



# INDUSTRY SANDBOX

**A DEVELOPMENT IN OPEN INNOVATION**  
INDUSTRY SANDBOX CONSULTATION REPORT



# FOREWORD

Industry Sandboxes offer new opportunities for the financial services sector to accelerate the use of shared knowledge, data and technology in the process of developing innovative solutions for customers. They can provide a forum for both engagement and observation for startups, institutions, regulators, and wider ecosystem players, in a safe 'off-market' environment.

The demand for Industry Sandboxes in the FinTech startup community is strong, and institutions have signalled a recognition of the benefits of open collaboration and digital marketplaces. There is a broad range of applications for Industry Sandboxes across all segments of the financial services ecosystem from catalogues of existing open data resources, to virtual technology environments, extending to forums for meetings and collaboration.

The adoption of open innovation principles, along with the use of financial services reference architectures, accredited certification standards, and the participation of regulators through Sandbox Observer Forums, may likely be key factors in driving the widespread use of Industry Sandboxes. This, in turn, can help accelerate taking innovative solutions to customers, addressing industry-wide pain points, and ultimately gain greater market adoption of FinTech.

The idea of using sandboxes in financial services in the UK was first covered in the Government Office for Science 2015 report on FinTech Futures. Since then, the Financial Conduct Authority (FCA) launched a Regulatory Sandbox and invited the industry to collaborate in consultation on Industry Sandboxes.

As at May 2017, over 16 jurisdictions have developed or are developing a Regulatory Sandbox, putting regulators in the somewhat unprecedented role of driving the adoption of innovative technologies that deliver better consumer outcomes.

Industry Sandboxes give an opportunity to supplement regulatory support of innovation and market competition by enabling industry to self-organise and support regulatory efficiency in providing a knowledge-sharing channel, a communication forum, and a certification facility as part of the regulatory process.

It has been a privilege for Innovate Finance to Chair the Industry Consultation. We worked with a Core Team to adopt an open and collaborative approach, inviting the global financial services sector to participate in surveys, design sprints, roundtables, and a formal written consultation process.

We have been overwhelmed by both the interest and response to the Consultation – there are currently many open financial services sandboxes in various stages of development, a sample of which has been included in the Consultation findings. The findings offer the reader the various ingredients required to create different variants of Industry Sandboxes for the different jobs at hand.

We would like to thank the over 25 Consultation contributors and acknowledge the over 160 participants in the consultation process and the Consultation Core Team: the Steering Committee, the Industry Advisory Board, the Technical Advisory Board, and the Delivery Partners.

We would also like to thank the Financial Conduct Authority for their support, and for supporting the use of innovative tools and open collaboration in problem solving and design in arriving at the Consultation findings.

We are confident that industry-led sandboxes will become a significant platform for the acceleration of FinTech, by enabling more and better open collaboration of market participants, and enabling the earlier and more transparent identification of opportunities and risks for all sandbox participants.



**Lawrence Wintermeyer,**  
Chair,  
Industry Sandbox Consultation

# EXECUTIVE SUMMARY

The UK FCA invited Innovate Finance to chair an industry consultation on an industry-led sandbox for financial innovation. The consultation was conducted between July 2016 and April 2017.

The Consultation found that Industry Sandboxes can be an advancement in open innovation which develop, accelerate and promote collaboration in the FinTech ecosystem.

Further, the consultation identified options for the design, governance, funding, and regulatory treatment of Industry Sandbox which would generate industry demand and meet feasibility requirements.

## Key Consultation Findings

In this consultation, an Industry Sandbox was defined as a shared off-market development environment where developers of FinTech solutions can access data, technologies, and services from different providers in order to validate innovative ideas or address common industry challenges.

Industry Sandboxes can be useful as a means to accelerate:

- Solution development by providing the whole of the FinTech ecosystem with access to resources such as data, APIs, or reference architectures which enable entrepreneurs to create solutions that are additive and more readily integrated with the existing technology stack;
- Complex problem solving by facilitating industry collaboration on identifying and addressing complex shared consumer, technological and regulatory challenges. Case studies of such shared challenges include RegTech, digital identity, and opening access to bank data;
- Regulatory efficiency by encouraging regulators to engage as observers where industry can share knowledge early in the life cycle of solution development.

## Industry Sandbox Implementation Options

High level Industry Sandbox design principles and components were developed by reviewing global practices and community requirements.

- OPEN to the whole of the ecosystem on a voluntary participation basis;

- CONNECTED to shared testing environments and different proprietary sandboxes;
- ACCESSIBLE via clear eligibility requirements and as low barriers for participation as are economically feasible.

Industry Sandboxes participation ranges from:

- USERS of the sandbox resources;
- CONTRIBUTORS of the sandbox resources;
- SPONSORS of the sandbox;
- OBSERVERS of the sandbox outputs.

FinTech startups, financial institutions, technology and data vendors, professional services firms, and venture capital funds can all be users, contributors or sponsors of Industry Sandboxes (or a combination of these roles). Regulators, academia and professional membership bodies can participate as observers or, where relevant, enablers in secretariat or research functions.

## Industry Sandboxes could have the following components:

- **Application assessment mechanism** allowing users to self-certify their eligibility for access, supported by case worker review where necessary;
- **Data sets** of as wide and varied nature as feasible, including market, product and consumer transactional data provided data privacy standards are met. Such data can be synthetic, historic, delayed or live market data, or anonymised transactional data. Data architecture should allow for both structured and unstructured data, with the ability to layer analytics. Enabling access to sample sizes live data from volunteer consumers was left to further review;
- **Permissions** for data access should be managed by the data provider, while the Industry Sandbox develops a registry of available data assets and collects meta-data on their usage;
- **Reference architectures** providing users with a set of domain-specific artefacts, design patterns and terminology that describe successful operational architectures, thus facilitating multiple parties coming together to interoperate and solve new problems at a business and technical level;

- **Product Certification** providing industry-level assurance that solutions tested in the sandbox confirm to existing national or international industry standards, best practices defined by competent bodies; or emerging standards agreed at sandbox level. Certification should be voluntary, time-bound, transparent, and reflective of the product maturity;
- **Showcase space** allowing solutions tested in the sandbox to be easily and digitally accessible by observers anywhere;
- **Advisory space** connecting sandbox users with interested providers of professional service advice, particularly with regard to regulatory compliance and readiness to integrate with legacy systems;
- **Analytics and audit** tools allowing understanding and transparency of how sandbox assets are being used;
- **Participants' Forums** providing a dedicated communication, collaboration and feedback channel for each participant type. Forums can be both digital platforms and physical meetings.

- TEST RegTech solutions for regulators;
- FEEDBACK into policy development.

Industry Sandbox could have simple and flexible governance structure providing for neutrality, robust management of the rights and obligations of participants, and compliance. They would be set up as non-for-profit structures.

Industry Sandboxes could be funded through a combination of subscriptions, sponsorship and benevolent funding. Their cost would vary significantly based on the sophistication of the environment constructed.

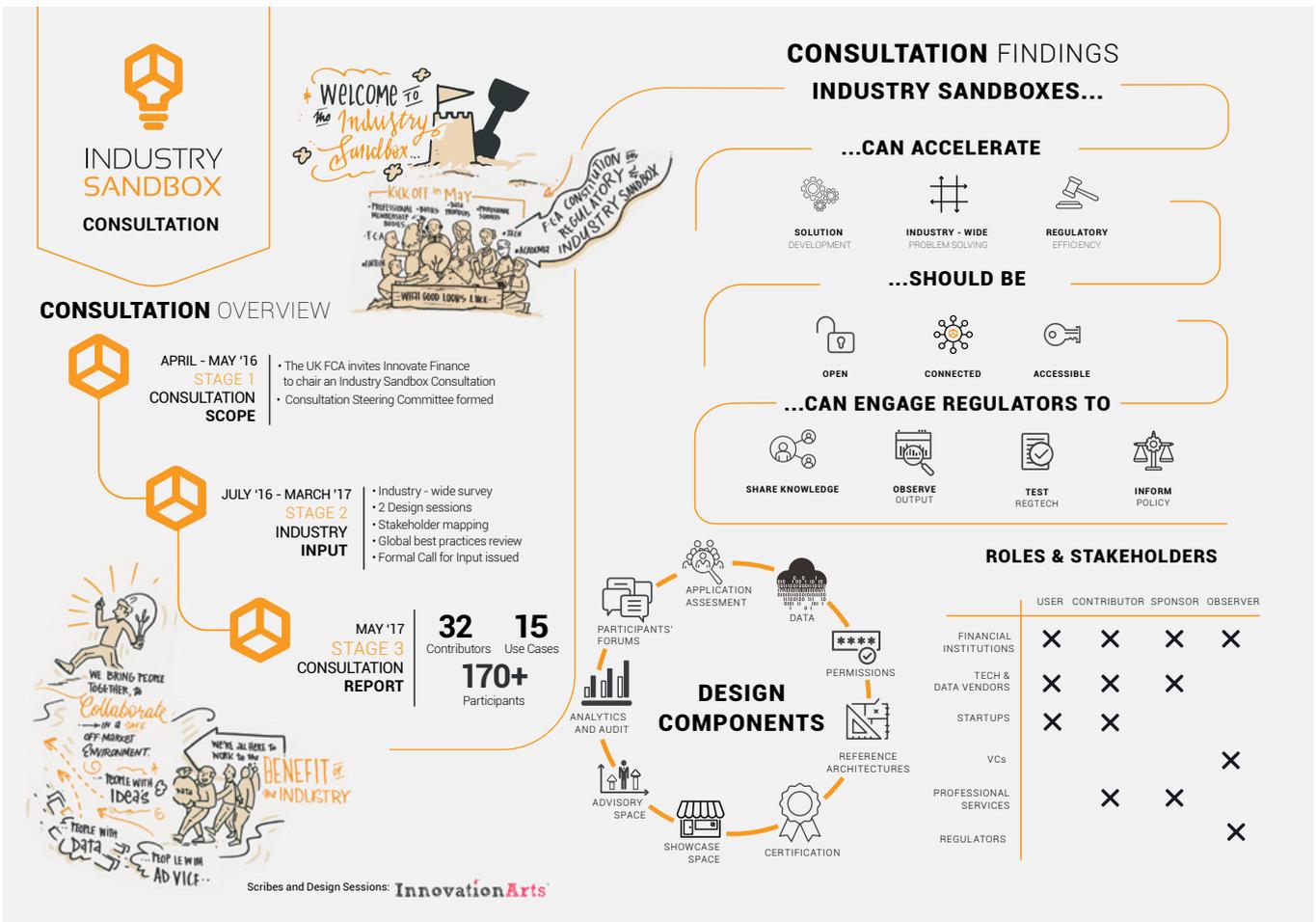
### Implementation Choices

Based on the identified design and governance requirements, an Industry Sandbox can be as simple as a catalogue of existing open datasets or APIs or as complex as a fully fledged digital platform for managing access to market and institutional data and conducting collaborative research and development. An Industry Sandbox could also be generic or dedicated to a specific industry challenge.

Implementation Choices would vary between organisations taking an Industry Sandbox forward.

### Industry Sandboxes could engage with regulators in order to:

- ENGAGE in curated dialogue with sandbox participants;
- REVIEW Industry Sandbox tests in applications to regulatory sandboxes;



# TABLE OF CONTENTS

<b>1 THE INDUSTRY SANDBOX CONSULTATION: ORIGIN AND CONTEXT</b>	<b>7</b>
1.1 Government Office for Science Report on FinTech Futures	8
1.2 FCA Regulatory Sandbox Consultation	8
1.3 Innovate Finance Member Input	8
1.4 Industry Sandbox Consultation Process	8
1.5 Building on Lessons from Open Source and Open Innovation	9
1.6 Landscape: Financial Services Sandboxes and API Marketplaces	10
<b>2. KEY FINDINGS ON THE ROLE OF AN INDUSTRY SANDBOX</b>	<b>11</b>
2.1 Addressing Cost and Inefficiency in Validating Innovative Solutions	12
2.2 Addressing Cost and Inefficiency in Developing Collaborations	12
2.3 Supporting Efficiency in Compliance and Regulatory Engagement	13
<b>3. INDUSTRY USE CASES</b>	<b>14</b>
3.1 Use Cases: Stakeholding Groups	15
3.2 Use Cases: Wicked Industry Problems	20
<b>4. IMPLEMENTATION OPTIONS</b>	<b>25</b>
4.1 Design Principles	26
4.2 Participant Types	26
4.3 Eligibility Requirements	27
4.4 Design Components	28
4.5 Legal and Governance Framework	33
4.6 Funding Model	36
4.7 Sandbox Participant Roles	37
<b>5 IMPLEMENTATION CHOICES</b>	<b>40</b>
5.1 Industry Sandbox Catalogue	41
5.2 Industry Sandbox for Wicked Industry Problems	41
5.3 Fully Fledged Industry Sandbox	41
<b>6 NEXT STEPS</b>	<b>42</b>
6.1 Umbrella Sandbox	42
6.2 Access to Live Customer Data	42
6.3 Developing an Industry Sandbox	42
<b>ANNEXES</b>	<b>43</b>
<b>ACKNOWLEDGEMENTS</b>	<b>64</b>
<b>CONSULTATION TEAM</b>	<b>67</b>



# 1 CONSULTATION ORIGIN AND CONTEXT

Software developers have relied on sandboxes (an isolated testing environment) to test solutions for many years. Most financial services institutions or technology providers already have their own proprietary sandboxes.

Much rarer in financial services are shared sandboxes, or similarly collaborative research and development environments. Learnings in open innovation are mostly derived from the industry's experience with accelerators and other forms of innovation labs.

Over the past two years, development of sandboxes available to all FinTech players has been largely focused on Regulatory Sandboxes, which are being established by regulators across 16 jurisdictions, led by the FCA's first-of-a-kind Regulatory Sandbox.

