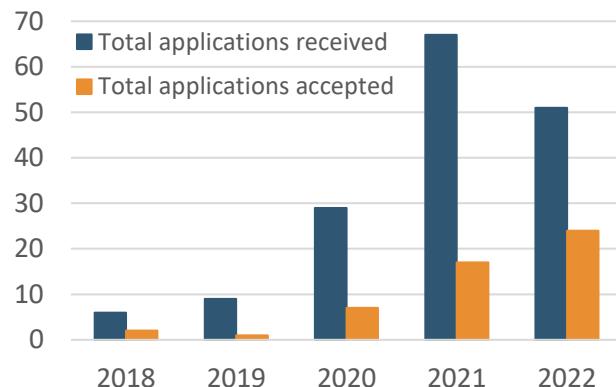
17. The ESAs note significant differences in the magnitude of activity in innovation hubs. A number of hubs see limited industry interest with approximately 1-10 inquiries received per year. At the same time, a majority of hubs receive up to 50 inquiries per year. A handful of innovation hubs receive significant amounts (100-500) of questions per year, with one innovation hub reporting of an even higher level of activity in the range of 500-1,000 inquiries received per year. Figure 6 depicts an average number of inquiries received per innovation hub, per year.

Figure 6. Average number of inquiries received per innovation hub, per year



18. Applications to regulatory sandboxes peaked in 2021, and then followed a somewhat declining trend (see Figure 7). However, the 2021 peak was mainly driven by an unusually high number of applications to the first cohort of one specific regulatory sandbox¹⁴, and therefore may not be representative of a general trend. Overall, the factors contributing to an increasing demand for sandboxes since 2018 are the high quality

Figure 7. An overview of applications to regulatory sandboxes received and accepted



¹⁴ As indicated by the decline of applications in 2022 and 2023.

and well described projects that apply to sandboxes, and the increasing capacity and experience of NCAs to delegate resources to work on the accepted cases.

Types of inquiries received by innovation hubs and regulatory sandboxes

19. **The types of inquiries received by innovation hubs are diverse.** Between 2018 and 2022, the most common types of inquiries received were related to (i) whether or not a certain activity required licencing, authorisation or registration and (ii) information and analysis about specific regulatory and supervisory obligations. They were followed closely by inquiries related to concerns about the regulatory treatment of the use of innovative technology (e.g. AI/ML, cloud computing, blockchain, APIs, etc). In turn, the least common inquiries were related to suggested changes in the legal framework (i) due to identified gaps or (ii) to facilitate more innovative business models, or proportionality issues. Innovation hubs also receive queries from third-country firms looking to enter markets in the EEA, EEA firms looking to expand to other jurisdictions, and inquiries regarding whether certain AML/CFT issues arise. Other types of inquiries include, for example, networking requests and suggestions for product demonstrations.
20. **The frequency of the different types of inquiries hints to successful operation of the innovation hubs.** Inquiries related to negative aspects (e.g. gaps in the regulatory framework or proportionality issues) were the least common, while the most common inquiries were related to the objectives of NCAs operating hubs. Additionally, the fact that inquiries related to authorisation and registration requirements are among the most frequent might be an indication that the objectives of innovation hubs are well communicated.
21. **The level of complexity of the inquiries received at hubs is also diverse. Nevertheless, NCAs do not find them difficult to address.** This may depend on the level of completeness and maturity of the inquiry, as well as on the level of development of the legal and regulatory framework pertaining to the specific question. In particular, if it requires an ad-hoc formulation of a new policy stance.
22. **The number of inquiries received via innovation hubs and applications to regulatory sandboxes is usually linked to the level of activity in the financial sector of a country.** Furthermore, the inquiries depend on the pace of the development of new business models, adoption of emerging technologies and adaptation of the regulatory framework. For example, DLT and crypto-assets, payment services, open banking/finance/insurance, RegTech and crowdfunding are among the most frequent topics that inquiries via innovation hubs relate to. Between 2019 and 2020, a significant number of inquiries were related to authorisation requirements or other guidance applying to payment institutions and e-money institutions. The number of these queries declined in 2021 and 2022 due to better market understanding of the regulatory and operational framework applying to payment services, and because of the guidance (e.g. FAQs) issued by NCAs. Over the last few years, however, questions related to crowdfunding, securities markets, DLT market infrastructures or crypto-assets have raised increased interest. On those topics, some NCAs have



experienced that some queries had a clear ‘hype’ element to them, for example some related to crypto-assets, in particular during the initial coin offering wave.

23. DLT and crypto-assets, RegTech and payment services-related topics are among the most frequently tested areas in regulatory sandboxes. Among the most common technologies tested through sandboxes are DLT/blockchain, APIs, AI, big data and advanced analytics.

3. Operating innovation hubs

24. The ESAs note that **the establishment and operation of innovation hubs in the EEA have achieved maturity**. The ESAs observe that most of the innovation hubs have been running for several years and two thirds of the NCAs are currently not reviewing or planning to review the organisational setup of their innovation hubs. Among those NCAs that plan to do so, the majority does not intend to change the objectives of the hubs. Hence, the planned organisational setup reviews aim to increase the efficiency of current internal processes and revamp the image and communications.

3.1 Main objectives and promotion of innovation hubs

25. **Raising awareness of all stakeholders is a common theme of the most frequent objective of innovation hubs** (see Figure 8). Overall, NCAs consider they promote a better understanding of the regulatory framework, of innovative and emerging technologies and of specific business use cases (and their opportunities and risks) among all stakeholders in financial innovation. Hence a majority of hubs seek to provide guidance on the conformity of innovative business models with regulatory and supervisory rules, get insights from innovators on potential needs to adjust the regulatory framework and, ultimately, to foster innovation in the financial sector thanks to network effects between authorities and market operators. Additionally, a third of hubs reported to the ESAs their ambition to foster technological development in their countries by exploring innovative use cases together with market participants. Conversely, a majority of NCAs do not establish hubs to attract new market participants from other countries or to reduce firms’ costs and time to enter the market with innovative products, services or business models. Finally, only a few of the hubs in the EEA have their specific objectives set in legally defined mandates, with most hubs’ scope of action stemming from the general supervisory and regulatory competencies of the NCAs.

Figure 8. Top 5 objectives of innovation hubs

1. Enhance firms' understanding of the regulation and supervisory expectations
2. Provide guidance on the conformity of applicants' proposed business models with regulatory requirements
3. Get insights on potential need to adjust regulatory framework
4. Establishing a network between authorities and market operators to foster innovation
5. To emphasise jurisdiction's openness to innovation

26. **Although the operational setup for most of the innovation hubs can be considered as stable with the hubs being well-established, some adjustments take place also while the innovation hubs are running**. Such potential changes made or planned to the innovation hubs operation may include: (i) the review of the application form, (ii) the revision of the internal procedure for the involvement of other internal structures, (iii) structuring the operational database/knowledge

management system to improve internal collaboration and collection of statistics, (iv) visual improvements (i.e. ‘face-lift’) for the innovation hub visual identity on the website, and (v) contribution to the ongoing discussions about the future of the innovation hub and possible ways to make it more efficient and fit for purpose.

27. **NCA’s mandates influence the way innovation hubs are promoted, both internally and externally.** NCAs that have a specific mandate for running an innovation hub, in particular, if related to enhancing and fostering financial innovation or objectives related to market development, and tend to have a clearly defined strategy on how to promote the innovation hub, both internally and with the industry. On the other hand, at least one NCA refrains from promoting the innovation hub because it is of the view that this would entail having a competition mandate.
28. **NCAs promote innovation hubs within the industry in various ways, but mostly through general contacts with the industry.** Two thirds of NCAs raise awareness about their innovation hubs by attending industry meetings, conferences and similar events. This increases market awareness regarding the existence and usefulness of innovation hubs, and enables NCAs to engage directly with potentially interested firms. Another common, though less preferred, way to promote innovation hubs is through advertisements on websites, social media, and various publications. Instead, advertising in traditional media is the least used method.
29. **The promotion of innovation hubs’ activities within the NCA is also important.** This may help in getting approval for additional resources needed to operate the innovation hub. In addition, there is a strong acknowledgement of the need to ensure close engagement from different functions within an NCA, for example, innovations, economics, prudential supervision, AML/CFT, consumer protection, and conduct. In this regard, some NCAs establish specific internal working groups, committees or teams that promote the cooperation. Arranging periodic meetings of internal experts involved in the daily operation of the innovation hubs and providing regular reporting to the management either through the above-mentioned groups or on an ad-hoc basis and issuing internal publications also helps. Innovation hubs that are run jointly by more than one authority or cover several financial services often require a greater internal promotion and cooperation.

3.2 Collecting feedback and suggestions

Approach to collecting feedback from innovation hub participants

30. **NCAs collect feedback and suggestions from innovation hub participants mostly through direct feedback or questionnaires.** In some cases, the feedback is provided by participants spontaneously. Some NCAs use dedicated surveys and questionnaires addressed to participants or made available on the NCA’s website. Collected data is analysed and findings are used to take any necessary correction measures. In certain cases, to address the issue of low response rate to the surveys, dedicated working groups are organised by the NCA with several previous participants, consultants and other members of the FinTech ecosystem. This approach allows to assess the work

of the innovation hub and come up with new ideas regarding its future operation. One example of the outcome of such a working group was the publication of a charter for the innovation hub, detailing its mission and pledges regarding deadlines, quality, etc.

31. Closing meetings with each participant at the end of interaction also allow the NCAs to collect feedback and publish it in written annual reports. Other NCAs instead hold interviews with innovation-related stakeholders, where partners, professional associations, incubators and relevant associations (e.g. banking, investment, insurance) discuss their approach to innovation. Feedback is also collected via e-mail, letters, and periodic meetings with participants.
32. To support their innovation hub, at least one NCA developed a knowledge management system for keeping all information gathered on the interview process. This also helps monitoring projects during their evolution and collecting feedback on the overall service provided by innovation hub.

Perceived benefits of innovation hubs based on feedback collected

33. **Although only half of NCAs collect feedback from innovation hubs' participants, the NCAs in general judge that the innovation hubs are perceived positively by the industry.** The majority of NCAs consider that the main benefits of innovation hubs include gaining insights into market development trends, the early identification of potential risks (for example, due to new technologies or business models), and possibility to inform the regulatory and supervisory approach. Based on NCAs' assessment, industry perceives innovation hubs as useful, especially because they represent an opportunity for the establishment and maintenance of a dialogue with the NCA. In fact, the expertise of subject matter experts and their perspective on innovation within financial services makes it beneficial for the development of business projects. Firms also reportedly find innovation hubs useful to obtain clarifications from the authorities on the regulatory and supervisory framework applying to them, including where they are subject to authorisation. This allows firms to obtain more legal certainty, including on operational matters, which helps to make their business plans and strategies compliant. Some NCAs allow participants to the innovation hub to directly ask questions or, where needed, they can arrange ad-hoc meetings with the supervisor. This is deemed to shorten the distance between NCAs and firms, while assuring open, cooperative and swift communication in the area of financial innovation, consistently with the objectives mentioned above. It was also outlined as an important advantage that responses are provided in plain, understandable language and, very importantly for firms, in a timely manner. Firms also appreciate the opportunity they are given to participate in various networking events and seminars.
34. **In addition, the ESAs observe that innovation hubs are often considered as an indication of a progressive, technology-friendly regulator,** willing to engage on innovation-related topics. In fact, innovation hubs improve NCAs' knowledge about the main FinTech sector concerns and help them to keep up with new developments in the financial sector, especially in relation to technological innovations. This experience allows NCAs to expand and improve their risk assessment perimeter

as well as gain experience regarding the taxonomy of FinTech services and technologies. A few selected examples how innovation hubs support innovation and/or supervisors' understanding of innovation-related risks are described in Box 3.

Box 3. Examples how innovation hubs support innovation and/or supervisors' understanding of innovation-related risks

Clarification of the legal and regulatory framework

The following examples illustrate revisions made to the legal and regulatory framework. One NCA, with contribution from the Legal department, provided the industry with clarifications regarding the regulatory framework of specific Buy Now Pay Later solution and legal qualification of loans for energy-efficient renovation works on buildings ('zero rate eco-loan').