Unlike a Regulatory Sandbox, an Industry Sandbox would be developed, operated and owned by industry. It would support the testing of solutions before they reach a market, regardless of whether these solutions need to be regulated. It would not give access to any form of regulatory relief.

## 1.1 GOVERNMENT OFFICE FOR SCIENCE REPORT ON FINTECH FUTURES

The concept of an Industry Sandbox was first put forward in the UK by the 2015 Government Office for Science report on FinTech Futures:



In fostering close collaboration between regulators, institutions and FinTech companies, much might be learnt from clinical trials (i.e. Phase III) structures. Specifically, regulator monitored 'sandboxes' for innovators to experiment with virtual environments or real people...a UK project could be a vehicle for bringing together regulators, key financial institutions, FinTech companies and the large number of world-class UK academics working on risk, software engineering and high-performance computing (HPC). Such a project may take years and may not succeed, however the spin-off in risk, analytics and software research results are likely to be significant.<sup>1</sup>



A number of suggestions from that report have been taken forward as sandbox design principles and components in the Industry Sandbox Consultation, for example that a successful Industry Sandbox should be an inclusive collaborative space open to all types of FinTech ecosystem participants, and that regulators might have a role as observers, in an Industry Sandbox.

## 1.2 FCA REGULATORY SANDBOX CONSULTATION

In late 2015, the FCA took this concept a step further in its Regulatory Sandbox Report, which introduced the launch of the FCA Regulatory Sandbox, and included the concept of an "industry-led virtual sandbox" as a recommendation to industry.

The Regulatory Sandbox Report text states:



*A virtual sandbox could be introduced by industry. This would be an environment to enable firms to test their solutions virtually without entering the real market. A number of large firms already have similar solutions for testing technologies but we understand these operate separately from each other and with data only from the owners of these sandboxes ... we do not think it is necessary for the FCA to set up the virtual sandbox; the industry is well placed to set up a useful virtual testing environment itself. However, we propose to facilitate collaboration between interested parties and provide support when the virtual sandbox is being developed. We will look into providing access to our various systems and to some data sets (provided this does not breach requirements from the Data Protection Act 1998 or section 348 of FSMA). We would be interested in having access to the results of the virtual sandboxing activity.<sup>2</sup>*



## 1.3 INNOVATE FINANCE MEMBER INPUT

Separately, in end-2015 / early-2016 Innovate Finance received feedback from its members (predominantly from the start up membership segment) that a shared sandbox would support their innovation journeys.

The feedback was sufficiently consistent for Innovate Finance to develop the proposal that a membership sandbox environment would need to address these four objectives:

- a. **Product development-** by giving access to infrastructure, such as payments systems or core banking platforms, using a development environment and institutional partnerships e.g. preferred supplier lists;
- b. **Product showcase-** by providing a curated marketing space for proofs of concept ("POC") which could support with attracting funding or customers;
- c. **Product regulation-** by assessing compliance and readiness for FCA authorisation and, if possible, streamlining progression towards applying for authorisation; and
- d. **Industry interoperability-** by providing an environment where developers could explore industry challenges and use cases for emerging technologies, standards and best practices linked to driving adoption and interoperability of new solutions across the industry.

The Innovate Finance Member Sandboxes Proposal is Available in Annex 2.

## 1.4 INDUSTRY SANDBOX CONSULTATION PROCESS

Innovate Finance responded to the FCA's Regulatory Sandbox Report with feedback from its own members, and was subsequently invited to chair the Industry Sandbox Consultation.

The scope of the Industry Sandbox Consultation is to:

- a. ascertain the demand for industry-led sandbox initiatives and develop a clearer idea of the solution(s) desired;
- b. consider the feasibility of the identified sandbox solution(s), taking into account governance, funding, commercial viability, legality, provision of data, access to the sandbox, etc.;
- c. in collaboration with the regulators, consider what (if any) role the regulators could have in the implementation and operation of an industry-led sandbox; and
- d. if the working group establishes that there is a need and it is feasible, develop one or more industry-led sandboxes.

<sup>1</sup> "FinTech futures: the UK as a world leader in financial technologies", Government Office for Science, published 18 March 2015.

<sup>2</sup> Regulatory Sandbox Report, November 2015, FCA

Acting as a secretariat, the Industry Sandbox Consultation Team conducted the Industry Sandbox Consultation between July 2016 and April 2017.

The FCA Invitation Letter to Innovate Finance is available in Annex 1. The Consultation timeline, governance and inputs are detailed in Annexes 3 to 7.

## 1.5 BUILDING ON LESSONS FROM OPEN SOURCE AND OPEN INNOVATION

The concept of an Industry Sandbox, or any other form of collaborative prototyping environment, builds on the tradition of open source software development, the use of open standards and the practice of open innovation.

### Lessons from Open Source

Open source development dates back to the 1980s with landmark projects such as the GNU Project, followed by Linux and Netscape among others. The open source community formed around the aim of providing an operating system free from the constraints on usage or issues on source code interoperability which can be the case with paid software.

A more recent example of open source is software for creating private and public clouds, such as OpenStack - open source software for creating private and public clouds.

Open source projects have gained traction due to their ability to deliver mass-scale security testing; quality analysis from a vast participatory community; customisability in that developers can tailor software to their own needs freely; and interoperability as open source software is typically better at adhering to open standards than proprietary software.



*Being able to access core banking or payment platforms through APIs is the de-facto open sourcing of banking services. Anyone in the near future would be able to build their own bank through apps, APIs and analytics.*

*2017 will be the year of open marketplaces and platforms. Platforms support the rapid cycle deployment of microservices into a financial marketplace. Those include apps, APIs, and analytics that transform the back, middle, and front office respectively. As the financial world is rapidly moving to open, loosely coupled marketplaces, using old legacy technology could impact on the agility needed by incumbents to compete.*

*- Chris Skinner, CEO, The Finanser Ltd*



This process is underway in a number of FinTech markets, supported by the opening up of bank data in the UK and EU or other seminal open API projects such as India Stack.

Sandbox environments should be able to reflect this industry trend by providing an open interoperable development environment where innovators can pick and mix from a large suite of APIs in testing their solutions.

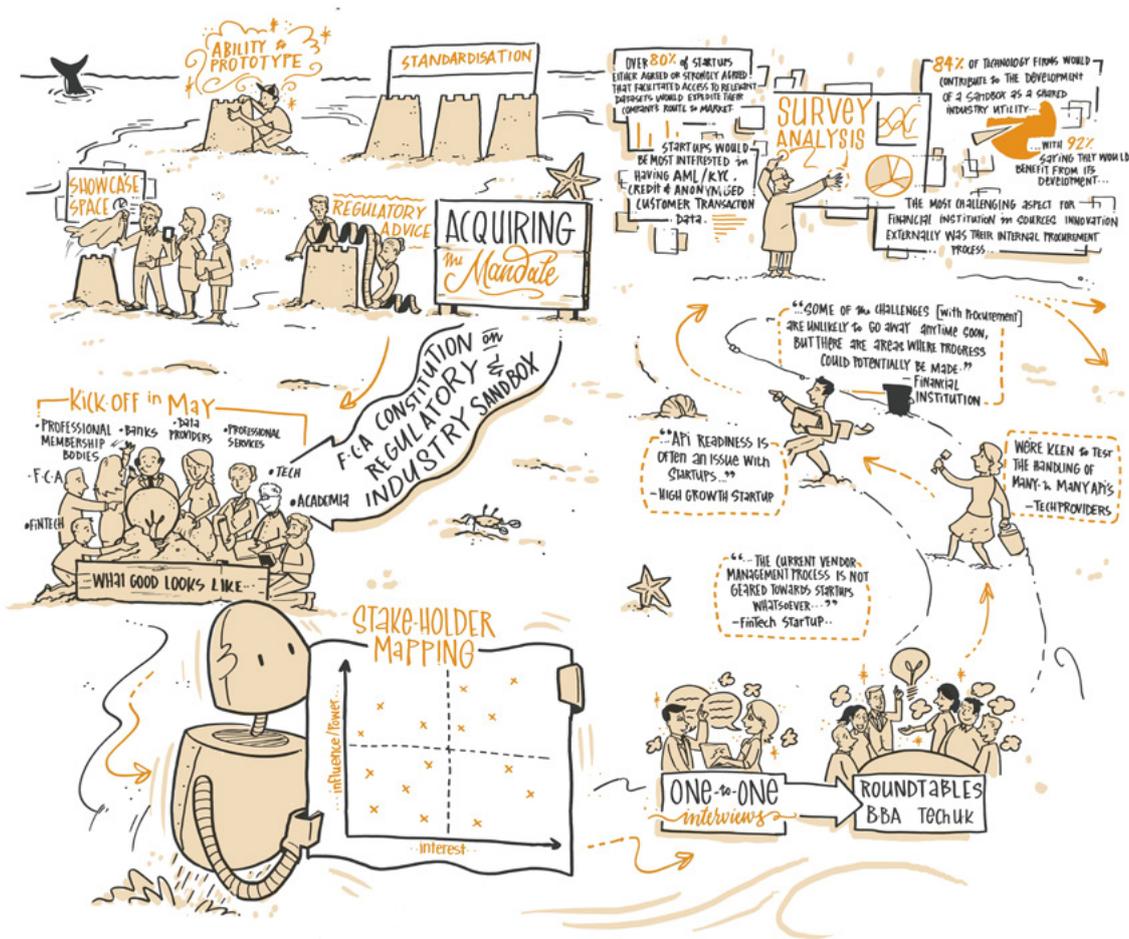
Lessons from the open source and open standards community is that while resources might be openly sharable, it is critical to have a governance model which binds these processes together, prevents abuse and (where necessary) identifies the common denominators which form best practice.

### Lessons from Open Innovation

In the footsteps of open source, open innovation is the idea that, in a world of widely distributed knowledge, companies cannot afford to rely entirely on their own research but should instead be open to sourcing inventions from other companies or collaborating with them to develop solutions.

The rise of FinTech incubators, accelerators, innovation labs, hackathons and other similar innovation programmes demonstrates the adoption of open innovation in financial services. Many well-capitalised FinTech startups, particularly in the retail space, can trace their origin to one of these programmes.





## 2 KEY FINDINGS ON THE ROLE OF AN INDUSTRY SANDBOX

The Industry Sandbox Consultation's key objectives were: first, to establish if there is demand for one or more Industry Sandboxes to support innovation in financial services and secondly, to provide insights on the design, governance and funding components which could be adopted in meeting that demand.

While there are a range of views in the FinTech community of what sandboxes are understood to be (Industry Sandboxes in particular), the feedback received converged on three key aspects of innovation which an Industry Sandbox can contribute to:

- i. addressing cost and inefficiency in validating innovative solutions;
- ii. addressing cost and inefficiency in developing collaborations to solve shared industry problems; and
- iii. supporting efficiency in compliance and regulatory engagement.

## Industry Sandboxes Understanding

The Industry Sandbox Consultation aims to address all aspects of an Industry Sandbox including the use of the term "sandbox" itself.

A sandbox is a testing environment that isolates new code or experimentation from a production environment. Since an Industry Sandbox is a shared environment where innovation can be tested in isolation from live customers, then the term indeed resonates with the policy objectives of undertaking the consultation.

The degree of familiarity with sandboxes and pre-production testing, however, varied significantly between consultation stakeholder groups and, in some instances, within stakeholder groups. In particular, while the term is very familiar to the software developer community, its adoption among strategy, marketing or regulatory teams is relatively recent.

Survey results show that while nearly all respondents from tech vendors either have used or have developed a sandbox environment, this drops to a third of respondents from financial institutions and a quarter of respondents from startups. The latter figures could also be a signal of the availability of readily accessible sandboxes in financial services at the time of the survey (Q4 2016).

Experience in relying on sandbox testing could be one factor which drives higher demand for an Industry Sandbox within the tech vendor community, as all tech vendors who considered that their company could benefit from an Industry Sandbox had experience with proprietary sandboxes.

However, survey data showed the reverse correlation within the banking sector – respondents that have access to a proprietary sandbox (although this sample size was small) were less convinced that there is value to be gained from establishing an Industry Sandbox.

The differing levels of understanding of the nature of Industry Sandboxes had an impact on the ability of the consultation process to assess how stakeholder views compare on the core consultation questions. On a positive note, the consultation process itself has increased understanding of the role which sandboxes can play.

### ▶ 2.1 ADDRESSING COST AND INEFFICIENCY IN VALIDATING INNOVATIVE SOLUTIONS

Consultation responses have indicated that there is significant friction, both in terms of resources required and length of process, for startups and institutions in developing multiple POCs bilaterally.

Some respondents noted that while an increasing amount of POCs are being developed in financial services, a disproportionately small number of these are being taken into production – lower than might be expected in a process of survival of the "fit-for-purpose".

Beyond the POC stage, both startups and buyers of innovative solutions indicated that multiple and repetitive due diligence processes add a significant amount of cost and friction to adopting solutions from startup vendors.

In survey responses, both technology vendors and their target institutional clients also pointed to friction in these processes.

The consultation feedback from the startup community indicated that the journey from POC to live deployment could be fast tracked in three ways:

- facilitating access to test assets;
- improving understanding of live production operating requirements and developing common industry standards; and
- making vendor assessment more efficient.

Facilitating access to data, in particular, has been widely recognised as expediting product development for FinTech solutions. In addition to data, access to APIs and tools were the top assets identified as in demand by the FinTech startup community.

In terms of vendor assessment, the Industry Sandbox Consultation identified a market need for a form of transferable validation or certification which might enable FinTech solution providers to expedite current due diligence processes which are largely seen by the startup community as prohibitively lengthy, cumbersome and not fit-for-purpose.

### ▶ 2.2 ADDRESSING COST AND INEFFICIENCY IN DEVELOPING COLLABORATIONS

Industry feedback, particularly through Design Sessions, has been that an Industry Sandbox could be helpful in bringing participants together in the resolution of shared challenges.