Another NCA, in the aftermath of an application to the innovation hub, created an internal working group to analyse the restrictions to credit institutions providing non-financial services and the potential uneven playing field vis-a-vis payment institutions in a context of new open banking services and service bundles.

Several NCAs, through innovation hubs, became aware that a growing number of FinTech companies started using online identification tools (e.g. selfies, videos, automated scanning of ID papers) during the digital onboarding of new clients and that, some of these tools did not provide sufficient guarantees regarding their security. The outcome taken varied from interactions with the relevant stakeholders to actual regulatory framework changes made.

Although the number of actual changes to the regulatory framework is low, several NCAs take into account the observations from innovation hubs to inform their regulatory activities. One factor that might explain this is the fact that most legal and regulatory frameworks for financial services are done at European level, with little discretionary power at national level for NCAs to promote improvements. This is a lesson learned for strengthening the role of the EFIF, as a place to raise important regulatory issues and inform policy work of the European Agencies.

Change in supervisory procedures

One NCA has published a supervisory policy to facilitate innovation in the financial sector¹⁵. On a related note, another NCA identified that the use of blockchain solutions required changes in what information needs to be considered during supervisory processes. Meanwhile, another NCA endorsed a new approach to give guidance to the market in case of a lack of regulatory provisions and to express its vision towards a safe technological development, also underlying the risks and the opportunities. It is also considered that innovation hub outcomes give better consideration of IT/cyber and innovations issues in prudential and conduct supervision.

Change in NCAs' own technological approach

Several NCAs mentioned that ideas and questions collected through innovation hubs benefited their overall SupTech strategy and helped to identify and develop specific SupTech initiatives. Concrete use

¹⁵(in Estonian language only) https://www.fi.ee/sites/default/files/2021-06/FI%20soovituslik%20juhend_Finantsinspektsooni%20i%C3%A4relevalvepoliitika%20uuendusmeelse%20finantssektori%20soodustamiseks_KINNITATUD.pdf

cases referred to include examples in the fields of data-driven supervision, automation, blockchain, quantum computing, and tools for fraud analysis.

Perceived limitations of innovation hubs based on feedback collected

35. **Despite the overall positive feedback, the ESAs observe that innovation hubs encounter some limitations, including having misaligned participants' expectations or not being able to give prompt and precise responses to queries.** First, in some cases, firms may have expectations that do not correspond with the scope, mandate and support offered by the innovation hubs. For example, at least one NCA indicated that participants expressed the need for advisory services that are not in the mandate of the innovation hub. Additionally, in some cases firms communicated on their website they were supported by regulators as a result of being part of the innovation hub. Similarly, some firms (for example, IT/solution providers) that themselves are not subject to supervision and therefore do not seek authorisation, expect to get a 'stamp of approval' from the supervisor/regulator to help them from a commercial point of view.
36. Secondly, based on considerable amount of NCAs' experience, some firms perceive that innovation hubs' helpdesks operate too slowly, for example when answering the inquiries. Additionally, information regarding the regulatory framework in some cases is considered not readily accessible, especially in a non-formal, non-technical language format. The precision of the answers received can also be perceived as insufficient, as firm expect definitive answers, while NCAs, in many cases, are not able to provide definitive advice on specific topics. Giving precise answers to inquiries can sometimes be challenging for NCA for different reasons – due to their complexity, to the unprecise regulatory and supervisory framework applying to innovations, but also because in many cases questions are out of scope of the NCAs' remit.
37. Finally, although overall innovation hubs' communication between firms and NCAs is improving, some innovation hubs' participants suggest to allow for a more in-depth dialogue, for example, by organising more on-premise physical meetings in addition to virtual ones. Other industry suggestions as recollected by NCAs include suggestions to (i) introduce a regulatory sandbox or expand the scope of innovation hub to financing and networking activities, (ii) better address participants' needs to find possible business solutions and (iii) provide advisory services.

3.3 Risks and challenges of innovation hubs

Risks related to operating an innovation hub

38. **Potential reputational/legal risk and inability to keep pace with innovation-related developments in the industry are considered to be the main risks related to the operation of innovation hubs.** Reputational risk may arise if a requested business model fails. Other risks such as consumer/investor protection, level playing field, regulatory arbitrage, insufficient cross-border

cooperation, insufficient coordination between authorities within a jurisdiction, investor protection or market integrity are also relevant.

39. There may also be risks related to opinions expressed on complex business models. An early ‘unofficial’ NCAs’ view on very complex (and thus potentially not well thought through) business models could present significant risks. As a result, NCAs’ positions in such cases are provided only after complex business models have been thoroughly examined and understood by its experts.

40. The ESAs observe that, according to several NCAs, some of the abovementioned risks have materialised.

Main challenges related to operating an innovation hub

41. The ESAs observe that NCAs face several key challenges related to operating innovation hubs:

- a) Incomplete/immature inquiries – some NCAs note that a significant number of inquiries are at a very preliminary stage (the projects are not defined as clear business model). Some applicants do not search for information that is already publicly available and only have general questions.
- b) Ineffective coordination between authorities within a jurisdiction – some enquiries may be out of the scope of the NCA’s responsibility and thus need to be referred to other authorities. This can be an issue where communication channels and procedures between authorities are not well established.
- c) Keeping up-to-date with market developments and being able to foresee the necessary changes in the licensing, regulatory or supervisory frameworks.
- d) Lack of human resources - some NCAs lack in-house experts regarding new technologies (for example, DLT, cloud computing, crypto-assets, etc.). Managing human resources over time can also be difficult as the innovation hub demand varies. For example, assigning full-time resources may not be efficient. On the other hand, assuring timely responses when the number of queries suddenly increases without additional headcount is challenging. If consultations last for some time and the delivery of answers is lengthy, that reduces the quality of the experience for participants. Some NCAs find it difficult to balance between keeping human resources available to ensure that innovation hubs remain ‘open’ for inquiries and at the same time preserving the NCA’s capability to conduct other tasks.
- e) Lack of regulation or ‘grey zones’ in regulatory framework related to new business models – for some NCAs the lack of existing regulation or ‘grey areas’ in existing regulation are of a particular concern. The main challenges involve unregulated topics where NCA can give only a general overview of the topic without being able to address regulatory issues. Some entities can be in a ‘grey zone’ regarding the regulatory framework, either because their activity is

completely new or because the NCA never had to adopt a position on the regulation applicable to their activity. When these entities contact innovation hubs they face the risk of disrupting their business model in case the NCA's interpretation of the rules may prevent them from operating in the way they used to.

- f) Fostering innovation while ensuring regulatory compliance, especially for NCAs that act as a supervisor and a facilitator of innovation. On the one hand the innovation hub aims at fostering innovation by providing innovative actors with a welcoming environment, but on the other hand, NCAs have to make sure all activities remain compliant with the regulatory framework and follow the technological neutrality principle.
- g) Budgetary limitations – if a separate unit is formed to deal with answers to inquiries, there will be a need to provide a separate budget for salaries for the involved staff; if there is no dedicated unit set up, then allocation of the appropriate financing and resources remains within the management's remit. Decisions on what software to use to support hub activities or other improvements to make, also have financial implications. Some NCAs indicate that no such analysis has been done.

42. In the context of cost-benefit analysis, some NCAs indicate that the main areas driving innovation hubs' costs relate to (i) inquiries not related to an innovation, (ii) receiving application forms with "required fields" that are not fully described (such applications require guessing the business model of the applicant), which slows down the decision-making process, and (iii) queries that are not of a regulatory nature and do not fit within the scope of the powers of the authorities running the innovation hub. Box 4 provides a few examples where benefits of innovation hubs may not outweigh the costs.

Box 4. Examples where benefits of innovation hubs may not outweigh the costs

ESAs' analysis of a few cases described by the NCAs indicates that sometimes it may be difficult to assess benefits of the innovation hub engagement. As explained below, even though the objectives of a specific engagement have not been accomplished, some positive aspects appeared.

Case study 1 – assisting crypto-assets services providers (CASPs) to open professional bank accounts. In 2021 one NCA organised a working group to bring together banking institutions and CASPs. The goal was to make it easier for CASPs to open professional bank accounts. Even though the participants could not agree on the final documents, the working group helped in bringing the positions of the actors closer, made them visible and public, and made clear that the public authorities were not trying to impede the development of innovative actors.

Case study 2 – unfruitful time commitment due to incorrect expectations of the participant. Another NCA received a query from a firm that wanted to set up a secondary market and apply to the DLT Pilot Regime without the necessary legal, technical or financial resources. Despite the evident impossibility of creating a minimal viable product, the participant was very persistent. Many

meetings were conducted to explain and discuss the regulatory requirements and resources needed to comply with them. The participant seemed to expect the innovation hub's experts to act as personal legal advisors, but this was not envisaged as a function of the innovation hub. Given the immaturity of the query, the incorrect initial expectations of the participant, and the time spent by the NCA's experts, the costs of this particular case were considered to outweigh the benefits achieved.

3.4 Outputs and outcomes of innovation hub engagement

Specific outputs of innovation hubs – NCAs' perspective

43. **The ESAs observe that more than a half of NCAs provide an overview of their innovation hubs activity as a section of their annual reports or as separate structured reports/studies on innovations observed via innovation hub.** Nearly 40% of NCAs issue and keep updated frequently asked questions (FAQ). Some NCAs also issue public statements on specific innovation-related issues. A noticeable part of these reports, FAQs and guidance are found to be related to crypto-assets area¹⁶. For the ease of reference, a non-exhaustive list of relevant publications and links to innovation hubs' reports is included in Annex 3.
44. Around one fifth of innovation hubs publish statistics on queries received externally and organise industry roundtables to disseminate learnings. On the other hand, the ESAs also note that around one fifth of innovation hubs keep information and activity reports for internal use only and do not disclose them publicly.
45. The ESAs are aware that NCAs use various additional information sharing channels to reach both internal and external stakeholders. Such examples include, (i) quarterly information and intelligence updates, both internally and to the innovation hub's stakeholders, (ii) regular engagement with subject matter experts within an NCA to share any information gathered through innovation hub meetings (in particular where a firm is considering to apply for authorisation), (iii) regular discussions and exchanges on the latest trends with industry representatives, including sharing statistics (which are not openly available) with selected stakeholders, (iv) issuing reports for internal use, (v) publishing occasional papers to raise awareness of market players on significant financial innovation topics (e.g. open finance) or topics explored through TechSprints and experimentations, (vi) delivering to each selected participant a report of NCA's analysis of a participant's project and questions raised (these reports are not public, although answers are incorporated into the FAQ published on NCA's website), or (vii) providing non-binding answers to the queries by emails.

¹⁶ For example: Guidance on virtual assets <https://www.cssf.lu/en/2021/11/cssf-guidance-on-virtual-assets/>; Crypto-assets: a threat to the climate transition <https://www.fi.se/en/published/presentations/2021/crypto-assets-are-a-threat-to-the-climate-transition--energy-intensive-mining-should-be-banned/>

Specific outcomes of innovation hubs – firms' perspective

46. From an innovation hub participants' perspective, there are mainly three possible ways forward following innovation hub engagement. The firm may (i) apply for an authorisation/registration procedure with an NCA, (ii) adjust its business model and operation in order to be compliant with the existing legal and regulatory framework without the need for any application, or (iii) pursue further dialogue with an NCA, including possible application to a regulatory sandbox. In this regard, Box 5 provides some specific illustrations.

Box 5. Examples of specific outcomes of innovation hubs

Several NCAs indicated that innovation hub participants fill applications for authorisation or registration under a certain regime after they receive clarifications, especially in relation to the regime applicable to their business model and the location of information on the requirements and processes to be followed.

Another NCA provided an example where the main solution proposed by a firm encompassed additional services that were not regulated but were inherently bundled with regulated service – a digital platform that facilitated the establishment of certain types of agreement among participants tied with payment initiation services. In this case, innovation hub members, based on their expertise, provided opinions on factors that should be taken into account as part of the risk assessment during the authorisation process.

As an additional example, one NCA revealed that a new business model was presented based on a digital customer onboarding solution using biometrics. That company later applied to the regulatory sandbox to carry out a deeper analysis of its project.

3.5 Metrics to assess the functioning of innovation hubs

47. **The ESAs observe that NCAs make an overall positive assessment of innovation hubs.** 45% of NCAs make a positive assessment and 40% make a very positive assessment of the activity of the innovation hubs. The only two 'negative' assessments relate to either slow response times to inquiries due to lack of resources or the inability to address them properly. However, this self-assessment needs to be interpreted with caution as very few NCAs actually measure the functioning of innovation hubs by using quantitative indicators.

48. The majority of innovation hubs do not have metrics to assess their functioning. Only 20% of innovation hubs use indicators to assess their functioning, success and usefulness. A non-exhaustive list of indicators includes the following examples below.

49. Some NCAs set as an indicator the number of firms provided with specific guidance, the number of publications (e.g. analysis of digitalisation trends among financial institutions), or the number of events organised.
50. For measuring engagement with the FinTech ecosystem, one NCA uses the number of meetings of the steering committee and of various working groups, as well as the number of public interventions, including discussions with RegTech providers, academics, students. A few NCAs also record the number and nature of queries (type of service, stage, origin, etc.). One NCA carries out ad hoc 'image studies', which include questions regarding how the NCA is perceived on innovation topics. Another NCA measures the time to organise the meeting (i.e. the date of the meeting compared to the date of inquiry). Box 6 provides more details about the deadlines set for responding to queries.

Box 6. Deadlines for responding to queries

Half of the innovation hubs set and monitor deadlines for responding to queries, including any follow-up engagements. The actual time that it takes, on average, to respond to an inquiry is usually between a few days and three weeks. Only a few NCAs reply in less than one or two days, or in more than two months. One NCA sets the target response time to different questions received against the benchmark of 14 days for 'trivial' questions, 28 days for 'difficult' questions, and 90 days for 'very complex' inquiries.

3.6 Regulatory and supervisory cooperation and coordination

51. To ensure effective operation of the innovation hub, a dialogue both within an NCA and with other authorities is needed.
52. **As innovation hubs need to be careful when assessing new activities or business models, in complex cases NCAs aim to assure intensive interdepartmental coordination.** For example, when dealing with queries received, responses provided have to be closely articulated with any other relevant departments within the NCA involved. This is important to ensure a consistent approach and shared views across all units, for example, those in charge of authorisation or permanent control of regulated entities. In addition, some enquiries raised may be out of the scope of the NCA's responsibility (e.g. related to fiscal matters). Such queries may be referred to other authorities or rejected. Box 7 illustrates another practical positive impact of innovation hubs on NCAs.

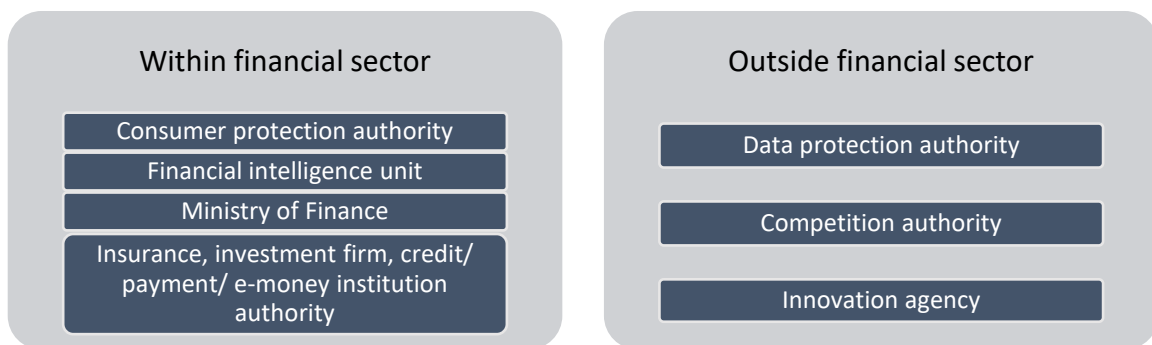
Box 7. Innovation hubs' impact on competent authorities' business model analysis under PSD2

Establishment of forums for exchange of information with market participants (e.g. various FinTech forums, innovation hubs, etc.) to monitor market trends and gather a deeper understanding of innovative business models and the key economic drivers of the industry is highlighted as a best

practice in the EBA report on the peer review on authorisation under PSD2¹⁷. Moreover, where such forums exist, competent authorities are encouraged to share key findings of those forums with the staff responsible for the assessment of the business plan of payment institution or e-money institution seeking authorisation under the PSD2. This can better inform the NCAs' assessment of the plausibility of business plans as well as understand the base assumptions upon which they were constructed.

The ESAs note that in the majority of the cases no more than one authority is involved in the activity of the innovation hub. In situations where operation of innovation hub involve more than one authority, most often cooperation is maintained with authorities listed in Figure 9.

Figure 9. Cooperation with other authorities



53. **In the majority of the cases domestic and cross-border cooperation works well.** The ESAs note that NCAs value continuous, structured and agile communication between authorities, and consider that, in general, supervisors are willing to share their experience and see the added value in doing so. Cooperation is understood to work well on frequent operational, regulatory and research/monitoring issues and the establishment of innovation hubs is perceived as having facilitated cooperation between experts from different NCAs. Box 8 describes a few selected examples of good international cooperation between authorities.

54. As one practical example, if there is uncertainty as to which authority should answer a query, one NCA first discusses internally who would be best placed to respond and, if needed, organises joint calls/meetings with the applicant. Another NCA, which has established a FinTech forum, highly appreciates its role and states that it is a very useful tool to share information and views regarding the innovation across public authorities, and to address issues in a holistic way.

55. However, several NCAs reflect that cooperation is working only in part. These NCAs report that the existence of different regulatory scenarios makes it difficult to create a harmonised set of answers

¹⁷Report on the peer review on authorisation under PSD2 (11 January 2023). Link: https://www.eba.europa.eu/sites/default/documents/files/document_library/Publications/Reports/2023/1050744/Peer%20Review%20Report%20on%20authorisation%20under%20PSD2.pdf

to similar queries. Also, cooperation on cross-sectorial issues (e.g. with data protection authorities) can be difficult. One NCA further suggests that innovation hubs' cooperation could be improved by enhancing harmonisation at the EU level.

Box 8. Examples of good international cooperation between authorities

In 2021, Bank of Italy together with BIS Innovation Hub Singapore organised the G20 TechSprint on Green and Sustainable Finance. As another example, Milano Hub (Italy) organises bilateral meetings to discuss specific topics to identify best practices and is planning to establish a new cooperation relationship and to enlarge its networking with other innovation hubs. Another innovation hub (AMF, France) is involved in more specialised international organisations such as the IOSCO (e.g. FinTech task force/DeFi working group). The AMF has also signed innovation cooperation agreements with several counterparts internationally. These agreements include mutual exchange of information to better understand the respective regulatory frameworks, including information sharing on innovative trends. The Central Bank of Ireland (Ireland) regularly engages with data protection, competition and consumer protection authorities on innovation features, when relevant.

56. **The ESAs consider that, in principle, the establishment of the EIF has improved the knowledge sharing between innovation hubs.** However, there is room for further potential improvements, for example, by considering (i) additional in-person meetings or seminars around shared topics/issues, (ii) to provide more information about innovation hubs and regulatory sandboxes (iii) to provide deeper involvement of the academia and innovation experts (iv) to discuss in more detail certain cases or (v) to further facilitate the sharing of specific legal or other issues that have arisen, including those related to challenges formulating the innovation hub's responses or to authorisation processes.

4. Operating regulatory sandboxes

4.1 Main objectives and promotion of regulatory sandboxes

57. The ESAs observe that the main objectives for the establishment of regulatory sandboxes relate to (i) increasing knowledge of the NCAs about financial innovations, risks posed and opportunities provided, (ii) fostering innovation uptake in the financial market, and (iii) getting insights on the potential need to adjust regulatory framework (see Figure 10).

58. Regulatory sandboxes provide a monitored space in which NCAs and firms can better understand the opportunities and risks presented by innovations, viability of innovative financial services or business models, and their regulatory treatment.

Through regulatory sandboxes NCAs can support the growth and development of the FinTech market in a safe manner that does not pose risks or cause negative effects for the

financial system and consumers. However, the objective to reduce costs and time for market entry for innovative products, services or business models is not common. Regulatory sandboxes also help to identify the most appropriate and effective regulatory interventions, especially when regulation may be insufficient or unclear.

59. All regulatory sandboxes analysed by ESAs in this report have a general, not thematic scope. This approach allows NCAs to observe a broad range of innovative solutions and technological developments. In one jurisdiction, the regulatory framework of the sandbox establishes the possibility of setting application windows dedicated to specific themes, but as of September 2023, this option has not been used. Some NCAs consider that, in fact, by choosing particular themes, NCAs could, in some way, be limiting and/or steering innovations.

60. Looking at the scope of activities, most of the analysed regulatory sandboxes do not provide additional services to participants. However, at least two regulatory sandboxes also make available a preliminary consultation procedure as a preceding step before the submission of the request for licensing.

Figure 10. Top five objectives of regulatory sandboxes

1. Increase knowledge of the authorities about financial innovations, risks posed and opportunities provided
2. Foster innovation uptake in the financial market
3. Get insights on potential need to adjust regulatory framework
4. Enhance firms understanding of the applicability of the existing regulatory framework
5. Enhance legal certainty within the market

61. **NCA use various mandates to establish regulatory sandboxes.** In one instance, the regulatory sandbox was established by a new law for the digital transformation of the financial system, providing a specific mandate for several NCAs in that country. In some cases, local government (for example, the Ministry of Finance) requested NCAs to establish FinTech initiatives and it provided, by a decree, the legal basis to implement the regulatory sandbox. In other cases, NCAs set out autonomously the legal framework and procedures to set and manage the sandbox. One NCA considers that the testing in its regulatory sandbox does not provide any waivers to participants, therefore, there is no specific mandate or a special external regulation needed for a regulator to support the testing phase – the NCA sets only internal procedures to handle applications and process the testing case. To illustrate another example, one NCA reported that its regulatory sandbox is currently established without a change in the law and therefore the scope of the sandbox is limited to firms authorised by the NCA. This NCA considers a legislative change in the future, which would expand the scope of the sandbox and make it open to non-authorised firms as well. As further explained in Box 9, in some regulatory sandboxes unregulated firms can only participate if they partner with entities holding a license to carry out a regulated service.
62. However, several NCAs have not established regulatory sandboxes because they consider that this is not within the scope of their mandate. Looking at overall challenges faced by NCAs running regulatory sandboxes, one of the main barriers to the establishment and operation of regulatory sandboxes relates to having a clear legal basis and then accordingly ensuring dedication of support employee resources and setting NCAs' internal processes and procedures.
63. In terms of communication with the industry, NCAs, in general, promote regulatory sandboxes mainly through a dedicated webpage and through organising or attending conferences, innovation forums and targeted meetings, for example, with FinTech associations and community. Another common way used by NCAs to promote their regulatory sandboxes is the publication of articles or reports (for example, annual reports or exit reports for the projects that complete the testing). Social media channels are rarely used. Additionally, innovation hubs play an important role in the promotion of the sandboxes – for instance, several NCAs use their innovation hubs to direct potentially eligible firms to their regulatory sandbox. One NCA provides for collaboration with independent local agencies that offer support schemes and programmes to start-ups and businesses.

4.2 Collecting feedback and suggestions

Approach to collect feedback from regulatory sandbox participants

64. **ESAs analysis indicate that only around 20% of NCAs running regulatory sandboxes gather feedback or suggestions from regulatory sandbox participants.** Feedback is collected through various channels, for example, during periodic meetings or at the end of the testing phase, via dedicated surveys or a general contact form available on the NCA's website. One NCA collects and shares sandbox participants' feedback in the lessons learned report.