A collaborative research laboratory could enable the FinTech community to more efficiently identify the shared industry-wide issues which multiple actors are seeking to resolve. Subsequently, some of these issues could be resolved through pooling resources to the benefit of all participants.

An Industry Sandbox could serve as a test-bed for, at the very least, identifying and collaborating on understanding such industry issues in a lean and inclusive way whilst allowing flexibility for responses to those issues to be developed independently or collaboratively.

All Design Sessions conducted as part of this Consultation indicated that identifying several such industry-wide issues would be a solid foundation on which to develop an Industry Sandbox. We have termed these "Wicked Industry Problems".

# WICKED INDUSTRY PROBLEMS

Wicked Industry Problems are issues that a critical mass of industry participants identify as significant or which could have implications for the systemic resilience of an industry, transparency and/or consumer outcomes.

Best practices from other industries, such as the pharmaceutical industry, suggest that a "working group" structure can reduce costs while advancing solutions by developing a consensus on what the Wicked Industry Problems actually are, combined with pooling resources to seek their resolution.

Wicked Industry Problems in the financial services industry most commonly relate to regulatory or technology interoperability issues.

Ongoing regulatory changes in the post-2008 regulatory environment have generated an unprecedented level of new compliance requirements for the financial services industry. According to industry research, global risk management and risk-related regulatory compliance technology spending is to hit \$72 billion in 2019, a 10% annual growth rate.

Technological advancements themselves can generate a need for regulatory change, or at a minimum, a change in supervisory approach. Compliance requirements could be efficiently managed via innovative solutions. This is the premise of the increased interest in RegTech, innovation in risk assessment and compliance technology solutions, from industry and supervisory authorities globally.

However, innovation to address regulatory change is facing a set of adoption barriers.

The risk of adopting innovative solutions for compliance purposes can be high as compliance is not an area which lends itself to experimentation. Consequently, the level of due diligence and scrutiny required to adopt a RegTech solution can be prohibitively high for startups.

An Industry Sandbox environment could address these barriers. Pooling resources in determining the use cases, technical asks, implementation requirements and solution due diligence could expedite product development and adoption.

An early view from the regulator on general interpretation of how regulation may interact with a proposed approach as RegTech solutions are being developed could give potential clients and investors a degree of confidence necessary to solidify the UK as a leader in taking RegTech solutions into production.

From a regulators' perspective, ensuring transfer of knowledge and early sight of products might be beneficial. If a RegTech solution is going to be relied on across the industry then it increases the potential for systemic risk and so it is important regulators have early sight and can shape concerns.

## 2.3 SUPPORTING EFFICIENCY IN COMPLIANCE AND REGULATORY ENGAGEMENT

In addition to validation at a business model and technology level, FinTech innovation requires clear understanding of compliance requirements and supervisory expectations. In FinTech, both a lack of awareness of compliance requirements and a lack of clarity in supervisory expectations have manifested themselves as barriers to innovative solutions going into production.

The consultation process revealed that within the startup community, understanding of the need for authorisation and compliance requirements in local and foreign markets could benefit from being accelerated. The professional services and, in particular legal community are well positioned to play a part in this process.

Where there is scope for differing interpretation of regulatory requirements, early indication of a view from the relevant regulators can be instrumental in product development as well as in providing the level of certainty necessary for fundraising and commercial partnerships.

A number of market and conduct regulators address this dynamic by providing direct support to startups. An Industry Sandbox could support regulators managing the volumes of direct support requests by highlighting regulatory queries multiple firms face while prototyping and providing forums to share such feedback.

A point raised repeatedly was the need for continuity between regulatory teams – from those providing direct support to startups, such as the FCA Innovation Hub, through authorisation and supervision teams, to the relevant policy teams.

While many regulatory innovation teams are being set up as hubs precisely with the view to share information more efficiently, feedback from momentum FinTech startups is that both access and continuity can be improved.

An Industry Sandbox could seek to support this process by bringing relevant departments of a regulator in front of tangible proofs of concept of innovative solutions.



## 3.1. USE CASES: STAKEHOLDER GROUPS

### ▶ 3.1.1 A STARTUP VIEW: ONFIDO



Access to reliable, fast identity verification services and KYC/AML checks is key in the FinTech space, from big bank players to start up innovators. For Onfido-a startup that provides these services – an Industry Sandbox has the potential to speed up innovation and market access in a big way. To date, there has been inertia around FinTech innovation and a reluctance to invest in new solutions.

An Industry Sandbox will give impetus to collaborative problem-solving in what has previously been a disjointed field, and do so without exposing any parties to external risk. An Industry Sandbox will provide an arena to share technical knowledge, the freedom to innovate and the social buy-in that is required to see FinTech more widely accepted and trusted. We are most excited to envisage enhanced access to data sets, including identity verification documents with which to train AI models.

We are keen to play a part in defining what data is of most use to the FinTech startup community. Regulator input

will be key in establishing how data can be handled in an Industry Sandbox. One important outcome for us would be the recognition that new solutions can perform as well, if not better than existing solutions. That an Industry Sandbox will comprise representatives from several different market sectors is therefore particularly valuable, as mutually agreed upon outcomes will have industry-wide validation before "go live".

An Industry Sandbox "certification capability" could alleviate the current due diligence burden that accompanies any engagement with regulated entities such as banks. Certification could take away the current stark choice that startups can often have: use resources to innovate, or to project manage extensive due diligence on a customer by customer basis. For example, it is currently not uncommon for a single trial to be preceded by pages of client-specific RFI questions, and followed by hundreds of audit questions. It will be exciting to work with Industry Sandbox Consultation stakeholders to define exactly what form that certification could take.

### ▶ 3.1.2 A SCALEUP VIEW: BRUCE DAVIES, DIRECTOR, UK CROWDFUNDING ASSOCIATION



In the UK, the alternative finance industry paved the way for FinTech in a number of ways-most notably in attracting investment capital, rapidly raising a user base, securing supportive legislative change and proactively engaging with the regulator to secure a dedicated regime.

As peer-to-peer and crowdfunding platforms scale and, invariably, make pivots in their business models and product suites, the need to test innovations and secure new regulatory permissions remains prominent. In this context, the need for a coordinated regulatory approach - across innovation departments, authorisation and supervision teams as well as those responsible for policy changes is clear.

In particular, the alternative finance industry can benefit from a neutral space where business model or product changes can be discussed with the regulator in a curated manner before any formal submissions are made. The focus of such discussion should be the most effective regulatory approach to secure a demonstrable consumer benefit, with a focus on outcome analysis.

A sandbox environment can support such dialogue as well as facilitate outcome projections in a prototyping stage.

### 3.1.3 A UK BANKING SECTOR VIEW: BRITISH BANKERS' ASSOCIATION (BBA) MEMBERS FEEDBACK



The BBA is the leading trade association for the UK banking sector with 200 member banks headquartered in over 50 countries with operations in 180 jurisdictions worldwide.

The BBA's members participated, both individually and at industry level, throughout the Industry Sandbox Consultation process to determine the feasibility of an Industry Sandbox. The BBA welcomes the opportunity to support the growth of the UK's FinTech sector and note that any models which encourage increased competition and technology innovation ultimately benefit our customers.

The BBA focused on four key points in their response to the Industry Sandbox Call for Input:

**1. Importance of voluntary participation:** in order to be successful in the long term an Industry Sandbox would need to be a market-led solution with participation and funding achieved on a strictly voluntary basis. The appetite of firms varies based on internal factors including the status of their existing work on innovation, the location of their research facilities and the funding allocated to testing activities. The BBA anticipates a varying level of participation amongst its member banks.

**2. Avoidance of duplication with ongoing data-related initiatives:** an Industry Sandbox is likely to achieve the highest level of participation if it focuses on adding value beyond what can be achieved by in-house or existing industry-led accelerators and regulatory sandboxes. The involvement of the regulator, subject to the specific details, could be a key differentiator in this area, as could the focus on industry wide ('wicked') problems. Where necessary, the BBA encourages the use of synthetic and publically available market data as an initial case for an Industry Sandbox. The use of customer data, even in an anonymised format would be prohibitively difficult and costly to include in an early form of an Industry Sandbox.

Where BBA members do see potential is in the role of an Industry Sandbox as a facilitator of experimentation between large institutions and startups or between multiple firms addressing a shared problem. Such collaboration can be frustrated by the contractual and legal questions surrounding shared work such as IP or, often, data protection/sharing concerns. The establishment of a forum to address these issues, or even the establishment of a venue for engaging in such questions, could benefit innovation in the industry overall.

**3. The need for further clarity of funding requirements and other requirements:** The view of the BBA's members is that in the short term, a low-cost, low-impact model is the most appropriate starting point. One important consideration is the source of this funding within the industry. In the case of the BBA's members, funding for participation will come from existing innovation budgets. This means that resources for an Industry Sandbox are only justifiable to the extent that they add value beyond what could be achieved through increased funding to existing accelerators/incubators or through in-house testing.

**4. The role of the regulator:** The Call for Input correctly identified the potential for an Industry Sandbox to serve as a place for an exchange of information related to new technologies under development or consideration and as a way to provide engagement early in a product lifecycle. These would be helpful developments in the effort to industrialise the process of technology adoption in financial services. BBA members are also clear that this should not be the sole source of education and information exchange between the regulator and industry.

The full BBA response to the Industry Sandbox Call for Input is available in Annex 6.

### 3.1.4 A CHALLENGER BANK VIEW: FIDOR



*Fidor is known as a FinTech friendly digital bank. We did bet on API from our origin with the aim to make FinTech and bank collaboration more effective. The ultimate objective is to create an ecosystem that makes it easy for customers to manage their money and engage with multiple FinTech from one single place. As of March 2017, 45 FinTechs have successfully joined the Fidor Finance Bay app store which helps FinTechs provide their own services to Fidor Bank's customers (currently in the German and the UK markets with plans to expand globally).*

*Our API sandbox was made public and available to partners, clients, developers and students from the early days. Key objectives were to testify to the quality of the fidorOS platform and most importantly to make collaboration with FinTechs*

*through our sandbox much easier. The fidorOS API sandbox is the perfect place for FinTechs to develop and test solutions in a place that mimics a real live production environment. FinTechs can freely test their solutions at their own pace, increase the quality of their delivery using quality data and really know which components can be integrated and licenced to Fidor.*

*Our API Sandbox plays an essential role in ensuring end-to-end integration for seamless customer journeys. We strive to share knowledge and co-innovate with industry peers, API sandbox makes it possible to collaborate on a larger scale and truly accelerate the advent of innovation.*

### 3.1.5 A PROFESSIONAL ADVISOR VIEW: RACHEL KENT, GLOBAL HEAD OF FINANCIAL INSTITUTIONS SECTOR, HOGAN LOVELLS

The logo for Hogan Lovells, consisting of a green square with the text "Hogan Lovells" in white serif font.

*In a highly-regulated industry such as financial services, understanding the regulatory context, and the optimum legal structures for securing funding, is vital to enable innovation to deliver viable and valuable solutions. This is an area where an Industry Sandbox could have a very useful role to play and benefit could derive from professional advisors' engagement.*

*For many FinTech startups, their inhouse resources are often limited and focussed on proving the technical and commercial imperatives of their solution so greater support is needed in navigating regulation. Our experience from advising on a range of FinTech solutions across the ecosystem and developing our Regulatory Accelerator has shown that, whilst some solutions will have unique characteristics which will need individual analysis, there are ways to streamline the delivery of advice needed on preliminary questions commonly raised by startups. For incumbents, even with large legal teams, there could be benefits from shared industry and regulatory insights on how FinTech innovations could fit into the regulatory landscape. By participating in an Industry Sandbox, professional services firms can gain understanding of the commercial and technical objectives which helps hone advice as well as increase their engagement with the FinTech community.*

*Observations by regulators shared in an Industry Sandbox could potentially reduce strain on their direct support functions, as well as support professional services firms in guiding their clients on areas reliant on interpretation of how guidelines would apply to new developments. Early engagement with potential FinTech solutions by professional services firms could also help to highlight where a solution may fit with regulatory policy objectives but would conflict with current regulatory guidelines and encourage dialogue with regulators to evaluate potential for removing technical obstacles.*

*Constructing a successful Industry Sandbox would be underpinned by designing a legal and governance framework which enables participants to collaborate to deliver agreed objectives, establishing a robust matrix of carefully balanced rights designed to allow it to evolve. In doing that we would be following a path well-trodden in today's financial services environment in which consortia play an increasing role, but by introducing Industry Sandboxes the industry itself will be innovating in collaboration by creating a new mechanism to foster its success.*

### 3.1.6 A TECH VENDOR VIEW: INFOSYS



As longstanding providers of leading edge solutions to financial institutions technology vendors we would look at the Industry Sandbox initiative as a collaboration model with the FinTech ecosystem where the use cases would fall into one of the following 3 categories:

1. **Stack Completion.** A FinTech solution while solving a specific set of industry use cases might also help fill the missing piece in a vendor's services stack thereby accelerating their time-to-market. The Salesforce ecosystem has proven that such partnerships can exist and an Industry Sandbox would be able to extend that to non-platform based modular solutions offered by other technology vendors. An open industry platform would enable both the entities to test and validate their fitment without the concern of any breach of intellectual property.
2. **Validation Services.** A technology vendor might also participate as a validator on behalf of its customer to assess the state of readiness or fitment of a FinTech solution. Besides fitment the technology vendor would also review the provisioning of safeguards to contain any consequences of failure and check overall security and soundness of the solution. The vendor would bring in knowledge of the customer's legacy state of infrastructure and help bring to light execution challenges in the FinTech's solution.
3. **Wicked Industry Problems.** Can an existing industry problem be addressed by new or emerging technologies? An Industry Sandbox could be a cost-effective way of undertaking hypothesis testing towards industry problems like KYC. Based on design and execution it could lead to emergence of early stage consensus on standards and protocols in the industry thereby fostering competition in the industry. An area like regulatory reporting would greatly benefit from early stage consensus on the data standards and data sets required by regulators across jurisdictions.

### 3.1.7 A DATA VENDOR VIEW: THOMSON REUTERS



THOMSON REUTERS

As a data vendor, exposing sample content sets within an externally available data sandbox would help facilitate partnerships and other collaboration opportunities. If we were also able to combine our content with additional 3rd party data sets, through predicating these content sets on Thomson Reuters entity masters (PermID's), users of the sandbox would be able to navigate an ocean of connected data, increasing the value and quality of all content sets hosted or accessible from within the system. This would greatly accelerate the assessment of viable commercial partnerships, help individuals and businesses identify the exact content sets they need to license and potentially provide data vendors an early access environment for product testing purposes.

Although the Industry Sandbox is not proposing a Hosting Environment, providing an ecosystem of content providers and facilitating relationships (to enable e.g. the co-mingling of content sets) between them is a highly valuable proposition for both data vendors and their respective customers.

### 3.1.8 AN INVESTOR VIEW: TIM LEVENE, MANAGING PARTNER, AUGMENTUM CAPITAL



At Augmentum, we like to get to build a relationship with entrepreneurs as early as possible, often before they are ready to raise finance, and where possible provide ongoing feedback as we look to build a long-term relationship. The businesses we invest in must stand out from the crowd whether that be due to a unique or disruptive business model, first mover advantage or by being best of breed.

A sandbox can help us make a better evaluation early in our relationship with a company. It also can support our portfolio companies in engaging with potential institutional clients more effectively.

An Industry Sandbox, as an open collaboration platform for product prototyping and pre-production testing, allows us greater visibility to assess and access innovative ideas. In many cases, this will reduce the uncertainty and risk that can deter investors. One of the biggest barriers holding back many innovative FinTech businesses is regulatory complexity, anything that can appropriately reduce those barriers will be welcomed.

### 3.1.9 AN INVESTOR VIEW: KABIR KUMAR, HEAD OF POLICY AND ECOSYSTEM BUILDING, OMI DYAR NETWORK



#### OMIDYAR NETWORK

As a philanthropic investment firm, Omidyar Network supports entrepreneurs and their innovative ideas through impact investing and philanthropic grants. Our hybrid model allows us to partner with the most innovative changemakers, regardless of whether they lead for-profit or nonprofit organisations. We deploy patient capital to scale innovative solutions in the marketplace, while our grants checkbook lets us expand understanding and positively influence the environment around it.

We advocate for a regulatory environment that supports sustainable and responsible financial inclusion and work to advance the financial sector as a whole. We believe that actors in the financial ecosystem are interdependent. The work of regulators can ease the path to market for new technologies, and new technologies can advance the financial inclusion goals of governments.

From this perspective, we believe that an Industry Sandbox can add value by:

- a. **Facilitating better product assessment by innovators:** An Industry Sandbox can enable easier and cheaper validation of product features and benefits in a live test bed before going to market or entering a regulatory

sandbox. As more companies access testing resources, their pipeline for FinTech investors can increase and attract more investors.

- b. **Encouraging portfolio companies to test new ideas faster:** Having a designated testing platform can move product development to pre-production testing faster. For investors, this means economies of scale can be created by opening up a testing environment to multiple portfolio companies at once.
- c. **Gauging regulatory implications of a product:** An environment with coaching startups on their authorisation requirements, screening for product compliance, and curated early-stage conversations between entrepreneurs and regulators could be a RegTech solution in itself, which can drive efficiency in regulating FinTech and confidence from an investor's perspective.

**Enabling ideas cross-pollination:** An Industry Sandbox should be a place to interact and share ideas with a wide variety of stakeholders, which can spark a demonstration effect and significantly accelerate market learning curve for participants.

### 3.1.10 AN INVESTOR VIEW: MIKE SIGAL, PARTNER, 500 STARTUPS



With over 200 fintech/insurtech investments in 26 countries, including Credit Karma, Stripe, Grab, RealtyShares and Simple (acquired by BBVA), CBInsights recognises 500 Startups as the world's most active early-stage investor in the transformation of financial services since 2012.

Our unique high-volume approach investing in, and accelerating, both new financial services and enabling technologies may substantially benefit from the creation of an Industry Sandbox as proposed:

- **Faster investment decisions and more investment:** Cost of compliance and regulatory uncertainty is a key concern when we consider making investments in early stage financial services companies. A program that makes those costs/risks more transparent earlier in startups' lifecycle makes it easier for us to assess a company and teams' potential, possibly leading to faster and more investment decisions.
- **More collaborations between startups and incumbents:** A properly organised sandbox program can reduce the cost of exploring collaborations, thereby increasing the likelihood that startups we invest in can accelerate their growth by partnering with incumbents. This can be achieved by both giving startups access to institutional data or reference architectures and by reducing regulatory uncertainty for both startups and incumbents.
- **Potential of alignment with other global sandboxes:** As an investor, we are not generally interested in investing in companies that may have a relatively transparent go-to-market in one country (UK) and a far less certain go-to-market in other markets. A virtual platform giving our portfolio companies access to global sandbox assets will assist access to foreign markets, and a forum providing transparency in regulatory approaches of other regulatory bodies/sandboxes will help reduce the uncertainty around regulatory impediments to global growth opportunities.

## 3.2 USE CASES: WICKED INDUSTRY PROBLEMS

### 3.2.1 OPEN BANKING

On 16 November 2015, the EU passed the Revised Directive on Payment Services (PSD2), and gave member states two years to incorporate the directive into laws and regulations.

In the post PSD2 payment ecosystem, there will be three new actors, third-party providers (TPP), added to existing payment schemes between payers and beneficiaries:

1. Account Servicing Payment Service Providers (ASPSPs)
2. Payment Initiation Service Providers
3. Account Information Service Providers.

Under PSD2, third parties authorised as any one of these types of providers will have access to customer account, payment and transaction data generated by account providers.

The new rules aim to promote pan-European competition in traditional banking and digital innovations that maximise consumer benefits.

#### Alignment with Open Banking Initiatives in the UK

In the UK, the Competitions Markets Authority (CMA) imposed remedies on the nine largest financial institutions which it required to also be in compliance with PSD2 following its review of competition in retail banking.

The CME ordered the nine largest retail banks in the UK, to create the Open Banking Implementation Entity and collaborate with it to deliver: (1) Open Data APIs to enable access to bank products and reference data, making available information on ATMs, Branches, Personal Current Accounts, Business Current Accounts for SMEs & SME Unsecured Lending and Commercial Credit Cards, by 31 March 2017 in a standardised way; and (2) Read/Write API's that were compliant with PSD2, making available to authorised third parties the ability to initiate payments and/or obtain transactional data from consumer & SME accounts by January 2018.

As part of this mandate, the Implementation Entity is creating a developer toolkit to assist FinTechs and ASPSPs in accessing the API's it has worked with the community in defining.

Also following a CMA remedy, NESTA launched a £5m Open Up Challenge to encourage development of new banking services for small and medium enterprises.

As part of the challenge, a screened and selected pool of 20 participants will have early-stage access to "Open Up Sandbox", containing anonymised UK banking transaction dataset and APIs aligned with the open banking standard. The use of the sandbox will help startups securely build and test innovation products to hit the ground running in 2018 alongside the implementation of PSD2 and Open Banking APIs.

### Open Banking and Industry Sandboxes

PSD2 and the CMA Remedies open the door for a new cohort of FinTech solutions which deliver customer services based on transactional data previously only accessible by the account provider. Whether these emerge as stand-alone FinTech products or collaborations between third parties and retail banks, testing, viability assessments and adjustments will be an integral part of the evolving payments landscape. With a number of government and proprietary initiatives already underway, an industry utility function could be beneficial to ensure visibility and interoperability of the various testing environments.

Industry could also consider making an anonymised set of transactional data available for testing purposes on an on-going basis, pooling resources in ensuring that access to this data is appropriately managed and secured, and usage analysed.

#### An Example of Open Banking Sandbox in Spain

The Germany-based Open Bank Project (TESOBE) together with Atmira, a Spanish Solution Integrator, organised the first PSD2 hackathon event in Madrid on June 11th - 12th 2016 as a way to bring banks together, collaborate and engage with the Spanish FinTech community and seek innovative ideas for a post-PSD2 world.

About 80 developers attended the event and developed seven applications over the weekend. A panel of judges composed of representative of the six largest banks including BBVA, Santander, Banco Sabadell, Bankia, Banco Popular and Bankinter, chose three winning teams - an account balancing service, an NFC payment aggregator and a QR-code-based payment solution.

TESOBE provided its Open Bank Project sandbox. Importantly, all data uploaded to the sandbox was test data, which was further anonymised. TESOBE worked together with the banks and Atmira to gather, anonymise and upload "localised" data. Data elements developers had access to included: bank details; Customer Profiles & Messages; Account information, balance and transaction history of multiple bank accounts; Counterparties information.

Alongside data, the Sandbox technology includes tools to help developers work faster.

The Open Bank Project sandbox, fed with Spanish test data, provided the stepping stone on which the ideas transformed into concrete prototypes. Its usage has sped-up development and provided a level-playing field for participants to build their applications on.

The hackathon was a great opportunity to connect disparate parts of the Spanish tech community in a new way.



Amazing weekend seeing so much talent ready to invest their free time in working hand in hand with random developers to create new value to our customers in a Post-PSD2 ecosystem. Open Bank Project Sandbox was just the perfect toolbox to make it possible to develop end-to-end applications in less than 36 hours of work.

- Raul Lucas Alcaraz, BBVA Open APIs, Spain Country Manager



## Our Two Cents on an Industry Sandbox: A view from Eric Moulleron, Founder and CEO, Bankable



Bankable promotes “Banking as a Service” experimentations and pilots with large financial institutions and global industry players. We have been actively involved in promoting Industry Sandboxes in the preparation of the PSD2. By providing banking and settlement access into the Industry Sandbox, incumbent and challenger banks can emulate relevant business cases in an industrial experimentation with various FinTechs. An Industry Sandbox provides an opportunity to test break-through innovation in a controlled, nurturing environment where financial institutions and startups can come together to discuss, develop, deliver, and share experience – to provide the best financial products and services to the end consumers.

We believe that an Industry Sandbox is complementary to a financial institution's in-house FinTech Lab. The Industry Sandbox encourages financial institutions to be involved with relevant FinTech(s) outside of their own innovation programmes enabling them to vet startups that may have not been on their radar.

An Industry Sandbox could provide information on the global industry happenings and brings together relevant players and thought leaders in the ecosystem in one big space. This could also enable financial institutions to maximise their capacity to anticipate the impact of PSD2 on every industry player.

Thus, Bankable looks forward to welcoming incumbent and challenger banks and other financial institutions in this initiative which is much needed to drive innovation in financial services today.



Part of the impetus for Open Banking regulation was the fact that current banking products have complex fees and pricing models, and as a result users are not able to easily compare services and understand where they can get a better offer. The Starling Marketplace strips away that complexity and enables users to easily compare products from across the market so that they can make better financial decisions about which products are right for them. As a result, this gives customers the greatest amount of choice in providers – so they are not just limited to traditional rates and products, but can explore and compare options from innovative new FinTech startups too.

This is a true marketplace model, and drives a network effects platform - ie. the more consumers are on the platform, the more the producers benefit, and the more producers are on the platform, the more consumers benefit.

In conjunction with building out this Starling Marketplace, we have launched our Developer Platform. The developer platform enables third party developers and FinTech companies to easily access and build on top of the Starling Bank APIs. As a result, users can easily access these products and securely share their data with them should they choose to do so. Integrating with the Starling APIs is also the first step to making a product available in the Starling Marketplace, if the FinTech company wants to do so.

We have been advocating PSD2 and the UK's Open Banking initiative as we believe this approach will transform the competitive landscape and foster innovation in financial services. In mid-April Starling Bank held its first Hackathon, making Starling the first UK licensed bank to launch a public API in keeping with the ambitions of PSD2 and the Open Banking initiative. At this event, 25 developer teams created social and commercial solutions to various different financial problems. We were able to provide an environment where developers, supported by the Starling engineers, could work with and test our public APIs, using a small amount of their own data along with some synthesized data sets. In the future, of course, apps will be able to use Starling customer data (as long as the customer gives their permission).

We see the benefit of an Industry Sandbox as a place where both banks and FinTech solution providers can come together. An Industry Sandbox provides an environment and opportunity for third parties to prototype before accessing a Regulatory Sandbox or seeking authorisation.

The provision of an Industry Sandbox provides the opportunity for collaboration in order to create, test and drive innovation in financial services. This in turn supports increasing competition with improved services and products for both commercial and social good.



## A view from Starling Bank



Starling bank is a licensed bank that has developed a feature rich mobile current account. Concurrently, we have been building out the Starling Marketplace, which enables users to easily search and access the best financial products from across the ecosystem, all from within their Starling account.

An Industry Sandbox essentially provides an off-market development environment that mirrors the logic of the Starling Marketplace by allowing innovators to build integrated solutions which will eventually populate such marketplaces. This is an essential part of finding and solving problems for customers using FinTech. Such collaboration is essential for addressing the shared challenges that face our ecosystem, with the vision of providing users with access to the best products from across the market for their specific needs, as well as the transparency necessary around these options to make better financial decisions.

### 3.2.2 DIGITAL IDENTITY: A view from Dave Birch, Director of Innovation, Hyperion Consulting

hyperionconsulting

A generation ago we had the famous cartoon "on the Internet, no one knows you're dog". A generation on, not only does no-one know whether you're dog or not, no one knows whether you're a fridge or not. What's more, no one knows whether you're a fridge pretending to be a dog. Or, more likely, a bot pretending to be a fridge pretending to be a dog. Whichever way you look at it, things have got worse.

There are real limits to how far we can go with the reinvention of digital financial services (as opposed to the mere digitisation of financial services, which to a large extent is all we have achieved so far) unless we can do something about the fundamental problems of virtual identities and their links with "real" identities. To paraphrase Bill Gates only very slightly, if you know who everyone is, transactions are easy. Identity is the most fundamental challenge facing the financial sector is facing right now and we need to bring some vision and leadership to this space to break the log jam and move forward.