Perceived benefits of regulatory sandboxes based on feedback collected

65. **NCA consider that regulatory sandboxes are perceived by the industry as useful.** Regulatory sandboxes are assumed to increase visibility to firms' projects, which helps to obtain funding. Regulatory sandboxes also increase an understanding how financial regulation applies to firms' business models and help to familiarise with the requirements firms have to comply with. Based on the feedback received, the NCAs stated that they had received very positive feedback from firms which have participated in preliminary consultations with them, especially regarding the approachability of the team, the assistance provided to better understand regulatory and supervisory expectations, as well as the scope and eligibility criteria for the sandbox. It seems important for the industry to be aware that the regulator is willing to keep an open dialogue with firms and is ready to support testing.
66. In terms of concrete proposals, some regulatory sandbox participants suggest to further improve regulatory sandboxes by (i) increasing visibility of the projects that participate in the sandbox, (ii) reducing the administrative burden and (iii) highlighting the importance of cooperation with data protection authorities.
67. **The ESAs observe that the main benefits of the operation of regulatory sandboxes for NCAs are the opportunity to understand the application of the regulatory framework** with regard to the innovative proposition and **the ability to reassess the regulatory perimeter** in the context of determining how the proposition fits within the regulatory framework. Other benefits, such as (i) the ability to recalibrate regulatory requirements within the existing framework, (ii) the opportunity to build in appropriate safeguards for innovative propositions (for example with regards to consumer protection, market integrity and financial stability considerations) or (iii) ensuring proportionality and technical neutrality, are slightly less important although highly relevant. Regulatory sandboxes also allow supervisors to keep up-to-date with the latest innovations and technologies applied in the financial sector.
68. **The main benefits of the operation of regulatory sandboxes for firms¹⁸ include having a close contact with NCAs for the purpose of testing and gaining better appreciation of the application of the regulatory scheme and supervisory expectations regarding the innovative proposition.** Slightly lower in the perceived ranking of benefits is dedicated supervisory support (in terms of hours spent) provided by the NCAs' IT or other risk-management experts. Some regulatory sandbox participants are seen to value potential better interaction with investors and consumers, stemming from the ability to demonstrate that in the context of admission and actual testing done in the regulatory sandbox they have benefitted from a continuous dialogue with authorities. As a result, regulatory sandboxes can bring additional benefit for the industry via improved funding for their projects. Examples of other benefits include better visibility within the industry after exiting the

¹⁸ Based on the responses provided by NCAs

sandbox, the possibility to test with real users, as well as the opportunity to participate in cross-border testing initiatives (although this option has not yet been used in practice).

69. A few selected examples to illustrate how regulatory sandboxes foster innovation and increase supervisors' awareness of innovation-related risks are described in the Box 9 below.

Box 9. Examples of how regulatory sandboxes support innovation and/or supervisors' understanding of innovation-related risks

Case study 1: Lithuania – peer-to-peer insurance platform. The peer-to-peer (P2P) insurance platform has been tested in the regulatory sandbox in Lithuania. The P2P insurance platform is based on the principles of the sharing economy, where its members form groups to protect themselves against losses, make their own decisions on loss compensation using pooled funds and get back those unused. The tests conducted in a regulatory sandbox helped to identify that P2P insurance services may be beneficial to consumers. However, it led to a conclusion that due to the specific nature of these services, the application of the current licensing requirements would be an unreasonable barrier to the development of P2P insurance services. As a result, the Bank of Lithuania issued P2P insurance [guidelines](#)¹⁹ (only in Lithuanian) that established conditions for P2P insurance activities that were proportionate to the risk related to them.

Case study 2: Spain – a platform that enables companies to offset existing positions. One of the projects tested in the regulatory sandbox was a technological platform that enabled companies within the same group operating in different countries to offset existing positions between them and settle the resulting net balance using digital tokens on blockchain networks. According to the findings document published by Banco de España after conducting the tests, the service offered through this platform should be categorized as fund intermediation (as defined in Article 3.19. of the Spanish Royal Decree-Law 19/2018, dated 23 November 2018, on payment services). Specifically, it qualifies as a money transfer, which the firm carries out through operations with their own funds in crypto-assets. Money transfer is a reserved activity according to the aforementioned Royal Decree-Law, and as such, its provision as a professional service requires authorisation. As a result, the firm would need to obtain a payment service provider license prior to the platform's go-live.

Case study 3: Spain – new business model consisting of financing based on orders. A new business model, financing based on orders (ordering), instead of financing based on invoices (factoring), has been successfully tested in Spain. This project may entail benefits for users of financial services and increase the efficiency of entities or markets. The solution is a platform where sales and purchase transactions are recorded in a blockchain, enabling financial institutions to offer financing to the supplier on orders (ordering) and to the buyer in advance of their sales (purchasing). The tests have

¹⁹ <https://www.lb.lt/lt/naujienos/lietuvos-banko-tarpusavio-draudimo-veiklos-gaires-tvarus-naujoves-kelias-i-rinka>

met the objectives set out in the testing protocol, the exit report has been published²⁰, and the project is ready to be launched to the market.

Case study 4: Norway – solution for sharing client data between financial institutions. In the project, a solution for sharing client data between financial institutions was tested to comply with AML/CFT legislation related to the onboarding and monitoring of customers. The case solution offers financial institutions the opportunity to build up consolidated data about a customer. Improved data quality and data management provide a better basis for understanding risks associated with customer relationships. As it is challenging for each financial institution to ensure adequate data quality and overview, sharing of anonymised data can contribute to enhanced AML/CFT compliance. The collaboration on data sharing through a common secure platform can also provide a platform to apply machine learning models in the future. The Money Laundering Act has provisions for the exchange of information between institutions, but how the provisions should be understood and used in practice is somewhat unclear. To create solutions compliant with the regulatory framework, it is important to be able to discuss issues to identify and solve regulatory issues. In the lessons learned report²¹ the firm emphasised that participation in the regulatory sandbox increased understanding of regulatory requirements and helped to identify and solve obstacles to innovation. The firm also valued the contribution of the Norwegian Data Protection Authority related to GDPR compliance aspects.

4.3 Key aspects in the design and operation of regulatory sandboxes

70. Regulatory sandboxes in the EEA are open to a broad range of applicants. All analysed regulatory sandboxes are open to firms holding a license to carry out regulated financial services. The majority of regulatory sandboxes are also open to firms not holding a license to carry out regulated financial services prior to entry into the scheme, and also to technology companies. Some regulatory sandboxes allow access to natural persons. Others are also open to entities, that are required to obtain the license, with a temporary license. Some further examples of eligibility criteria are provided in Box 10.

Box 10. Eligible entities

Based on some selected examples, one regulatory sandbox has very broad eligibility criteria and no license or authorisation is required – projects may be promoted by any natural or legal party, individually or together with other persons, including technological firms, financial entities, credit administrators, associations, public or private research centres and any other interested person. However, in some regulatory sandboxes, firms not holding a license (for example technology companies) may only apply in partnership with an authorised institution.

²⁰ https://www.bde.es/f/webbde/INF/MenuHorizontal/Servicios/Sandbox/Conclusiones_Ithium_100.pdf

²¹ https://www.finanstilsynet.no/globalassets/regulatorisk_sandkasse_sluttrapport_quesnay.pdf

71. **Individual guidance that can be provided to firms is the most common tool available to NCAs as part of the regulatory sandbox.** This is the case in the majority of regulatory sandboxes analysed. Flexibility in the applicable legislation is also a very important element, further described in Box 11. So-called ‘no enforcement measures’ have been found to be applied by one NCA.

Box 11. Applicable legislation

In one country the national sandbox law provides the possibility that projects are not subject to the specific legislation applicable to the provision of financial services, because the tests are not considered professional services. In any case, they have to comply with the provisions of the local sandbox law and the corresponding protocol. The tests shall never jeopardise financial stability, the integrity of financial markets or the protection of customers and must comply with AML/CFT and the data protection regulation. When drafting the protocol, some obligations that are not considered relevant in the context of the testing can be waived, such as payment of registration fees. During the testing, some specific waivers can be provided.

However, in a few countries NCAs can only provide flexibility concerning some national regulations. As way of another example, one NCA can issue a license with conditions and for a temporary period in the case of public testing.

Finally, as already highlighted in 2019 ESAs report, NCAs can follow the proportionality principle in applying EU regulatory and supervisory requirements, applying a more flexible and innovation-conducive interpretation of certain legal acts regulating the financial market.

Phases of regulatory sandboxes

72. As introduced in the ESAs 2019 report, typically, regulatory sandboxes follow four phases: application, preparation, testing and exit/evaluation.



73. However, there are some differences, for example, the preparation phase in some regulatory sandboxes may be merged with the application phase. In relation to the building of the NCAs’ experience gained while running regulatory sandboxes, the section below provides a deeper analysis of findings from operation of each of the regulatory sandbox phases.

I. Application phase

74. **The majority of regulatory sandboxes are open for application to firms at any time.** In two countries firms may submit applications to participate in the regulatory sandbox only when an application window is open – during the so-called ‘cohort’. In one of these jurisdictions, there are two cohorts planned per year, every six months, and to date, six cohorts have been run, each open

for a period of six weeks. In the other country, the regulatory sandbox decree provides for the NCAs to choose to open the sandbox for applications at any time or to schedule cohorts. For the first application of the sandbox regime, the NCAs chose to set a window (open for a period of two months) for submitting applications without setting a maximum number of eligible applications.

75. In terms of pros and cons of a cohort-based regulatory sandbox approach versus the one with an unrestricted application window, it may be more efficient and easier for the NCAs to organise the workload and resources needed in case of a cohort-based approach. In this case, the approval of applications are concentrated in small periods and various synergies can be achieved when evaluating projects and signing testing protocols. In addition, the cohort-based approach allows thematic cohorts to be launched. On the other hand, the cohort-based approach may provide less flexibility for applicants, as projects that are ready for testing would need to wait until the opening of a new cohort window.
76. **In most of the cases there are no limitations in terms of the maximum number of eligible projects that can be accepted for a test at the same time into a regulatory sandbox.** However, this can depend on the interest and the availability of resources within the NCA. In one jurisdiction the maximum number of projects that can be admitted is limited to five projects per cohort. In another jurisdiction, the sandbox framework establishes the possibility of setting a maximum number of projects, but this option has not yet been used.
77. With regard to ensuring quality of applications received and timely decisions, the **majority of regulatory sandboxes have compulsory legal deadlines for concluding the assessment procedure** that range from one to four months. Generally, NCAs have the possibility to interrupt such a period in justified cases, for example, to request the applicant's clarifications (e.g. additional documents or more information). As for the assessment, each NCA follows a specific procedure. At one NCA the process has two stages: (i) in the first stage, firms submit an application to enter the regulatory sandbox, and the NCA shall adopt an interim decision within two months from the date of submission of the application, (ii) in the second stage, firms have to submit testing plans within two months, after which the NCA also has two months to adopt a final decision regarding the admission to the regulatory sandbox. If the authority refuses to approve the application, the firm has the right to re-apply after six months. By way of another example, one NCA checks the completeness of the application and notifies the firm of any missing documents or information within a reasonable time frame. The firm then has to submit the required documents or data in a timely manner and without undue delay. As a next step, the NCA needs to communicate its decision whether to admit the firm into a sandbox within one month of the receipt of a complete application.
78. **The most common criteria used to assess firms' admission to regulatory sandboxes are (i) the firms' readiness to conduct tests, (ii) the overall innovativeness of the proposition, and (iii) the benefits for the consumers that it may bring.** Also, other important factors are the scope of the proposition against the NCAs mandate, if a proposition supports the provision of regulated

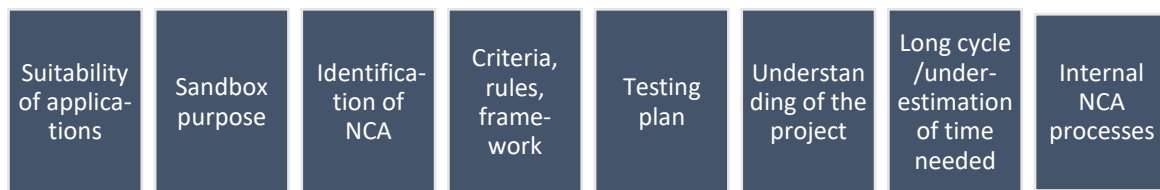
financial services in the domestic market, and if there is an actual need for testing in the regulatory sandbox.