I don't think it is an exaggeration to say that in Europe at least the financial services industry is very close to handing over the identity crown jewels to third parties. If banks do not work together to provide an efficient, interoperable identity infrastructure then it will be provided by someone else. Government? Maybe. But more likely it will be the internet giants that the vast majority of the people use on a daily, hourly, minute-by-minute basis: Facebook, Google, Apple, Amazon, Microsoft. In which case, the banks' only function will be the heavily-regulated utility provision of basic services via API to those who control the customer relationship.

We as an industry already have most of the infrastructure we need to deliver digital identity, better customer experience, more security and real privacy. We have mobile phones and SIMs, we have smartphones with trusted hardware, we have biometrics for convenient authentication and we have institutions that already do know-your-customer checks. Let's start putting it together.

- Sandbox providers will self-certify against the defined standards and their documents will be available on the listing page.
- Communication to market will be done initially via the GOV.UK Verify blog.
- The sandbox providers can decide their own commercial models in engaging with the market.
- Aggregated analytics and status reporting is made available to GOV.UK Verify.
- All IP must be protected.

### 3.2.4 PRUDENTIAL RISK: A view from Keith Saxton, Chair Financial Services and Payments Programmes, techUK

techUK

FinTech innovations can have a significant impact on approaches taken by the prudential regulators and central banks. The goal to make the financial system more stable, resilient, efficient and inclusive clearly depends on both understanding the impact that FinTech innovations will deliver, as well as the dangers of unintended consequences if not fully controlled. The ability to improve their own capabilities from the use of these technologies would also appear attractive.

Understanding the interconnectedness, concentrations and 'health' of the financial system from the significant amount of data now collected can only be achieved with innovative and powerful technologies. New approaches to data analytics, data cleaning, security and behavioural analysis can all benefit from work with FinTechs, preferably in close collaboration with all industry participants.

Systemic risk analysis can be greatly improved by using a powerful suite of technologies to assess the system at large. The approach to stress testing can be enhanced by application of new technologies such as simulation and visualisation. Developing market segments such as peer to peer lending and other so called shadow banking activities can also be assessed from data that may well be unstructured and sitting outside the normal reporting regimes. Resilience, recovery and resolvability of systemically important banks and institutions such as central clearing counterparties can be better assessed by using agent based modelling and the development of 'real time' dashboards which can inform policy and market intervention actions.

Assessing and understanding emerging technologies in collaboration with the industry can avoid costly initiatives which can increase the cost of compliance for the industry, and equally the prudential regulator can promote more active adoption of important regulation where banks legacy technology is impeding progress.

Prudential authorities could also benefit from taking a systems engineering approach to assessing the financial services ecosystem and models. Collaboration with industry, technology firms and academia could well be positively stimulated by the engagement in an Industry Sandbox.

### 3.2.3 DIGITAL IDENTITY: A view from Jim Purves, GOV.UK Verify



GOV.UK Verify enables a UK citizen to verify their Identity to high government standards for access to government services. These standards align with the Joint Money Laundering Steering Group requirements for identity verification. This will enable a citizen to assert their digital identity to a regulated organisation which can then be consumed as trustworthy. In Summer 2017, Verify is planning to go into Beta with private sector organisations that have identity assurance needs. In order to enable organisations to test and learn about Verify prior to going into Beta, the Verify Sandbox Environment was created. The key design principles were as follows:

- The sandbox will be provided by private sector organisations.
- GOV.UK Verify will define the standards which the sandbox providers need to follow at a technical, operational and governance level.

### 3.2.5 REGTECH: A view from, Richard Maton, Chief Marketing and Strategy Office, Sybenetix



The framework being developed by the industry for MiFIDII data management and reporting provides the catalyst for innovative technologies such as AI and new collaborative models enabled through the Cloud to transform risk and compliance effectiveness for both firms and regulators.

For example, Sybenetix's Behavioural Analytics Model applies algorithms to individual decision making to provide a holistic behavioural analysis of market abuse, conduct risk and investment performance. Supervised machine learning is used to eliminate false positives for market abuse surveillance, provide instant insight based on individual behavioural profiles, and an evidence-based conduct risk system for senior managers and accountable individuals.

Developed for firms and regulators, the Behavioural Analytics Model is validated by a community of leading financial institutions and through the traditional processes and timetables of regulatory scrutiny. Sybenetix is currently working with partners to scale its Behavioural Analytics Model using cloud infrastructure being developed for the granular data reporting required by MiFIDII. The company is also solving new regulatory challenges associated with the use of AI in financial services.

The Industry Sandbox could help accelerate Sybenetix's development process through a faster, more efficient digital collaboration framework that creates new standards for proactive conduct risk management while further reducing costs and risk for both firms and regulators.

Ultimately, the value proposition of the Sandbox for RegTech firms, financial institutions and regulators is its capacity to accelerate off-market testing to on-market use and scaling. The key is designing the right process and testing mechanisms within the Sandbox that all stakeholders can align around to validate new RegTech solutions. For example, defining a standardised set of KPIs for more effective regulatory outcomes of new solutions that link directly to the application of core technologies and business models. This should include an assessment of how new solutions and models reduce operational risk compared with legacy systems and models. For example, how systems scale with the speed, breadth, accuracy and transparency required under new regulations.

The application of this RegTech acceleration framework could extend beyond conduct risk to the broader set of risk and regulatory challenges that RegTech solutions are solving. For example, the development of KYC/AML monitoring, regulation scanning, interpretation, change management, reporting and risk management solutions.

Such a framework would enable faster validation of new systems for use by both participants and supervisors. This framework could also help facilitate new collaborative designs of more effective and efficient regulation, such as real-time supervision, and even new models of self-regulation.



Consequently, the Sandbox could also enable regulators to accelerate how they become more 'digital' through a collaborative framework that fits into broader, global policies and mechanisms being developed. For example, integrating an Industry Sandbox with other testing mechanisms such as sprints and sandbox initiatives in other jurisdictions would also benefit Sybenetix, its partners and its global financial institution clients."

### 3.2.6 DISTRIBUTED LEDGER TECHNOLOGIES:

As the adoption of Distributed Ledger Technologies (including blockchain) in financial services matures and it moves from a proof-of-concept technology into production, for example in cross-border payments, trade finance or capital markets, the importance of interoperability and standardisation between use cases and protocols increases. Given its cross-border nature, it is also an area where international collaboration could be beneficial in developing common international standards and a co-ordinated regulatory response.



There are many consortia and collaboration projects emerging in the Distributed Ledger space due to the nature of the technology itself. An Industry Sandbox can support development of this emerging space if it provides a neutral ground for efficient early engagement with regulators as different use cases are identified by industry. As the technology matures, an Industry Sandbox can be a space to test interoperability between protocols as well as support standards development where appropriate. In these instances, the need for an Industry Sandbox is clear - and any solution should be constructed as a global platform.

- Oliver Bussmann, Founder and Managing Partner, Bussmann Advisory



### 3.2.7 FINANCIAL INCLUSION

An Industry Sandbox could be useful in developing and testing new products and business models that are specifically designed to foster financial access and improve financial health and wellness. It could be a venue for collaboration between industry participants, regulators and consumer organisations to explore insights on the potential of new products and business models to address market failures with pressing social dimensions.

In particular, a Sandbox can make it easier to share and analyse data on what consumer issues with access and inclusion are. Such data would be collected either through companies' complaint procedures (on an anonymised basis) or via public services such as an ombudsman. Thin data about the prevalence of an issue is sometimes used as a reason for rejecting or deferring action to resolve it. An Industry Sandbox can improve the transparency of such data in aggregate and thus highlight pain points which innovative solutions can seek to resolve.

Furthermore, alternative or difficult to access data, for example on credit scores, can be made more widely available through an Industry Sandbox, fuelling new business models powered by such data. An Industry Sandbox for financial inclusion would be well positioned to support data philanthropy initiatives, providing an operating and governance model for private sector data to be shared for the delivery of a public benefit.

Additionally, such a Sandbox could include measurable indicators of delivering financial inclusion as part of its Certification Capability, giving industry validation for the social benefit of an innovation.

Finally, as an Industry Sandbox could improve access to best practices, at operational and business level, in the delivery of financial inclusion products, which might be especially helpful where solutions are to be integrated in the legacy infrastructure in less accessible or remote markets. Accessing regulators across regions via a dedicated Forum could more efficiently pinpoint where policy change is required to facilitate financial inclusion.

Overall, lowering product development cost, reducing time to market, and encouraging consumer-friendly innovation are trends that can positively impact financial access.



*An Industry Sandbox like this would be incredibly useful for gathering insight as we develop products for financially excluded communities. Financial exclusion is a huge problem, blocking three billion bankless people from access to basic financial services. Azimo exists to solve these problems. We would relish having access to data that helps us build the tools and services that people desperately need, not to mention pinpoint the areas where regulatory action is necessary to enable change.*

*- Marta Krupinska, Founder and General Manager, Azimo.*





# 4 IMPLEMENTATION OPTIONS

This chapter outlines implementation options for the design, governance, funding and regulatory and academic engagement in an Industry Sandbox.

The options reflect Consultation feedback, best practices from industry and proprietary sandboxes globally, and learnings from other collaborative development environments within and outside financial services.

Together, these options would support industry actors in making the necessary choices when building one or more specific Industry Sandboxes. The stepping stones are set out. The choice of direction would lie with industry.

Three sample types of Industry Sandbox are discussed in Chapter 5.

## 4.1 DESIGN PRINCIPLES

With Contributions by Aman Kohli, CTO,  
Financial Services and Insurance Practice, Microsoft

A design principle is the set of fundamental objectives, parameters or rules which would underpin any specific components of an Industry Sandbox. For example, if the design principle of an Industry Sandbox is that it should be multi-stakeholder, its access criteria need to allow different types of FinTech players to engage in a feasible way.

In the consultation process, a set of design principles were taken as fundamental and indispensable for understanding what is meant by an Industry Sandbox. That is, any Industry Sandbox would by definition comply with them.

### ANY INDUSTRY SANDBOX WOULD:

- **Validate Innovative Ideas:** make it easier and cheaper to validate new ideas in an off-market environment.
- **Be Open:** accessible based on transparent, predictable, non-discriminatory eligibility criteria that do not preclude from access any organisation or groups of organisations within the FinTech ecosystem.
- **Be Neutral:** offer a space for experimentation and collaboration unaffiliated with any one organisation. From a regulatory perspective, the Sandbox should be an experimental 'safe space'.
- **Be Self-sustainable:** be resourced and operated by industry and, where relevant, foundation sponsors.

Some design principles were added as optionalities in the consultation process based on industry needs and demands identified in design sessions. That is, an open, neutral and self-sustainable Industry Sandbox can be designed to abide by one or all of these principles in order to effectively attract industry participation.

### AN INDUSTRY SANDBOX MIGHT BE:

- **Scalable:** An Industry Sandbox could accommodate increasing frequency, complexity and speed of testing. The sandbox could be vertically expandable so that experiments can be run by an increasing magnitude of users.

To ensure scalability in an Industry Sandbox, engagement in a sandbox would be as frictionless as possible, from a governance and technological perspective. The entry point to a sandbox would be automated. Users would be able to run and alter their testing, deploy new versions of their product without interference to sandbox services or other users.

- **Modular:** An Industry Sandbox would enable users to compile testing environments, e.g. combinations of hosting environment, reference architecture, data feeds and APIs, specific to their testing purposes. Users and user-generated tests would run independently of each other.

- **Interoperable:** An Industry Sandbox would acknowledge and leverage the existence of other sandbox or similar prototyping environments, and be set up in a way that enables interoperability with them through; (1) self-certification mechanism in experiments; (2) secure authorisation such as VPNs to access proprietary and shared sandboxes; (3) secure connectivity, entry, and exit point to the sandbox and the services the sandbox has access to; and (4) industry standard APIs to communicate compatibly between systems and sandboxes.
- **Additive:** An Industry Sandbox would take into account industry dynamics and regulatory changes, with their respective timelines, and offer a space for identifying and resolving challenges which will support ongoing developments.

## 4.2 PARTICIPANT TYPES

An Industry Sandbox is open to the whole FinTech ecosystem, which includes startups to momentum growth plays, financial institutions, technology and data providers, and (where relevant) investors and academia.

Based on best practices from professional membership bodies, other shared sandboxes or industry research bodies, there could be four types of engagement models:

- **Users:** entities conducting testing via the Industry Sandbox would participate as users, provided they satisfy the user eligibility listed below. Users would subscribe to the Industry Sandbox at a cost proportional to the size of their organisation, as proposed under the funding models in this report
- **Contributors:** entities providing assets, including data, technologies or services to the Industry Sandbox, could engage as contributors, provided they satisfy the contributor eligibility criteria listed below. Professional services firms could engage as contributors by providing access to advice.
- **Sponsors:** entities can sponsor the Industry Sandbox should they be interested in setting up issue-specific testing environments as well as exercise appropriate decision-making power in the development of the Industry Sandbox. Sponsors can also create an environment where visibility of outputs is restricted to the sponsor/group of sponsors.
- **Observers:** regulators, investors such as venture capital funds, or membership bodies can join as observers in order to have access to outputs from the sandbox and engage with other participants as appropriate. Regulators could engage via a dedicated forum for curated exchange of information.

## 4.3 ELIGIBILITY REQUIREMENTS

### Users Eligibility Criteria

The eligibility criteria for users participating in the Industry Sandbox should be clear, predictable and non-discriminatory – and, if possible, support the development of streamlined processes for demonstrating eligibility for participation in other sandboxes, accelerators etc.