79. Overall, the average duration of the application phase ranges from 2-4 weeks (in case of three regulatory sandboxes), to 1-2 months (two sandboxes), 2-3 months (three regulatory sandboxes), or 3-5 months (two sandboxes). Longer timelines, e.g. 5-7 months or 7-9 months have each been indicated by one regulatory sandbox.

80. In general, **NCA**s consider having adequate resources to assess innovative firms' applications and analyse test results, but several of them specified that the amount of the resources would need to be revised in case of an increase in the number of application requests. One NCA clarified that the sandbox activity is resource and time consuming and that NCA's need to have a sufficient number of staff with the right expertise specifically allocated to it.

Main challenges related to the application phase

81. The ESAs assess that the main challenges during the regulatory sandbox application phase relate to the following areas:



- a) Suitability of the applications – as previously depicted in Figure 5, a lot of applications do not meet eligibility criteria and are thus rejected. Additionally, some NCA's consider such applications would be more suitable for an innovation hub. As a result, bringing in new projects to the regulatory sandbox is a challenge for some NCA's, especially if there is a lack of innovation in the local market.
- b) Regulatory sandbox purpose – some firms find it difficult to understand the purpose of a sandbox and what can be achieved via the sandbox, or they do not operate in a regulated area at all.
- c) Supervisory authority identification – applicants may find it difficult to identify the correct supervisory authority for the project, especially when several authorities/areas are involved. One NCA indicated that pre-assignment of the projects to the different authorities has been improved by establishing internal (informal) guidelines and procedures.
- d) Criteria, rules and framework – applicants may find it challenging to have a good understanding of the entry and acceptance criteria, the documentation requested and the

applicable rules/framework of the sandbox. There may be situations where these are not clearly explained. For example, one NCA in the first cohort required projects to comply with the applicable data protection requirements, however, the issue arose when too detailed information was requested from the projects. This resulted in firms having to prepare extensive new documentation and led to significant delays in the approval and signing of the testing protocols. To overcome this barrier in the following cohorts, the procedure was simplified²² and the NCA published guidelines explaining in detail each entry/acceptance criteria, the objectives and the usual stages of the regulatory sandbox.

- e) Testing plan – some firms find it difficult to define a concrete testing plan.
- f) Understanding of the project – initially, the NCAs may have a limited understanding of the innovative content of a project as well as of the related benefits, risks for customers and impact on regulation.
- g) Long cycle/underestimation of time needed – in some cases the insufficient quality of applications require sandbox administrators to spend additional time in a ‘back-and-forth’ communication to obtain sufficient details about the application, in particular, in relation to the testing plan, which needs to be provided by the applicant. In some regulatory sandboxes, the administrative process of evaluating sandbox acceptance criteria has been identified as too complex and lengthy. For example, in one regulatory sandbox, the submission of requests for clarification often resulted in the extension of the deadline for concluding the procedure. In addition, some NCAs may have underestimated the time and supervisory expert effort needed to contribute to sandbox projects. Similarly, some firms did not realise that participation in the sandbox was a long-term commitment involving many resources.

II. Preparation phase

- 82. **40% of regulatory sandboxes do not have a specific preparation phase.** Instead, NCAs discuss testing characteristics (e.g. duration, KPIs, etc.) with firms during other phases, in particular during the application phase or the preliminary consultation phase.
- 83. **One quarter of sandboxes have a legal limit for the duration of the preparation phase.** In one country, after receiving a favourable preliminary evaluation, the NCA and the firm have three months (extendable by additional 1.5 months) to sign a test protocol. In another jurisdiction, the firm has to submit the testing plan within 15 working days from its admission to the regulatory sandbox. The NCA then assesses the testing plan within 15 working days from the submission and, if it requires amendments to the testing plan, the firm has five working days to make the additional changes. If the revised testing plan is found adequate, the NCA has 15 working days to finalise it.

²² The NCA now only requires that the firm certifies that it complies with the accountability principle and has the required documentation at the disposal of the supervisor at any time and if needed.

The procedure may be repeated only once. Another example to illustrate a possible longer timeline in the preparation phase is one NCA, which has a total time limit of two years.

84. In practice the average duration of the preparation phase varies. On the shorter end, two sandboxes indicated a duration of 2-4 weeks, of 2-3 months and of 3-5 months. While on the longer end, a duration of 5-7 months and more than a year has been reported once.

85. **Duration, key performance indicators (KPIs) and the risk management process are the most common parameters included in the tests.** Limitations on the number of clients or volumes of business activity are also important factors. For example, a few NCAs can limit the testing phase only to specific clients, for example, to professional clients, ‘family and friends’, or a company’s clients. The types of restrictions depend on the project’s characteristics. Interestingly, despite the importance of KPIs, as further elaborated in the next section, some NCAs find it challenging to define and select the most important performance indicators for tests.

86. The ESAs note that there are also other types of safeguards included in the testing. For example they relate to (i) financial guarantees/warranties to cover the liability for the damages suffered by the participants as a result of their participation in the tests (for example, deposits, credit letters, insurance policies), (ii) measures to duly inform users, including signing consent documents, that the service/product is offered in a regulatory sandbox environment and that it does not have an explicit seal or license by the authorities, or (iii) restrictions to an authorisation in the sandbox on a case-by-case basis that can be imposed by means of a decision in the form of requirements (for example, to provide regular reports), special conditions or time limits.

Main challenges related to the preparation phase

87. The ESAs consider that the main challenges faced by NCAs during the preparation phase relate to:



- a) Maturity of projects – some projects might not be mature enough to be tested. As a result, KPIs cannot be specified.
- b) KPIs identification – identifying the appropriate quantitative and qualitative KPIs in order to set them consistently with some projects characteristics as well as assessing potential risks of the projects is another common challenge faced by NCAs.
- c) Communication – in particular to ensure good quality of communication with firms, including providing regular feedback.
- d) Coordination – coordinating sandbox related activities with the firm and within the NCA, especially if the case relates to new legal matters.

- e) Test scenario – establishing a suitable test scenario that is approved by the regulator. Also obtaining financial guarantees to protect participants in the tests is sometimes challenging for the firms.
- f) And finally, marketing, to ensure firms do not use the sandbox as a marketing device before they are even admitted to the sandbox and start testing.

III. Testing phase

88. **In all of the evaluated regulatory sandboxes, admitted firms can test innovative activities in close collaboration with NCAs, which give them guidance or legal and regulatory advice.** NCAs often form ad hoc teams of internal experts to support sandbox participants. Such teams receive evidence (e.g. reports, various documentation, technical data, including queries, logs, screenshots, recordings, etc.) and meet regularly with firms to discuss the developments and the results of the testing, or may help to address supervisory or regulatory issues. As another example regarding a sandbox, one NCA has a more flexible and innovation-conducive interpretation of legal acts and does not apply enforcement measures.
89. **The majority of firms participating in regulatory sandboxes are able to test their propositions in a ‘live’ environment** (with real consumers or companies) within the agreed parameters of the test. In one quarter of the sandboxes, this possibility depends on the actual proposition being tested. Regarding the testing itself, some NCAs participate as a remote observer in the most significant tests (for example, having a node in the blockchain when the project uses this technology). In this way they can give suggestions on how to improve the solution tested at a technical or design level, improve the usability of the solution, or make it a better fit for regulation when it is launched on the market.
90. **In most of the sandboxes there are legal limits for the duration of the testing phase.** Mentioned examples of timelines include (i) six months, (ii) six months with a maximum of six months extension (in total maximum 12 months), (iii) up to 12 months, which may be extended by a maximum of six months (in total, maximum 18 months), upon the justified request of the financial entity, (iv) no longer than six months, but with possible extension to up to 12 months if the financial market participant presents reasoned arguments, or in case the authority needs to decide whether to issue a licence/grant authorisation, (v) maximum 18 months, or (vi) a total duration of two years.
91. **Most often the testing phase in regulatory sandboxes lasts 3-5 months, but a longer duration of 5-7 months and 1-1.5 years is also frequent.** One authority is considering the possibility to shorten the current testing period of 1.5 years as this may allow for more mature projects and avoid delays during the experimentation.
92. **All NCAs can terminate the tests in the case of a breach of the testing parameters.** Several of the NCAs also provide for warnings requiring immediate remedial actions. A few NCAs envisage other appropriate supervisory or enforcement actions. For example, several NCAs can withdraw a firm’s

licence to carry out the relevant regulated activity or impose a fine, if needed. In the case of testing in a live environment, the actions depend on the supervisory law applied.

93. **All analysed regulatory sandboxes have specific means to protect consumers.** To do so, admitted firms have to provide (i) a clear exit plan setting out how consumers will be treated on exit and (ii) a clear communication explaining the nature of the test and the implications for consumers. Compensation or redress measures, should any detriment be suffered in the context of testing, are also very often considered. Two NCAs limit testing with investors only with a higher risk appetite and/or non-retail clients.
94. Other specific safeguard measures may include a regular and scrupulous follow up of each test phase and results. As another example, consumers/participants have to sign a 'single information document' to confirm they are aware of (i) the nature or character of the tests, including implications and risks that may arise from participation in the tests and the guarantee regime established to cover the liability of the company, (ii) the withdrawal regime, (iii) the way in which their personal data will be processed, (iv) the confidential nature of the information obtained, as well as provisions on industrial and intellectual property rights or business secrets. Other NCAs similarly require firms to indicate in their testing plan the client group that it intends to target, main risks, measures to safeguard those risks, and actions to be taken after the exit. Finally, one NCA requires compliance with the standard investor compensation regulations during the sandbox test (if such regulations exist).
95. **Testing can be terminated, generally, by the NCA or at the request of the firm, also if the firm fails to comply with the designated testing parameters.** Many regulatory sandboxes also envisage possible termination of the tests if it is necessary to mitigate consumer detriment, upon a breach of the agreed communication arrangements, or under some other circumstances (see Box 12).

Box 12. Other specific conditions under which testing can be terminated

Some NCAs can terminate the tests under specific conditions, for example: (i) in case of lack of relevant development of the project within three months period, (ii) if the prerequisites for participation cease to apply, (iii) if it can be assumed that the intended purpose of participation in the sandbox cannot be achieved or after two years has elapsed, (iv) the firm has technical, strategic or any other reasons that prevents the test's continuation or when the objectives established for the tests have been achieved, (v) in case of breaches of the legal regime applicable to the tests or of the firm's duty of good faith during the tests (vi) if the firm breaches the provisions of the licence several times or in a serious manner, fails to apply the innovative solution or fails to comply with the conditions set out in sandbox regulation/protocol, (vii) if the NCA notices repeated deficiencies or possible risks to financial stability, the integrity of the financial markets, or the protection of customers.

The main challenges related to the testing phase

96. The main challenges related to the testing phase relate to the following aspects:



- a) Deviations – in respect of agreed testing conditions/plan due to project deviations or delays due to projects not being ready for testing.
- b) External collaboration – collaboration with other authorities, for example, AML/CFT authority or data protection authority. In some jurisdictions other authorities cannot supervise projects directly, offering only support when needed; however, some projects would benefit from having other authorities more directly involved.
- c) Management of the testing – including (i) interpretation of processes, (ii) understanding of innovative approaches, (iii) assessing the compliance with the deadlines or the quality of the work, (iv) evaluating the test results.
- d) Internal coordination – coordinating the sandbox related activities with the relevant in-house experts in the NCA.
- e) Flexibility – in certain cases the existing legal framework may not provide the necessary flexibility for the testing environment.
- f) Delivered product – delivering a minimum viable product.