The criteria should be based on the following elements:

- **Need:** does the business have a demonstrable need to test using assets available on the Industry Sandbox?
- **Readiness:** is the business ready to test their innovation in an off-market environment? Is the solution mature enough to require validation or certification? Will the business reach a meaningful milestone during its residency in the Industry Sandbox?
- **Non-commercial use:** can the business demonstrate that sandbox assets will be used in a non-revenue generating environment for testing purposes only and any use of sandbox assets will cease prior to any commercial use being undertaken?
- **Geographical scope:** there is no requirement that users of the Industry Sandbox be locally-domiciled, but they need to demonstrably commit a dedicated resource to the testing process.
- **Partnerships:** startups can collaborate with firms of any size for the purposes of an Industry Sandbox test.

Contributors or Sponsors might have additional eligibility criteria for accessing the asset they provide into the Sandbox or the Sandbox environment they sponsor. These can be managed through a permissions system.

Access to regulators, in their role as observers, will need to consider the criteria on which regulatory resources are being deployed. Typically, conduct regulators only support firms where there is direct consumer benefit and genuine innovation, which means that issues raised to an Observer Forum might need to match these criteria.

### Contributor Eligibility Criteria:

When setting the eligibility criteria for contributors, consideration should be given for potential alignment with the eligibility criteria for other similar endeavours. This can reduce the effort for contributors to become involved or make support available. Criteria could include:

- **Availability of asset:** is the contributor prepared to commit an asset (dataset, element of reference architecture, service) to the Industry Sandbox on a pro-bono basis for a minimum of twelve months?
- **Availability of support:** is the contributor prepared to commit any requisite dedicated support for its testing asset to the Industry Sandbox on a pro-bono basis for a minimum of twelve months?
- **Auditability:** does the contributor agree to the usage of its testing asset to be monitored and reported on throughout its residency in the Industry Sandbox?

Contributors that provide access to sensitive testing assets, for example live or sensitive data, will be able to set up additional eligibility requirements upon agreement with the governance of the Industry Sandbox.

## 4.4 DESIGN COMPONENTS

Design Components are tangible technical elements an Industry Sandbox, which in aggregate constitute the sandbox solution. For example, if the design principle of an Industry Sandbox is that it should validate innovative ideas, an associated component is the Sandbox having Certification Capability.

### APPLICATION ASSESSMENT

A self-certification process for accessing an Industry Sandbox based on established eligibility criteria. Self-certification should be supplemented by a process for case-by-case assessment of user applications.

### DATA SETS

A key component of an Industry Sandbox is access to the data required to demonstrate how an innovative solution would work in practice. Data could be synthetic, historic anonymised data, delayed, reference or live market data. It can be provided via APIs or data feeds.

Whether an Industry Sandbox hosts third-party data would depend on the third party itself. For example, market data is usually readily available via a data feed or an API from the data owner. Institutional data, for example synthetic or anonymised transaction data, might need to be hosted in a specifically created and secure hosting environment.

Both structured and unstructured data can be available in an Industry Sandbox. To translate unstructured data to structured data for business logic, 'lakes' of structured data can be build on top of 'rivers' of unstructured data, for example by leveraging artificial intelligence and machine learning algorithms.

An Industry Sandbox should provide a view on the quality and type of providers' data as well as a streamlined legal process governing the relationship between the data user and data provider. An Industry Sandbox should seek to automate as much as possible the process of matching data users to data providers, as well as the process of assessing users' eligibility.

Data providers (whether a data vendor or an institution) will join an Industry Sandbox as a contributor, and will have the option to specify additional eligibility criteria for access to all or a subset of its datasets.

According to the surveyed startup population, the following datasets would be of most interest:

- AML data;
- KYC data;
- credit data;
- anonymised customer transaction data; and
- global market data.

Transactional data whether it is synthetic, anonymised or live should be made available on a timeline consistent with other regulatory changes in the UK, namely the implementation of the CMA remedies and the implementation of PSD2.

### PERMISSIONS:

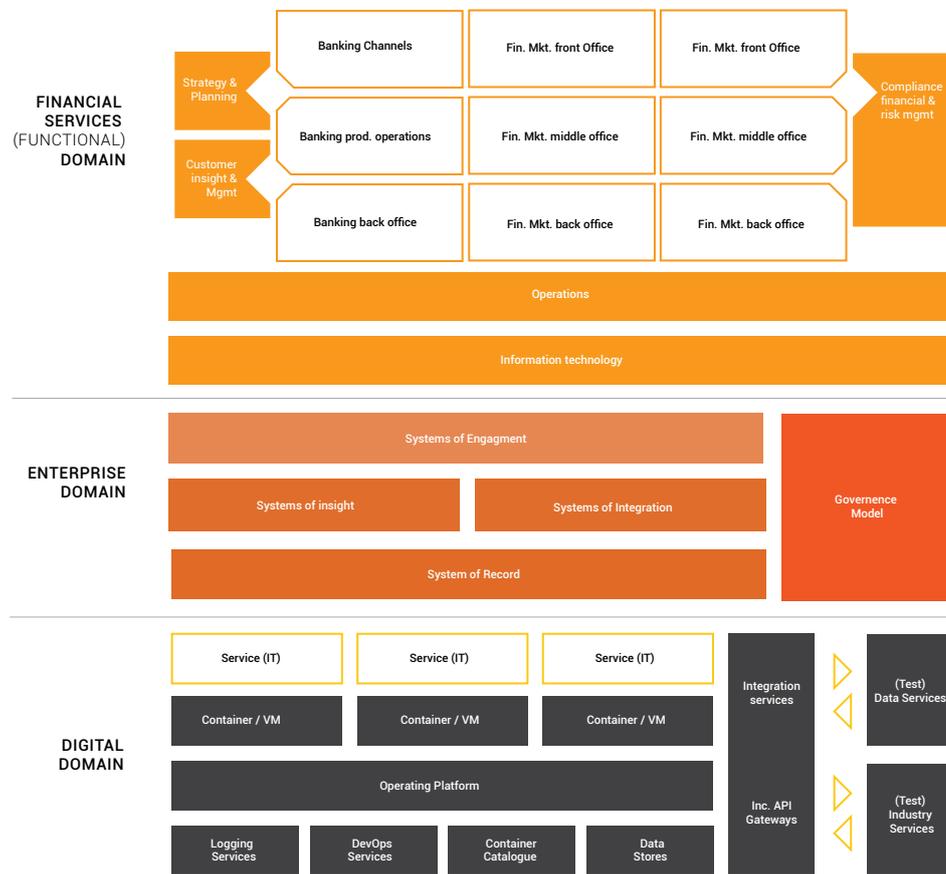
**A view from Chris Blatchford, Head of Enterprise Technology and Software, Thomson Reuters**



*Content sets made available via the Industry Sandbox environment(s) need to be highly secure and tightly controlled. Even after a user has authenticated, authorisation and entitlements to specific content sets will be provisioned by the content set owner. This access should be entirely the data-owner's responsibility. Where content is connected or merged, permission from the owner of each respective content set needs to have been obtained. Although the Industry Sandbox will not be storing any third party data, if it provides test environments for analysing extracted content, clearly defined roles and responsibilities in respect to use of these environments should be considered (e.g. co-mingled content sourced from a different/multiple legal jurisdiction need to be considerate of data residency, privacy and confidentiality).*

*To help aid in content visibility, a content catalogue & meta-data registry should be maintained – in addition to 'standard' meta-data descriptors, data provenance should be a high priority, especially when co-mingled or otherwise highly curated content sets are involved. Lack of visibility into content ownership and usage is a highly prohibitive factor when considering content collaboration. Sitting 'on top' of the meta-data registry should be a data catalogue, a 'store-front' of searchable content sets to enable rapid discoverability. The store-front should be a publicly available service; the meta-data registry however should be a service reserved for signed-up users or participants in the sandbox.*





Source: IBM

## REFERENCE ARCHITECTURES:

**A view from Andrew Graham, Distinguished Engineer, Financial Markets, IBM and Winston Yong, Chief Architect, Industry Platforms, IBM**



Reference architectures are a set of domain-specific artefacts, design patterns and terminology that describe successful operational architectures. The artefacts can span business to operational domains, with emphasis on interoperability within complex systems.

The primary role of Reference Architectures in an Industry Sandbox would be to provide Interoperability and best practices for the advancement of FinTech solutions.

The use of Reference Architectures would facilitate multiple parties coming together to interoperate and solve new problems at a business and technical level. The architectures would be grounded with key principles and assumptions. For example, services should be highly componentised, loosely coupled and have clear separation of concerns. Furthermore, concepts such as systems of engagement, integration, insight and record are a useful means to separate functions.

### Common vocabulary could provide a quickstart for industry collaboration

Each business domain would have agreed functional component descriptions with a clear vocabulary. Context diagrams to define scope boundaries to a problem domain e.g. Wicked Industry Problems, component/business service models and interaction/sequence diagrams to describe business and technical flows would ensure best practices are utilised and understood in common.

The use of pertinent industry and technical standards would provide clear guidance on preferred middleware, service and data standards. The encouragement of certain technologies, such as containers, RESTful APIs, JSON documents and DevOps techniques should be included as foundational enablers within the reference architectures. Consideration of non-functional requirements, including security and service level constraints is an important aspect of ensuring stability and resilience in the financial services industry.

### Consistent service patterns and test data, leading to development of industry standards.

An important area of focus for a sandbox is the quality and availability of test data and test services to simulate a real environment. The sandbox reference architectures should layout where data providers (e.g. reference data and market data) and industry service providers (e.g. SWIFT gateways, payment gateways, credit checking services, KYC and AML services) fit in the overall architecture, as these services are often prerequisites to testing new services.

Ultimately, reference architectures are sets of domain specific architectural views. They do not constrain innovation by reinforcing prior approaches but instead provide FinTechs with base templates to articulate their innovation with. Financial institutions likewise are able to standardise their technology for interoperability, internally as well as with external FinTechs. Reference architecture are tools and patterns for common ways of working and as a precursor to establishing industry standards.





## CERTIFICATIONS: A VIEW FROM WINSTON YONG, IBM

Certification, which has been effectively used in many industries as a benchmark of quality, has the potential to bridge the disruptive nature of innovation with the need for stability in a financial services industry. The value of certification in technology is the assurance of adoption and conformance to standards which have been defined as best practice. Certification affirms a level of quality that does not need to be reassessed by individual customers.

The most common type of certification is professional certification, where a person or entity is certified as being able to competently complete a job or task. The second and relevant certification type to the Industry Sandbox is product certification, in which the product (or operations) i.e. the FinTech solution, is certified as meeting a set of minimum standards, particularly with respect to quality and performance; and meets qualification criteria stipulated in contracts, regulations, or specifications.

There are four main factors that would shape a FinTech solution certification programme:

1. **Certification is voluntary:** unlike regulatory compliance, certification is voluntary and therefore requires a particular implementation approach based around communicating stakeholder benefits that attract community members. For example, achieving Certification may become a prerequisite for solution inclusion in Request for Information/Proposals responses whilst granting an accelerated procurement process. Positioning these privileges and the value they carry will be a critical success factor for the Certification programme.

2. **Existing standards are relevant:** the existence of many specialised technology standards provide a rich and diverse portfolio for FinTechs to develop their solutions against. It would be more efficient and flexible to certify that a FinTech solution has rigorously adhered to the standard(s) of its choosing. Whilst a catalogue of relevant technology and industry standards may be provided, the FinTech may choose the standards most relevant to build their innovation upon.
3. **Certification has a shelf life:** the continued evolution and maturity of the standards involved, together with the rapid pace of FinTech changes necessitates active management and re-certification to ensure currency.
4. **Transparency provides credibility:** to optimise the value of certification to stakeholders, and promote industry acceptance, the Certification process should be governed in a transparent way by an independent Certification body. The independent body would provide direction, governance, design authority and arbitration.

A FinTech certification programme would help FinTech achieve scale and adoption in the financial services industry

A potential FinTech certification framework for adoption in an Industry Sandbox would span seven areas of competencies, providing coverage across Business, Operations and Technology. It would be established across 3 tiers of certification – Formative, Diagnostic and Benchmark; reflecting a FinTech's progression through maturity and increasing capabilities.

A FinTech certification programme based on existing standards will help FinTechs achieve scale and adoption in the financial services industry; but the need for transparency and neutrality in its governance is crucial to its implementation success.



### Business Segment

Competency of the solution's grounding in the business model and intrinsic value it is providing to the industry; across market clarity, enterprise architecture, roadmap, continued innovation and research

### Operational Segment

Competency of the solution usability; across abilities to introduce deployment with minimal disruption and support



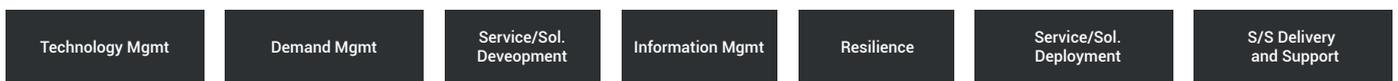
### Technical Segment

Competency of the solution design and build; across abilities such as quality, consistency, performance, integrity, resilience and interoperability

← Business →

← Technical →

← Operational →



...ability to have sound approach management of technology

...focus on clear understanding of consumers, requirement and use

...quality, discipline and consistency of its development and roadmap

...treating information as an asset, managed purposefully and rigorously ...

... capacity to adapt and respond to unanticipated negative events ...

... Ability to introduce change into operations with minimal disruption ...

... ability for continued delivery, meeting standards and customer satisfaction ...

Source: IBM

## **VOLUNTARY STANDARDISATION WITHIN AN INDUSTRY SANDBOX:**

### **A view from Ben Helps, CEO, Factern**



*Standards are seen as a signal of market efficiency. But standardisation itself (i.e. the process through which standards are developed and agreed) is invariably arduous and time-consuming. Convergence has a cost.*

*An Industry Sandbox provides a forum in which the relative costs and benefits of standardisation can be explored carefully, through mutual collaboration, whether that collaboration is bilateral or multilateral. Financial institutions with different starting points to set, evolve or converse standards can move at their own pace, based on business cases that make sense to them.*

*Standardisation could occur in any area of due diligence: a common contract, billing and payment platform that provides FinTech startups and institutions with an easy way to engage with each other; default security protocols that depend on the nature of the data assets being exchanged; operational standards that offer economies of scale; policy standards that increase interoperability; etc. The trade-off between the costs and benefits of standardisation will not only differ in each case, but also for each participant.*

*An Industry Sandbox would not force its participants to adopt a common set of standards, although widespread convergence may be required to solve some of the industry's "wicked problems". However, it would require transparency: the onus must be on the financial institutions acting as Contributor to identify their own business cases for change, to specify their service needs, and to make clear their due diligence requirements. The Industry Sandbox would help to manage that demand, aggregating and communicating those requirements to the market provided by the Users.*

*Therefore transparency is the most important access criteria for contributors. With transparency comes rational standardisation, and with standards comes efficiency and innovation.*

*It is this transparency that sets the Industry Sandbox apart from other initiatives, as it opens up potential of voluntary standardisation: that is, standardisation that takes place step by step over time, as and when it makes sense.*



## **Cast Study 1: European Marine Energy Centre**

UKAS has accredited the European Marine Energy Centre (EMEC) for the testing of wave and tidal energy conversion systems since 2005. EMEC was established in 2003 and is the first and only centre of its kind in the world to provide developers of both wave and tidal energy converters – technologies that generate electricity by harnessing the power of waves and tidal streams – with purpose-built, accredited open-sea testing.

EMEC is accredited to operate to relevant test laboratory standards (ISO17025) enabling the Centre to provide independently-verified performance assessments, and is accredited to ISO/IEC 17020 offering independent Environmental Technology Verification (EMEC-ETV) to help innovative technologies reach the market.

Like an Industry Sandbox it is in effect a sandbox for innovative new ideas and technology for equipment for producing renewable marine energy sources. Companies can take their new technologies to EMEC to be tested and the credibility of EMEC's test results for technologies that have been trialled there is subsequently underpinned (or badged) by UKAS accreditation, which gives assurance to potential users and increases market, consumer and regulatory confidence.

## **Case Study 2: Fair Banking Foundation**

UKAS accreditation of the Fair Banking Foundation's scheme is an example of how an accredited certification scheme that formally evidences and makes public the extent to which a banking product helps customers manage their money can give greater confidence to purchasers, regulators and customers in the end-product.

The Fairbanking Mark scheme grants those products submitted that are successful with a 3, 4 or 5 star rating, indicating the level to which they have been independently assessed to help improve the customer's financial well-being. Each financial product is tested against a range of relevant criteria which have been derived from extensive customer research and the application of academic behavioural theory as being critical to the improvement of financial well-being. A crucial part of the testing is independent research carried out with a significant number of existing holders of the product to ensure that the product's relevant features have been sufficiently effective.



## **NATIONAL ACCREDITATION:**

### **A VIEW FROM LORD JAMIE LINDSAY, CHAIRMAN, UKAS**

*As the Government appointed National Accreditation Body, the United Kingdom Accreditation Service welcomes this important project/report and the recognition that the use of standards in the FinTech arena can benefit from being underpinned by the establishment of a robust verification and certification system. For a certification scheme to offer assurance to users and increase market, consumer and regulatory confidence, it needs to be operated by a body which can demonstrate its own competence, impartiality and integrity. This can be achieved through UKAS accreditation which assesses, against internationally agreed standards, organisations that provide certification and broader conformity assessment services. UKAS stands ready to support this exciting new area.*



## SHOWCASE SPACE

A key role of an Industry Sandbox could be to showcase new products to potential customers, collaborators or investors. By bringing together interested parties, in an environment where the product can be demonstrated, an Industry Sandbox could facilitate the discovery of innovative solutions whose validity has been tested by developing dedicated virtual showcase space, as well as off-line demo days.

## ADVISORY SERVICES

The Industry Sandbox could create mechanisms for participants to access advisory services, including from lawyers, accountants or other professional advisers. This may involve offering 'day surgeries', training for participants, online directories, creation of model documents to streamline advice requirements and tailored advice packages.

It could also involve the creation of online tools to support participants with particular needs in order to deliver advice in a cost-effective manner. One example of this would be the Regulatory Accelerator tool<sup>3</sup> developed by Hogan Lovells in the context of its strategic partnership with Innovate Finance to provide guidance on when companies need to be regulated.

## Analytics & Audit tools

An Industry Sandbox can provide both users and partners with analytics of the frequency and user base of different testing assets. Such tools would ensure that usage of an Industry Sandbox is auditable.

Examples of analytical solutions developed by startups:

### QUMRAM

*Qumram, a potential partner as technology vendor, provides analytics tools for cross-channel intelligence and compliance. Qumram can record and replay (in movie-like form) all digital interactions, allowing an Industry Sandbox to see exactly what users did within any browser-based application. The Industry Sandbox could benefit from Qumram through: (1) user experience playback and analysis; (2) audit trail recording and archiving; (3) and specific errors and exceptions catching. Qumram is developing next generation of analytics tool for not only real-time monitor, audit, and archive, but also predictive intelligence to prevent errors and wrongdoings.*

## SANDBOX



*Boston-based startup Sandbox (sandboxbanking.com) is building an app-store for banks and credit unions. The solution's integration layer creates standardised APIs against legacy systems and their deployment layer allows third party fintech products to be tested without sharing sensitive financial institution data. To satisfy information security and audit needs, Sandbox created built-in authentication, encryption and immutable audit log modules. The Industry Sandbox could benefit from Sandbox through (1) their standardised API design across various legacy systems (2) their ability to separate fintech applications from underlying sensitive data (3) their approach to built-in audit trails to track information security.*



## Participation Forums

An Industry Sandbox can be equipped with discussion forums, online communication channels as well as regular offline meetings, where participants share experiences during their residency in the sandbox. Dedicated Forums could be set up for each participant type as well as to achieve seamless communication between the users, contributors, sponsors and observers. Existing digital communication channels, e.g. Slack or Github, could be utilised in the setting up of various forums.

Types of Industry Sandbox Forums:

- **User Forum:** allows users to share experiences and feedback into the development of the sandbox, enables sharing of open code (e.g. via a GitHub page), and allows users to transparently rank sandbox assets such as datasets and APIs. Via a user forum, users can contribute to the development of an Industry Sandbox by, for example, cataloguing assets, thereby creating a self-sustainable sandbox ecosystem.
- **Contributor Forum:** allows contributors to share experiences and feedback into the development of the sandbox in order to ensure their participation returns value.
- **Sponsor Forum:** allows sponsors to set challenges and specific environments, and ensure interoperability between these; ensures transparency on how sponsors prioritise allocation of sandbox resources.
- **Regulatory Forum:** allows regulators to join curated conversations on issues raised through sandbox testing.
- **Observer Forum:** allows observers to view outputs of an Industry Sandbox, for example via an "app store".

<sup>3</sup> accessible at <http://www.hoganlovellsregulatoryaccelerator.com/>

## 4.5 LEGAL AND GOVERNANCE FRAMEWORK: A view from Hogan Lovells

The core function of a legal and governance framework for an Industry Sandbox is to create a legally compliant operating environment which appropriately regulates the relationships involved (both amongst the participants and in relation to any relevant third parties, such as regulators) so as to support delivery of its agreed objectives and to enable it to evolve to meet changing needs.

Choosing the appropriate legal and governance framework for any Industry Sandbox will depend on the nature of the activities to be undertaken and of the participants involved.

There will be detailed and technical decisions to be made on the intricacies of any structure but there are common characteristics which can be outlined.

If the function of an Industry Sandbox is essentially to act as an aggregator or access point for other sandboxes then the framework could be relatively light-touch and could potentially be operated from within the organisation setting it up.

However, if it is to operate independently, its objectives go beyond providing information or its function evolve over time, then more formal structures will be required and, most likely, a separate legal entity should be created rather than relying purely on a matrix of contractual relationships. Contractual relationships will also, likely, need to be created between participants directly as well as with the legal entity and should facilitate the inclusion of new participants.

In this era of positive collaboration, these are familiar choices for those engaged in delivering joint projects or operating shared development environments.

The overview of potential characteristics for legal and governance frameworks below focuses on the key elements to be considered in developing an independently operated Industry Sandbox structure.

There are a number of core principles that this framework could reflect:

- **Simple and flexible:** the legal and governance structures for an Industry Sandbox should be designed to be as simple as is possible. The nature of the structure put in place will depend on the complexity of the activities to be undertaken and the profile of the proposed participants. The model may change over time. Therefore, the framework should also be flexible and able to evolve as the Industry Sandbox develops. The scalability of an Industry Sandbox itself should be built into and accommodated by the legal and governance structure with clear mechanisms for decision-making, including on funding requirements. Mechanisms for participants joining and leaving should be clear.
- **Neutral:** the governance of an Industry Sandbox should be neutral and should not favour the interests of any one potential participant or category of participant. This means that the framework will need to include checks and balances to ensure that the interests of all participants and potential participants (regardless of their position in the market) are appropriately represented. It will also be important to ensure that the environment establishes fair and objective, and non-discriminatory, access criteria and a level playing field, remaining consistent at all times with competition law requirements.
- **Not-for-profit:** an Industry Sandbox can be set up as a separate not-for-profit entity, for example, a company limited by guarantee where participants are members rather than shareholders. By establishing an Industry Sandbox as a not-for-profit entity, it enhances the neutrality of the Industry Sandbox and gives confidence that it will be run in a way which is consistent with its function as a forum for collaboration, rather than to further profitability for one or more investors.
- **Compliant:** fundamentally, an Industry Sandbox needs to create an environment which ensures that all participants can engage without being in breach of any compliance requirements simply by virtue of choosing participation in the Industry Sandbox, including compliance with financial regulation, data protection or competition laws. This will drive the structure and core operational parameters of the sandbox, as well as the policies, such as on competition and on privacy, and agreements which need to be put in place. The nature of the activities which the participants choose to undertake within an Industry Sandbox may require a separate assessment of whether those activities are compliant but that may be conducted on an individual basis.
- **Legally robust:** to ensure confidence in an Industry Sandbox, participants are likely to look for certainty over the rights and obligations which will exist between them, the Industry Sandbox itself and other participants. Participants will therefore need to agree to contractually binding terms of participation. Throughout the consultation, information security has been raised as a key concern; the contractual arrangements would need to deal particularly with participants' respective rights and obligations in relation to the sharing and use of information. The complexity of these issues will depend on the type of information that is being used (for example, whether or not it is synthetic or real data). Contractual arrangements will also be necessary to ensure that an Industry Sandbox cannot inadvertently become a forum for the exchange of competitively sensitive information.
- **Designed to reflect intellectual property (IPR) considerations:** Protection of intellectual property rights has also been raised as a concern and these issues need to be addressed in the design of an Industry Sandbox and the terms of participation. If participants' IPR may be made available to others for use within the parameters of the Industry Sandbox then it could require cross-licences to be put in place. The terms relating to IPR and any such cross-licences would typically be mandated by the design of the Industry Sandbox to apply to all participants in order to protect existing IPRs, regulate how another's IPR may be used and determine who owns IPR in any resulting work product. For example, for participants for whom protection of trade secrets is material, it may require care to be taken on how disclosure is managed. It is likely that the status quo will be that arrangements provide that participation in an Industry Sandbox does not operate to transfer any intellectual property rights but there

may be occasions where a different approach is adopted by agreement, for example, to Open Source some element of a potential solution to a Wicked Industry Problem or for a consortium of participants to form around developing such a solution. Care will be needed to ensure that any differential approach to IPR operates in a way which maintains a structure which complies with competition law considerations, particularly with respect to problems where the solution sought is intended to have industry-wide applicability, e.g. interoperability of standards. If activities may draw on IPR contributions from different parties in order to develop a solution to a Wicked Industry Problem, the IPR position could be more complex and insights may be gained from analysing the approach adopted in other collaborative research groups. For example, in EU-sponsored consortia, funders often specify what cross-licensing terms apply during the project, which tends to be relatively uncontroversial. More complex is to provide for how the IPR and work products which result from the collaboration can be used once the testing or development phase has ended, particularly where such use may require ongoing use of another's IPR.

Legal and governance frameworks for organisations, such as an Industry Sandbox, tend to have some or all of the following key components:

- **A governance body** (which could be structured as a board of directors). This would oversee the operation of an Industry Sandbox in the interests of its sponsors, contributors and users. This body would have terms of reference setting out its role and responsibilities. If required by size, membership of a leadership governance structure could be elected or rotational to ensure fair participation. The governance body would be responsible for ensuring that the sandbox fulfils its objectives and that any developments beyond the initial set up are in line with these objectives as well. Careful consideration of the nomination processes and voting rights will be needed in order to ensure that its neutral objectives are achieved. An Industry Sandbox should also be designed so that it does not inadvertently become a forum for the exchange of competitively sensitive information and that this is reflected in undertakings in the binding terms of participation as well as having a robust legal structure.
- **A dedicated secretariat/operational team** to carry out the day-to-day operations of an Industry Sandbox. This could include, for example, managing applications to the Industry Sandbox, communicating with participants and assisting the governance body. This function could be outsourced from the sandbox legal entity to a third party. Consideration could be given to outsourcing to an independent third party to reduce scope for conflicts of interest and potentially enhance external confidence in its neutrality.
- **Dedicated participant forums** could be set up in order for different types of participants, for example sponsors, to discuss, agree and input into the strategy, operations and priorities of the Industry Sandbox they are participating in.
- **Terms of participation** which regulate each participant's rights and responsibilities in respect of an Industry Sandbox

and to each other. These terms could be tailored as appropriate for each type of participant but, to ensure fairness and reduce operational friction, should be the same for each participant and potential participant of that type. The term of their participation and ability to withdraw should be clear and there would be consequences for those who breach the terms of participation (for example, being bound to compensate those who have suffered as a result of the breach, or to leave the Industry Sandbox). It is likely that industry engagement on developing these terms of engagement would be key to their adoption.