IV. Exit/evaluation phase

97. **In the majority of analysed regulatory sandboxes, there are no legal limits for the duration of the last exit/evaluation phase.** In three jurisdictions where specific timelines exist, the firm shall prepare a report in which the outcomes of the tests and the project as a whole is evaluated and submit it within one month to the NCA that has monitored the tests. In one case, no deadlines for the drafting of the exit report by the NCA is set, however, another NCA has 20 working days to assess the successful or unsuccessful outcome of the test and communicate it to the firm.

98. **The actual average duration of the exit/evaluation phase varies.** For example, the duration of 2-4 weeks, 3-5 month and 5-7 months have been indicated by two regulatory sandboxes respectively. The duration of 1-2 months and 1-1.5 years has been mentioned once.

99. Looking ahead beyond the regulatory sandbox engagement, in one jurisdiction the procedure times in the authorisation process might be reduced for those firms that have gone through the regulatory sandbox and subsequently request an authorisation to begin a regulated activity. In that

case, procedure times might be reduced in the case that the tests have simplified the assessment that must be performed during the authorisation process. To give an additional example, one NCA can streamline the licensing process for the sandbox participants, especially if licensing is happening in parallel with or after testing.

The main challenges faced during the exit phase

100. **In general, NCAs indicate very few exit phase related challenges due to limited experience, as a number of projects are still in the testing phase and have not yet reached the exit/evaluation stage.** One NCA indicates that the main challenges faced during the exit phase relate to dealing with barriers or recommendations on regulatory adjustments identified by NCAs after the test. This is due to the fact that often such aspects are not within the NCA's remit (for example, issues related to eIDAS, commercial law, AML/CFT, data protection, etc.) or are related to EU laws, therefore they cannot be addressed independently at national level. Another NCA reports that issuing a comprehensive lessons learned report is also a challenge, as there is significant reliance on the external firms conducting tests to provide relevant data and information. In addition, there are some concerns regarding the extent of information about the projects that can be included in the NCAs' reports. One NCA addresses this issue by establishing specific covenants in the protocols and by continuously engaging with firms to make sure that no confidential information is unintentionally disclosed by the NCA.

Risks related to operating a regulatory sandbox

101. **The ESAs observe that according to NCAs no specific risks have materialised. Reputational/legal risk is perceived by NCAs as the main risk related to the operation of regulatory sandboxes.** Other risks such as (i) inadequate consumer protection, (ii) insufficient coordination between authorities within a jurisdiction, (iii) inability to keep pace with innovation-related developments in the industry, or (iv) inability to ensure the level playing field are perceived as less relevant risks. One additional risk indicated by NCAs stems from the fact that the limited size and impact of approved projects' tests may not allow for a concrete risk assessment at market level.

102. To ensure the NCAs' ability to keep up with latest developments, staff training and education is key, both for experts in the working group established under the regulatory sandbox or working closely with it, and, in a more general sense, for cultivating the culture of experimentation, which is different than the established NCAs' approach to supervision.

4.4 Outputs and outcomes of regulatory sandbox testing

Specific outputs of regulatory sandboxes – NCAs' perspective

103. **The ESAs note that majority of NCAs publish results of testing in summary form.** They also issue public statements on specific innovation-related issues, as well as publish results in an annual

activity report or a special report with the anonymised results on the overall operation of the regulatory sandbox and the lessons learned. Organising industry roundtables to disseminate learnings and issuing FAQs were pointed out as less frequent outputs of the sandbox testing. Two NCAs reported that the decision for the publication of the outcome is based on the decision of the firm (taking into account if publication may hinder their competitive advantage) or agreed together with the firm. Two other NCAs reflected that the results are shared internally with the management, but not published.

Specific outcomes of regulatory sandboxes – firms' perspective

104. **The agreed exit plan mostly comprises discontinuation of the product or service being tested, as well as continuation outside the regulatory sandbox.** If any consumer detriment arise, appropriate remedial steps can be taken together with measures for the firm to protect the interest of consumers – for example, to arrange for a smooth off-boarding of consumers, the payment claims, etc. Continuation inside the regulatory sandbox, if a prolonged testing period is agreed, was also noted. In addition, the exit plan elements may include individual activities depending on the specific case. For example, one NCA elaborated that according to their practice, once the tests are completed, the firm has to prepare a report to evaluate the results of the test and in this report, it may also specify the next steps planned for the project once it has exited the sandbox. The ESAs also note that in at least two regulatory sandboxes there is no agreed exit plan.

Specific outcomes of regulatory sandboxes – NCAs' perspective

105. **Regulatory sandboxes have facilitated regulatory framework revisions and improved cooperation with other authorities.** Several revisions of the legal and regulatory framework have been made as an outcome of regulatory sandbox engagement. One NCA identified regulatory issues related to AML/CFT, GDPR and DLT-based accounting and auditing. As a further example in a particular case, regulatory sandbox testing was skipped and AML/CFT-related regulatory framework had been modified. Additionally, one NCA issued new guidelines on P2P insurance (more information is provided in Box 8), that had a positive impact on market development and risk management.

4.5 Metrics to assess functioning of regulatory sandboxes

106. **The ESAs observe that all but one surveyed NCA running regulatory a sandbox consider that their cost/benefit perception justifies the continuation of the regulatory sandboxes.** However, no specific metrics have been set to measure their success or usefulness. As a result, this does not allow NCAs to objectively assess the functioning of their regulatory sandboxes.

107. Looking ahead, some adjustments may be needed to keep regulatory sandboxes attractive for firms and able to respond to the changing needs of the market.

4.6 Regulatory and supervisory cooperation and coordination

108. **The ESAs observe that the majority of the regulatory sandboxes have no more than one authority involved. However, operation of a handful of regulatory sandboxes involve several authorities.** In cases where more than one authority is involved, NCAs work together with data protection authorities, consumer protection authorities, financial intelligence units, ministries of finance, competition authorities, and other country-specific bodies, for example, the insurance sector authority, the investment firms sector authority, the credit/payment/electronic money institutions sector authority, the authority responsible for national registration or authorisation regime, or the innovation agency. Cooperation with other innovation hubs within the EEA is also happening.
109. **Domestic and cross border collaboration seems to work well, however there is room for improvement.** Four NCAs indicated that cooperation on sandbox related matters works well, while three NCAs assessed cooperation working partly well, although improving. One NCA particularly referred to the successful cooperation with the national data protection authority, both in its own and in the data protection authority's sandbox. As another practical example to improve cooperation, one NCA has established a team of contacts between the relevant domestic bodies working in the field of innovation. However, another NCA considers that the current procedures set to interact with other domestic authorities make the collaboration bureaucratic, and as a result, a revision of the relevant rules is under evaluation.
110. **At the EEA level, the establishment of the EFIF has improved the knowledge sharing between regulatory sandboxes.** The EFIF allows NCAs to share knowledge on the characteristics and functioning of regulatory sandboxes and exchange information about various use cases being tested across the EEA.
111. **However, the ESAs highlight that actual cross-border activities of regulatory sandboxes have not yet been tested in practice. Actually, as of now, none of the firms have participated in the EU cross-border testing framework established by the EFIF in 2021²³.** The lack of industry interest to participate in the cross-border testing framework could be partly attributed to the existing passporting regime that allows firms authorised in one EU Member State to carry out business in one or more other EU Member States.
112. Although cross-border testing may be useful to identify and remove regulatory barriers at the EU legislation level and to ensure consistent supervisory practices across the EU, the EFIF has mixed views on the potential next steps. To identify the exact factors limiting interest and finding the

²³ EFIF Procedural Framework for Innovation Facilitator Cross-Border Testing (2021) (https://www.eba.europa.eu/sites/default/documents/files/document_library/About%20Us/Governance%20structure/JC/oint%20Committee%20pages/1025448/EFIF%20Procedural%20framework%20for%20cross-border%20testing.pdf)

most suitable actions, a root cause analysis would need to be conducted. This could be done by the ESAs, in coordination with the EC and EFIF members.

113. **Those in favour of further supporting cross-border testing framework suggested ideas on how cross-border testing could be better promoted.** The proposals mentioned include actions to improve public communication with an emphasis on potential benefits, create a competition element to be onboarded that may increase firms' interest to participate, conduct a thorough cost-benefit analysis (including evaluating interplay with other existing cross-border testing frameworks), identify particular cases that may benefit the most from cross-border testing, and resolve the issue of effective resource allocation.
114. **A pan-EU regime for cross-border testing could address limitations in certain cases where, due to regulatory constraints** (e.g. the scope of the sandbox being limited to firms already authorised by the NCA, etc.), **cross-border testing is not available at present.** However, to work appropriately, it would require dedicated resources and a central coordination point. To attract participation of firms in the cross-border testing exercise, closer coordination and cooperation between the cross-border authorities to appropriately identify and address market needs would be needed. Given these implications, detailed analysis and considerations would need to be carried out to assess potential benefits versus the related costs.

5. Conclusions and recommendations

5.1 Summary of key findings

115. Based on the information and assessment provided by NCAs, the ESAs have identified a number of benefits and challenges in the operation and design of innovation facilitators in the financial sector across the EEA.
116. Regarding innovation hubs, the ESAs find that the establishment and operation of innovation hubs in the EEA have achieved a certain degree of maturity and that the FinTech sector perceives hubs as positively contributing to regulatory and supervisory clarity. The ESAs also observe that innovation hubs are often considered by the FinTech sector as an indication that regulators and supervisors in that jurisdiction are progressive and technology-friendly and open to financial innovation. The ESAs find that NCAs providing an overview of the activities of innovation hubs within their annual reports or other FinTech reports contribute to that positive perception by the FinTech sector.
117. Simultaneously, the ESAs find that NCAs face challenges in the operation of innovation hubs, including the perception of risk of misalignment between the FinTech sector's expectations and the purpose of the hubs, or the NCAs not being able to give prompt and precise responses to the queries they receive.
118. The ESAs note that the main benefits of the operation of regulatory sandboxes for NCAs are to improve their awareness of new emerging innovations in the financial sector and recognise cases where a reassessment of the relevant regulatory perimeter may be needed. For the FinTech sector, it is to enhance their understanding of the application of the existing regulatory framework to the innovation they aim to test. Additionally, the ESAs find that all regulatory sandboxes considered in this report include specific consumer protection measures, and allow the NCA to terminate the testing if the participating firm fails to comply with the agreed testing plan or testing parameters.
119. As a consequence of the above, the ESAs observe that a large majority of NCAs operating regulatory sandboxes consider that their cost-benefit perception supports the continuation of the operation and activities they undertake.
120. Regarding the risks of operating both types of innovation facilitators, the ESAs find that NCAs perceive reputational and legal risks as their key concerns. The results of the analysis also suggest that despite the benefits of innovation facilitators, NCAs still face limitations in their ability to keep pace with developments in financial innovation.

121. Finally, the ESAs find that the NCAs consider that the establishment of the EFIF has improved the effectiveness of knowledge-sharing activities between innovation facilitators.

5.2 Considerations and recommendations

122. Based on the findings identified in this report, the ESAs highlight a number of considerations addressed to NCAs, the ESAs themselves, and the EC, to improve the effectiveness and cross-sectoral and cross-border coordination of innovation facilitators across the EEA.

Considerations addressed to NCAs:

123. To improve their understanding of the concerns and interests of participating firms, the NCAs should:

- a) **Introduce arrangements for the innovation hubs and regulatory sandboxes to collect feedback from participating firms.**

124. To enhance the scope of innovations captured by innovation facilitators, including at the cross-sectoral level, the NCAs should:

- b) **Introduce ways allowing participating firms to liaise with a wider set of supervisors and other relevant authorities, where possible.** This is important in projects where a closer collaboration and dialogue with other authorities may be needed. This could be the case where the topic falls under the scope of both financial sector supervisors and, for example, an AML/CFT authority, a data protection authority, or national taxation office. NCAs should communicate to firms, where applicable, that there might be other authorities with competences over the same topic and that additional regulatory requirements may apply.

125. To ensure an effective collaboration and coordination between NCAs operating innovation facilitators across different sectors and jurisdictions and to better share good practices, the NCAs should:

- c) **Consider closer collaboration within the EFIF to share experience.** Whilst bilateral engagements between authorities are helpful, to ensure an efficient and useful collaboration and knowledge exchange, NCAs should consider engaging more multilaterally on topics that are of interest to a broader set of NCAs. The EFIF should be able to provide the platform to further facilitate NCAs' exchanges on the practical challenges faced when operating innovation facilitators and the approaches adopted to address them. The ESAs consider that stronger cooperation on cross-sectoral topics should also be valuable, and that the EFIF could contribute to that cooperation.

126. To improve the assessment of the performance of innovation facilitators and the identification of potential improvements, the NCAs should:

- d) **Continuously evaluate the functioning of innovation hubs and regulatory sandboxes.** Based on such analysis the NCAs should consider necessary changes to their operation based on the metrics assessing the functioning of innovation facilitators and the feedback received from participants.
- e) **Assess how operation of their innovation facilitators will be affected by the existing or forthcoming EU-wide initiatives (for example, DLT Pilot Regime or AI regulatory sandboxes).** Beyond the EU-wide initiatives, there should be sufficient flexibility maintained in the design and operation of the innovation facilitators. NCAs should run innovation facilitators based on their objectives, mandates, available resources and identified market needs. Profound understanding of the main challenges and risks faced as well as the emerging practices across the EEA can be helpful to increase efficiency and effectiveness of the operation of the existing innovation facilitators.
- f) **Address the challenges that they find in the operation of innovation facilitators by taking into account approaches reported as ‘good practices’ by some NCAs that are listed in Annex 1.**

127. Furthermore, the NCAs should:

- g) **Continue applying the guiding principles for the establishment and operation of innovation facilitators set out by the ESAs in Annex B of the joint ESAs report of 2019, as they remain applicable and valid.**
- h) **Take into account guidance from the EC on setting up regulatory sandboxes when establishing and operating regulatory sandboxes²⁴.** This guidance provides a set of considerations that NCAs aiming to set-up a regulatory sandbox need to take into account. For example, determine whether a project’s innovation is genuine and beneficial, to consider temporarily relaxing or suspending applicable rules and applying flexibility, considering the impact of the access criteria on competition and level playing field. Also clearly defining the goals of sandboxes during the design phase, pre-defining success measures, including when results can be scaled up beyond the controlled environment, and adequately considering the time and resources needed to run and coordinate regulatory sandbox activities (including, in coordination with other competent authorities).

Considerations addressed to the ESAs:

²⁴ See ‘TOOL #69. Emerging methods and policy instruments’, pages 599-604, https://commission.europa.eu/document/download/0d32ee11-92da-434d-9c86-fd4579d95dc6_en?filename=BRT-2023-Chapter%208-Methodologies%20for%20analysing%20impacts%20in%20IAs%20evaluations%20and%20fitness%20checks_0.pdf

128. To contribute to the set-up of new innovation facilitators and the effectiveness of existing ones in the financial sector across the EEA, the ESAs under the auspices of EFIF should:

- a) **Re-evaluate the procedural framework for cross-border testing, established by the EFIF in 2021.** The framework has not yet been used in practice, hence a root cause analysis should be undertaken by the ESAs, in coordination with the EC and EFIF members, to identify the factors limiting industry interest and finding the most suitable actions to follow.
- b) **Formalise the EFIF's process to discuss and raise to the attention of co-legislators issues identified via innovation hubs or while conducting tests at regulatory sandboxes.** This would strengthen the role of the EFIF in identifying possible recurrent regulatory obstacles or gaps for scaling up financial innovation across the EU, or addressing inconsistencies or convergence needs, as identified via the activities of running innovation facilitators. These obstacles, gaps or inconsistencies may relate to the various aspects of applicable national or EU law, or transposition of EU directives into the national laws of the EU Member States.
- c) **Provide through the EFIF framework recommendations to future EU-wide initiatives that focus on experimentation, based on the financial sector's experience gained while running regulatory sandboxes.** While in the past regulations affecting the financial sector did not include experimentation clauses or provisions on the setting up of sandboxes for testing specific innovations, the ESAs note that lately, regulations are including these kinds of clauses. For example, the AI Act contemplates AI regulatory sandboxes, and DLT Pilot Regime²⁵ allows for the experimentation with DLT for financial market infrastructures. The ESAs propose that the EFIF could do an assessment of what the benefits and drawbacks are of the different types of emerging specialised/thematic sandbox approaches.

Consideration addressed to the European Commission:

129. **The ESAs consider that the EC should undertake a comprehensive reflection on the EU-wide strategy to support financial innovation and the operation of innovation facilitators, in particular regulatory sandboxes. The EFIF could contribute to the reflection in the form of a joint ESAs advice to the Commission on approaches that could be adopted for that purpose.** The EU-wide strategy could also evaluate the legal status of regulatory sandboxes, the adequacy of emerging practices to introduce experimentation clauses and proportionality elements, including related to temporary and controlled waivers on the EU law. The strategy would contribute to ensuring a level playing field in the EU financial sector, fostering a consistent application of the EU legal and regulatory framework for financial services, while helping to avoid harmful practices for consumers and preventing 'regulatory shopping' across jurisdictions (a 'race to the bottom' by national governments) in the competition for the development of markets for innovative financial services.

²⁵ Regulation (EU) 2022/858 on a pilot regime for market infrastructures based on distributed ledger technology

Annex 1. Observed practices in running innovation facilitators

130. The EFIF gathered a number of practices followed by some NCAs that might be useful for other innovation facilitators. These can help NCAs when considering the establishment of innovation facilitators or in the course of the revision of the operation of the existing innovation facilitators. Given that the application of certain practices may depend on the specific situation, these ‘good practices’ should be read in conjunction with a certain degree of interpretability.

‘Good practices’ identified by NCAs running innovation hubs

131. In order to improve visibility and to receive a higher number of inquiries, some NCAs introduced a dedicated section on the website landing page where the innovation hub use is promoted. Some NCAs consider that there is still room for increasing the awareness of firms about the existence of the innovation hub as a direct communication platform.

132. Some NCAs automate and standardise replies to general queries. Having all relevant information easily available on the website (e.g., answers to FAQs, guidance on inquiries, etc.) can limit the number of inquiries received to those, where NCAs’ expert analysis and feedback is actually required. A chatbot application can provide immediate answers without human intervention and can reduce the number of inquiries of a general nature, for which answers can be easily found on the website. When manually responding to general or simple queries some NCAs use templates for replies with a reference to the homepage of the innovation hub or, where available, to relevant FAQs or activities summaries.

133. In the case of more specific inquiries that require the attention of experts, NCAs often arrange meetings. Some NCAs request firms to send the documents in advance, in order to prepare for the meeting and invite the relevant experts. Some follow the same procedure to approach all relevant experts in case of written communication as well.

134. NCAs transparently communicate the rules of engagement, limitations of the innovation hub, and set clear expectations. A pre-defined contact form for inquiries helps to ensure that the business model or idea is described in a clear manner. It also facilitates participants’ preparation for the first meeting with the hub and allows participants to share materials in advance (including, if possible, the first legal analysis regarding the proposed business model).

135. Innovation hubs provide user interfaces and facilitate the interaction between supervisors and firms. The existence of innovation hubs is particularly helpful for stakeholders that do not usually

engage with regulators: these may include academics/researchers, start-ups without previous experience in the financial sector, law firms and/or consultants.

136. Stakeholders appreciate having a dedicated (informal) point of contact (via e-mail, online form, phone call, online meeting) that allows them to engage with regulators outside of the formal regulatory processes. This helps to establish the relationship on *cooperation* rather than a *control and supervision* perspective. In addition, it helps to clarify the rules of engagement to eligible candidates and enables NCAs to understand business models of innovative firms and obtain a clearer picture of concerns and expectations of the sector in a shorter timeframe, ultimately supporting the boost of financial innovation. Some NCAs underline the importance of face-to-face interactions with the industry.
137. To ensure record-keeping and effective follow-up to queries, NCAs write down information on queries in knowledge management systems. This is used both as a workflow tool to ensure all queries are adequately addressed and also as a recording tool (where queries are also classified e.g., according to the topic, technology, entity). Some NCAs also maintain notes on the questions received and answers provided during bilateral meetings. The insights can be used internally, for example, to analyse trends in terms of specific use cases and to take informed conclusions on what regulatory work needs to be done. Insights gained from internal webinars and workshops organised by the innovation hub team on the topic of financial innovation may facilitate work of authorisation and supervisory teams. Organising webinars with experts from the authority, especially ahead of the transition from a national regime to a European framework (MiCAR for example), has proven to be valuable for market players.
138. Sharing aggregated information externally helps to establish good communication between the NCAs running innovation hubs and the industry. Publishing annual reports or making aggregated results available on the dedicated websites of NCAs improves communication and awareness about the innovation hubs' activities.

'Good practices' identified by NCAs running regulatory sandboxes

I. Related to the application phase

139. An important part of the application phase relates to the assessment of firms and their applications. Based on the NCAs' experience, the following practices related to the application phase have been gathered:
 - a) Define and publish clear requirements, eligibility criteria, the main purpose of the sandbox and what can be achieved when participating in it. Ensure applicants know (i) the entry/acceptance criteria, (ii) the sandbox rules/framework, and (iii) the documentation to be submitted. As regards rules/framework, NCAs should have clear regulations or guidelines specifying such rules/framework. This can be achieved through a clear public communication

and guidance, (e.g., on the website) as well as through preliminary informal dialogues/consultations with firms. This would benefit NCAs, who may get a better understanding of the project, as well as applicants to ensure they choose the most appropriate cooperation channel and model with the regulator/supervisory authority. It may also be useful for firms to receive direct feedback from the authority, also in the cases where a project is rejected.

- b) Ensure that applicants/participants in the sandbox are able to correctly identify the supervisory authority for the project, especially when more than one authority and/or area inside a supervisor is involved. In this regard, establishing a central coordinator could facilitate the filtering of the projects, determining the relevant authority/area for each project, and standardising the application of the acceptance/entry criteria procedures, while at the same time maintaining a global vision for the sandbox.
- c) Support firms in the establishment of a proper testing plan prior to the application confirmation. NCAs could support applicants in preparing a testing plan, by establishing an internal testing team to provide expert input when negotiating the testing plan earlier in the process, before the application is confirmed. NCAs would also benefit from a good collaboration with the internal sandbox advisory board (if one exists) or with the different authorities to provide a coordinated and harmonised response to applicants.
- d) Manage expectations both of firms participating in sandbox testing and supervisors in terms of time commitment and resources necessary to run sandbox projects.
- e) Give feedback to all applicants, also to those that are rejected. Do not limit feedback to that provided in the follow-up reports after the testing phase.

II. Related to the preparation phase

140. The following practices related to the preparation phase have been observed:

- a) Set goals and the related timeline and establish/identify appropriate KPIs. Identify: (i) the appropriate quantitative and qualitative KPIs in order to set them consistently with some project characteristics, (ii) the potential risks of the projects in the testing phase and (iii) safeguard measures (for example, financial guarantees) to protect the participants in the tests. This would help to understand whether the firm can commit to the criteria specified by the NCA for the testing phase. In this regard, NCAs need to make sure that the testing scope is realistic, the testing protocol is thorough and comprehensive, and that the applicant has the appropriate resources in place prior to the testing period.
- b) Organise as many preparatory meetings between the firm and the NCA as necessary to speed up the preparation phase, as well as regular ongoing meetings where goals are set and

progress is monitored. Such meetings can be used also for the provision of regular feedback to participants.

- c) Ensure participating firms do not use the sandbox as a marketing tool to misleadingly imply that their innovative product, service or business model has been certified as compliant, validated or licensed by the NCA. This can be done, for example, by maintaining ongoing communication with firms, ensuring contractual clauses on their participation are clear and a closer supervision of their marketing communications before, during and after the testing period.
- d) Ensure information exchanged between the firm and the NCA during the preparation phase is well protected, by using safe communication channels for information sharing.
- e) Ensure there is a proper coordination (i) with the applicants, (ii) within the authority, especially in the case of new legal matters arise, and (iii) with external authorities (for example, data protection authority, AML/CFT authority) to ensure they are involved in the sandbox process where needed.

III. Related to the testing phase

141. The following good practices related to the testing phase have been identified:

- a) Ensure regular and frequent communication with firms to identify potential problems in a timely manner, and to receive and provide them with continuous feedback. During these meetings NCAs should monitor that agreed goals, milestones and testing conditions are fulfilled. Meetings can be as frequent as needed, for example, weekly meetings if appropriate. Ensure proper communications for each of the test cases to avoid misleading sandbox participants and their clients on what the testing in the sandbox means. Some NCAs find it important to allow firms to test their innovations with real users – this may help in ensuring that the testing results in a minimum viable product.

IV. Related to the exit/evaluation phase

142. The following practices related to the exit/evaluation phase have been shared:

- a) Both firms and NCAs are to produce a comprehensive lessons learned report. Firms' reports would help the authority to improve the way the regulatory sandbox is run. NCAs' reports should be based on the data and information obtained in the testing phase and may instead be useful to document the knowledge gained during a sandbox testing procedure. Sharing it with the relevant experts would help build knowledge within the organisation.



- b) Publish annual reports and make information about the regulatory sandboxes' operation publicly available. This helps establish a good communication and feedback channel between the NCA running the regulatory sandbox and the industry.

Annex 2. Examples of new innovation facilitators' activities

143. **'Virtual PSD2' Sandbox (2020)**²⁶. This virtual sandbox established in Poland allows for simulating banking operations and testing technologies based on the Open API interface, compliant with the Polish API standard. The 'Virtual PSD2' Sandbox was launched within the Polish Financial Supervision Authority (UKNF)'s IT infrastructure as a testing environment. By using the Virtual PSD2 Sandbox the participants in the tests gain access to an IT infrastructure which allows verification of their business assumptions in a controlled testing environment. An entity planning to offer an innovative payment service may apply to the Innovation Hub Programme, where it can consult service users about its idea and to test its functionalities in an IT testing environment simulating the basic services provided for in the Payment Services Directive 2 (PSD2), i.e. the Payment Initiation Service (PIS), Account Information Service (AIS), and Confirmation of Availability of Funds (CAF). The access to the Innovation Hub Programme and the testing environment is free of charge and voluntary. The 'Virtual PSD2' Sandbox is open to supervised entities, entities seeking UKNF authorisation to carry out regulated activities, and start-ups. Participation in the 'Virtual PSD2' Sandbox does not give rise to the obligation to apply for UKNF authorisation. Each participant reviews their own the findings from the consultations and tests and considers them in deciding whether to apply for authorisation.
144. **'Virtual Sandbox DLT' (2023)**²⁷. Another virtual sandbox established in Poland provides DLT/Blockchain testing environment. The environment developed and implemented in the infrastructure of the UKNF was launched in cooperation with experts from National Depository of Securities (KDPW)²⁸. Within the DLT Virtual Sandbox, the UKNF has decided to initially provide an environment based on the Hyperledger Fabric (HLF) platform given the frequency of use of this technology in the financial market. HLF is a 'permissioned' network, which means that if any new organisation wants to join the network, it must obtain a consent in advance to access it. The data circulation that is recorded in the network blocks is protected from access by organisations that have not received such a permission. It is an in-house solution based on open-source technology, developed on a container data structure. The solution allows to verify digital identities and to monitor smart contracts. It allows to connect any HLF blockchain network and enables testing of HLF-based innovative solutions. As in the case of the 'PSD2 Virtual' Sandbox, a

²⁶ https://www.knf.gov.pl/dla_rynku/fin_tech/Piaskownica_Wirtualna/Q&A

²⁷ <https://fintech.gov.pl/pl/o-fintech/virtual-sandbox>

²⁸ National Depository of Securities (in PL - Krajowy Depozyt Papierów Wartościowych), is a central securities depository and a capital market infrastructure institution responsible for registration of securities, settlement of transactions and services related to trade reporting.

mandatory condition of access to the DLT Virtual Sandbox is the regulatory consultation under the Innovation Hub Programme.

145. **A sandbox in Free Technological Zone (FTZ)**²⁹. In Portugal the decree-law on the creation of Free Technological Zones has been established with the aim of promoting technology-based innovation. The FTZs are intended as test sites, geographically located, for the testing of innovative technologies, products, services and processes, by their promoters, in a safe manner, with the support and monitoring of the respective NCAs. Specific experimentation instruments are created, in the form of programs for innovation, or legal and regulatory instruments, which aim to facilitate the testing of technologies, products, services and processes.
146. **Hackathons/TechSprints**. Some NCAs (for example, PL UKNF) organise hackathons addressed to specialised group of startups and IT specialists for the creation of prototypes of IT solutions in the area of financial innovation, SupTech and cybersecurity. Participants in the hackathons obtain information about the Innovation Hub programme and related activities of the Virtual PSD2 and DLT Sandboxes. For the NCAs, involvement in the Hackathon allows the NCA to obtain ownership rights to the winning prototypes and creates the possibility for further development and implementation. The KNF has organised three editions of the *#Supervision_Hack* hackathon³⁰, which were attended by several hundred participants. Among the acquired solutions, four have already been implemented. The solutions involve the use of modern technologies (e.g. machine learning, natural language processing, computer vision) in the areas of the capital sector, cybersecurity and AML/KYC. Currently, work is ongoing on the implementation of the tools acquired during the last edition, which will support supervisory processes in the banking and insurance sectors. As another example, TechSprints organised by FR ACPR are targeted events to address a particular challenge, e.g. the explainability of artificial intelligence (AI)³¹ or methods and techniques for confidential data pooling³².
147. **Collaboration with universities**. For example, the Slovakian NCA organises IBOLab, a laboratory for cooperation, with Slovak University of Technology in Bratislava on innovative domains. The project allows the NCA to get in touch with local talents for the use of new technologies and their application in practice, for example, in areas of AI, Machine Learning, or cyber security. Under this setting students can test initiatives and use cases that are relevant for the regulator.
148. **Other activities**, including various forums with industry, science conferences, and internal or external workshops on selected financial innovation topics.

²⁹ In PT - Zonas Livres Tecnologicas

³⁰ More information and reports from the events can be found at <https://supervisionhack.pl/>

³¹ <https://acpr.banque-france.fr/en/acpr-tech-sprint-explainability-artificial-intelligence>

³² <https://acpr.banque-france.fr/en/acpr-tech-sprint-confidential-data-pooling>

Annex 3. List of innovation hubs and regulatory sandboxes

Innovation hubs

As of October 2023, 41 innovation hubs exist across 30 countries in the EEA.

	Country	Name of the innovation hub	Website	Year	Cross-sectorial coverage			Links to relevant publications
					Banking/ Payments	Insurance	Securities/ Markets	
1.	AT	Sandbox & FinTech Contact Point	Link	2016	X	X	X	Link
2.	BE	FinTech portal	Link	2016	X	X	X	
3.	BG	Innovation hub	Link	2019		X	X	
4.	CY	CBC Innovation Hub	Link	2022	X			
5.	CY	CYSEC Innovation Hub	Link	2018			X	
6.	CZ	FinTech contact point	Link	2019	X	X	X	
7.	DE	FinTech Innovation Hub	Link	2017	X	X	X	Link
8.	DK	FinTech Team	Link	.	X	X		
9.	EE	Innovation Hub	Link	2021	X	X	X	Link
10.	ES	Queries on technological innovation	Link	2021	X			
11.	ES	Portal FinTech	Link	2016			X	
12.	FI	Innovation Help Desk	Link	2016	X	X	X	
13.	FR	Pôle FinTech et Innovation	Link	2016	X	X		Link Link Link
14.	FR	Innovation & Digital Finance Hub	Link	2016			X	Link Link Link
15.	GR	BoG FinTech Innovation Hub	Link	2019	X	X		Link
16.	GR	HCMC Innovation Hub	Link	2019			X	
17.	HR	CNB Innovation Hub	Link	2019	X			
18.	HR	Hanfa Innovation Hub	Link	.		X	X	



Country	Name of the innovation hub	Website	Year	Cross-sectorial coverage			Links to relevant publications
				Banking/ Payments	Insurance	Securities/ Markets	
19.	HU MNB Innovation Hub or InnoHub	Link	2018	X	X	X	Link
20.	IS Sedlabank FinTech Helpdesk	Link	2019	X	X	X	
21.	IE Central Bank of Ireland Innovation Hub	Link	2018	X	X	X	Link
22.	IT Milano Hub – Innovation Center of Bank of Italy	Link	2021	X	X	X	
23.	IT Canale Insurtech	Link	2016		X		
24.	IT Canale FinTech	Link	2017	X	X	X	
25.	IT LIFTECH	Link	2021			X	
26.	LV Innovation hub Inovāciju centrs	Link	2017	X	X	X	Link
27.	LI Regulatory Laboratory / Financial Innovation	Link	2018	X	X	X	
28.	LT LB Newcomer Programme	Link	2018	X	X	X	
29.	LU Innovation Hub	Link	2020	X		X	
30.	MT Innovation Office	Link	2018	X	X	X	
31.	NL AFM, DNB, ACM Innovation Hub	Link	2016	X	X	X	
32.	NO Finanstilsynet Guide to FinTech businesses	Link	2019	X	X	X	
33.	PL The KNF Innovation Hub Program	Link	2018	X	X	X	
34.	PT CMVM Innovation Hub	Link	2022			X	
35.	PT Portugal FinLab - Where regulation meets innovation	Link	2018	X	X	X	Link
36.	PT FinTech+	Link	2018	X			
37.	RO ASF FinTech Innovation Hub	Link	2019	X	X	X	
38.	RO FinTech Innovation Hub	Link	2019	X			
39.	SK Inovačný hub (Innovation hub)	Link	2019	X	X	X	Link
40.	SI Banka Slovenije's FinTech Innovation Hub	Link	2019	X			
41.	SE Innovation Center	Link	2018	X	X	X	



Regulatory sandboxes

As of October 2023, 14 regulatory sandboxes exist across 12 countries in the EEA, and two sandboxes are planned to be established.

	Country	Name of the regulatory sandbox	Website	Year	Cross-sectorial coverage			Links to relevant publications
					Banking/ Payments	Insurance	Securities/ Markets	
1.	AT	Sandbox & Fintech Contact Point	Link	2020	X	X	X	Link
2.	CY	-		Plan to establish				
3.	DK	FT Lab	Link	2018	X	X	X	Link
4.	EE	Sandbox	Link	2023	X	X	X	
5.	ES	Espacio controlado de pruebas (Controlled testing environment)	Link	2020	X	X	X	Link Link
6.	GR	Bank of Greece Regulatory Sandbox	Link	2021	X	X		Link
7.	HU	MNB Innovation Hub - Regulatory Sandbox (Financial Innovation Testing Environment - FITE as defined in the MNB Decree)	Link	2018	X	X	X	Link
8.	IT	IVASS Sandbox Regolamentare	Link	2021		X		
9.	IT	Banca d'Italia Regulatory sandbox	Link	2021	X			
10.	IT	CONSOB Regulatory Sandbox	Link	2021	X	X	X	
11.	LV	Bank of Latvia Regulatory Sandbox	Link	2017	X			Link
12.	LT	Regulatory Sandbox	Link	2018	X	X	X	
13.	MT	MFSA FinTech Regulatory Sandbox	Link	2020	X	X	X	Link
14.	RO	-		Plan to establish				
15.	NO	Finanstilsynet's regulatory sandbox	Link	2019	X	X	X	Link
16.	SK	Regulačný sandbox	Link	2022	X	X	X	