- **A dispute resolution procedure** to deal with disputes between participants. Although participants would have legally enforceable rights against each other, alternative dispute resolution procedures such as escalation, negotiation and mediation tend to reduce cost and can ensure that differences are reconciled quickly and easily.
- **A legal structure** that delivers these key components and supports the effective functioning of an Industry Sandbox. For example, if an Industry Sandbox were set up as a company limited by guarantee, its participants could be members of that company and the governing body could be its directors. Ad hoc working groups or formal sub-committees could be established which feed into and advise the board, which could allow the members to be actively involved and to influence the direction of the sandbox. There could be different categories of members with different terms of engagement relative to the nature of their relationship with the sandbox based on objective criteria. The constitutional documents, together with any additional agreements, would set out the respective rights and duties of these groups, the terms of reference, the governance structure and cover procedural matters (such as the appointment of directors and voting rights). The legal structure will also deal with the allocation of liability between the participants. Given that a number of participants will likely be competitors, it will also be important to ensure that the structure is compliant from a competition law perspective – consideration would need to be given to this both structurally and in relation to developing and implementing a competition law policy. The legal structure would also need to address other potential concerns of participants, such as appropriate protection of their intellectual property rights and funding obligations. An area where the approach to intellectual property rights may be more complex could be where the solution to a Wicked Industry Problem may be advanced by a combination of the intellectual property rights of different participants.

Industry Sandboxes can vary in scope and complexity. Detailed proposals on legal and governance structures will need to be developed accordingly. Learning from this consultation process is that the next level of detail will need to be developed through an inclusive pan-industry engagement with interested stakeholders.

Alignment with other sandboxes on access or exit criteria could be explored to help users participate in multiple development environments at the same time.

# TISA EXCHANGE LIMITED (TeX)

## A CASE STUDY ON LEGAL AND GOVERNANCE FRAMEWORKS

TeX is a not-for-profit organisation, established at the initiative of TISA and with members from across the industry, which has facilitated the design and implementation of a forum for delivering an innovative solution for the electronic transfer of wrappers and assets between fund managers, platforms, wealth managers and any firm which holds assets on behalf of investors.

Although TeX was established for a specific activity the framework for collaboration and the process for establishing it, provides useful insights on the proposed governance approach for an Industry Sandbox whether it is established to focus on a single activity, for example, to create an industry-wide standardised process, or to create an operating environment like an Industry Sandbox in which innovations across a number of activities can be explored.



*In setting up TeX our objectives were to support the industry in responding to new FCA requirements and improve certainty to consumers that processes were being completed to an agreed standard. It also enabled reduction of cost, risk and duplication within the industry. The FCA has consistently supported the progress made by TISA in launching TeX.*

- Peter Smith, Head of Industry Policy Liaison, TISA



*When we were developing the legal and governance framework for TeX, we worked with the industry, regulators and members through TISA, on agreeing open standard form contracts for engaging with the platforms & UK Fund Management Groups. Having that wide industry engagement meant we could create a transparent operating environment with streamlined engagement and on-boarding processes which is able to evolve to meet the needs of its members and the industry, providing an ultimate benefit to consumers.*

- John Salmon, Technology Partner, Hogan Lovells



The TeX structure uses a separate legal entity, a company limited by guarantee, in which participants are members. There are different categories of members related to the role they play, though parties can be in more than one category. There are also associate participants who have a more limited set of rights reflect the different nature of their involvement.

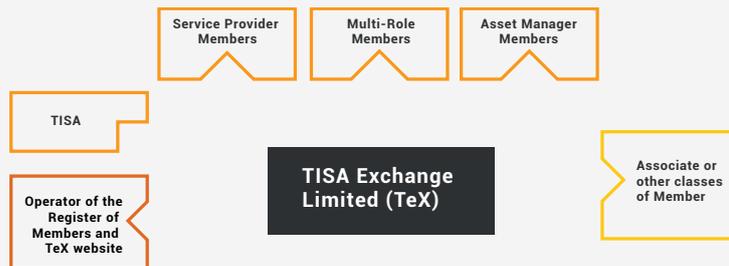
Contractual relationships are also established between participants and TeX and directly between each participant and each other participant under a Membership Agreement. This is a standard form agreement which means it needs to be fair and reasonable and was agreed through consultation with the industry. Any changes to the Membership Agreement are made in accordance with the TeX governance structure. This means that participants can engage directly with each other to resolve disputes if one participant breaches their terms of participation in a way which causes loss to the other.

Compliance is supported by having in place clear terms of reference, service level agreements, a competition policy, a privacy policy and a whistle-blowing policy. Separate arrangements are in a place for associate participants. In keeping with many collaboration structures of this nature, parties agree expressly under their participant agreements that they will each retain their own intellectual property rights – this is an area where the position in an Industry Sandbox may be more complex if parties may be working together to develop new forms of intellectual property rights and the participation agreements will need to ensure that the position on ownership is clear.

Voting rights were carefully constructed to reflect the nature of the collaboration and deliver a balanced approach but TISA, as the neutral founding body, was set up with a specific category of rights which effectively delivers a veto right in certain circumstances to help ensure the neutral objectives of the organisation were maintained. This involved TISA being set up as a 'special member' with the right to appoint its own directors to the TeX board. Part of the process of establishing TeX was analysing the optimum structure for voting rights to ensure its smooth operation that this position was accepted by other TeX members and made effective through their membership documents. An outline of the structure and the relevant constitutional documents is set out below.

**Articles of Association**

1. Objectives
2. Application for and membership termination of Membership
3. Members voting rights and members meetings
4. Appointment and removal of Directors
5. Directors powers
6. Directors voting rights and board meetings
7. Members liability
8. Administration
9. Definitions



**Contract Club Membership Agreement**  
Registration & Joining Fee Forms

1. Competition Policy
2. Articles of Association
3. Contract Terms
4. By-Laws
5. Glossary of Defined Terms
6. Service level Agreement (SLA)
7. Whistle blowing policy
8. Privacy Policy

**Associate Terms**

1. Associate Side Letter
2. Glossary Competition
3. Competition Policy
4. Associate Privacy Policy

Source: TeX

## 4.6 FUNDING MODELS

An Industry Sandbox would be open to all types of entities in a FinTech ecosystem, provided they meet the eligibility requirements for at least one of the four types of sandbox participants: users, contributors, sponsors or observers.

Industry consensus is that participation should be voluntary. Affordability should be a consideration for ensuring an Industry Sandbox is accessible to, in particular, the startup community.

Consultation feedback has been that an Industry Sandbox should be set up as a not-for-profit structure. Therefore, its funding requirements extend to covering the cost of setting it up, investment in scaling its services, and the operational cost of running the Industry Sandbox.

As a guiding principle, cost of participation should be tiered, calibrated on the type of participation, the scope of the testing conducted, and the size of the participating organisation.

The range of available funding approaches is as follows:

- **Users:** Users could be charged on a test-by-test or subscription basis. Fees will be determined by the (1) size of the participating organisation; (2) level of its utilisation of the sandbox; and (3) duration of utilisation of the sandbox. Industry Sandbox operators should consider the feasibility of providing free or near-free testing to the startup community.
- **Contributors:** There is significant scope for contributors to engage through in-kind support. These can include providing pro-bono technical or other professional advice, developing elements of the digital Industry Sandbox platform, or providing access to data, APIs or technical infrastructure.
- **Sponsors:** Organisations interested in exploring a particular issue via an Industry Sandbox (e.g. a Wicked Industry Problem) should be able to sponsor specific environments to a level proportionate to the resources required to set up and operate the required testing environment and engagements
- **Observers:** Entities interested in the outputs from the sandbox could be charged a fee in order to access them. This should not extend to public bodies participating as observers. Whether the results of a test are open to observers would be determined by the user conducting the test. Observers, such as venture capital funds, might find it economically beneficial to offer paid access to an Industry Sandbox for their portfolio companies as an analytical tool.
- **Foundation funding:** An Industry Sandbox should review options to align its objective of fast-tracking open innovation with the objectives of public bodies or private foundations committed to supporting the growth of the UK FinTech sector and innovation and competition in financial services.

The cost of an Industry Sandbox would depend heavily on the design components it is set up with. Costs of operating market sandboxes vary significantly. For indicative purposes only, we note that:

- development of a technical data sandbox environment might be priced between GBP 25,000 and 50,000 depending on number of participants, testing period, and data requirements;
- operational costs for low-technology shared data sandbox environments can be around GBP 300,000 per year; and
- a technically sophisticated sandbox environment staffed with senior researchers can cost between 1 and 1.5 million GBP annually.

## 4.7 SANDBOX PARTICIPANT ROLES

Different FinTech ecosystem players – from startups to institutions, regulators, or academics – can engage in an industry sandbox as one or all types of participants, all at the same time.

For example, a retail bank can test its solution to a Wicked Industry Problem with partners, contribute product data, sponsor a challenge and observe outputs of open sandbox tests.

The table below gives suggestions of how any member of a FinTech ecosystem can engage in the four different roles they can play in an Industry Sandbox.

	USER	CONTRIBUTOR	SPONSOR	OBSERVER
<b>STARTUP</b>	<ul style="list-style-type: none"> <li>• Deploy own tests</li> <li>• Participate in collaborative tests</li> <li>• Validate products via industry certification</li> <li>• Showcase products</li> <li>• Participate in User Forum</li> </ul>	<ul style="list-style-type: none"> <li>• Contribute data or other APIs</li> <li>• Contribute open source code</li> <li>• Contribute solutions to be used by sandbox e.g. analytics</li> <li>• Access analytics on contributed assets</li> <li>• Participate in Contributors' Forum</li> </ul>	<ul style="list-style-type: none"> <li>• Sponsor wicked-problem specific environments</li> <li>• Conduct startups challenges</li> </ul>	
<b>FINANCIAL INSTITUTION</b>	<ul style="list-style-type: none"> <li>• Deploy own tests</li> <li>• Participate in collaborative tests</li> <li>• Participate in User Forum</li> </ul>	<ul style="list-style-type: none"> <li>• Contribute product or transactional data</li> <li>• Contribute open source code</li> <li>• Contribute other APIs</li> <li>• Access analytics on contributed APIs</li> <li>• Participate in Contributors' Forum</li> </ul>	<ul style="list-style-type: none"> <li>• Sponsor environment specific for a Wicked Industry Problem</li> <li>• Sponsor startups challenges</li> <li>• Participate in Sponsors' Forum</li> </ul>	<ul style="list-style-type: none"> <li>• Access test results</li> </ul>
<b>TECH OR DATA VENDOR</b>	<ul style="list-style-type: none"> <li>• Deploy own tests</li> <li>• Participate in collaborative tests</li> <li>• Participate in User Forum</li> </ul>	<ul style="list-style-type: none"> <li>• Contribute data and support services</li> <li>• Contribute other APIs and /or Reference Architectures</li> <li>• Develop neutral in Certification Capability</li> <li>• Participate in Contributors' Forum</li> </ul>	<ul style="list-style-type: none"> <li>• Sponsor environment specific for a Wicked Industry Problem</li> <li>• Sponsor startups challenges</li> <li>• Participate in Sponsors' Forum</li> </ul>	<ul style="list-style-type: none"> <li>• Access test results</li> </ul>
<b>PROFESSIONAL SERVICES FIRMS</b>		<ul style="list-style-type: none"> <li>• Contributed assets to an Advisory Space</li> </ul>	<ul style="list-style-type: none"> <li>• Sponsor environment specific for a Wicked Industry Problem with clients</li> </ul>	<ul style="list-style-type: none"> <li>• Access test results</li> </ul>
<b>VC</b>			<ul style="list-style-type: none"> <li>• Sponsor sandbox access for portfolio companies</li> </ul>	<ul style="list-style-type: none"> <li>• Access sandbox tests for developing deal flow</li> </ul>
<b>ACADEMIA</b>	<ul style="list-style-type: none"> <li>• Deploy own tests</li> <li>• Participate in collaborative tests</li> <li>• Participate in User Forum</li> </ul>	<ul style="list-style-type: none"> <li>• Contribute research tools and expertise</li> </ul>		<ul style="list-style-type: none"> <li>• Access sandbox tests for research purposes</li> </ul>

## ▶ 4.7.1 ROLE OF REGULATORS AND PUBLIC BODIES

Responses to the Industry Sandbox Consultation strongly indicate that there is demand for regulators to play a part in an Industry Sandbox.

There were five areas where respondents were keen to see regulatory engagement with an Industry Sandbox:

1. engage in curated dialogue with sandbox participants where there is uncertainty around the regulatory approach to an innovative solution;
2. review Industry Sandbox tests in applications to regulatory sandboxes, authorisation or supervisory decisions;
3. leverage an Industry Sandbox to test RegTech solutions for regulatory use;
4. consider Industry Sandbox output towards policy development; and
5. provide a forum for international regulators and developers of innovative solutions to discuss divergences in regulatory approaches and the potential for alignment.

Nearly all respondents across all stakeholder groups agreed with these asks. We note that this was the survey question with the highest degree of convergence among stakeholder groups.

As with other aspects of an Industry Sandbox, engagement with regulators should add to on-going global regulatory initiatives aimed at supporting market competition and better consumer outcomes through supporting innovation.

### Engage in curated dialogue with sandbox participants

We note that many market or conduct regulators have set up innovation units to provide direct support to startups that seek clarity on the regulatory implications of their products.

Cohorts that, in the process of sandbox testing, identify issues where regulatory steer might be beneficial to further product development, secure funding, or enable partnerships with regulated entities, should have a safe space to engage with the regulator. This space would be the proposed Regulatory Forum under Design Components.

The same logic holds for engagement between industry and multiple regulators, particularly ones committed to convergence of approaches, such as regulators connected via a FinTech bridge or cooperation agreement.

### Review Industry Sandbox tests in applications to regulatory sandboxes

An issue is the potential interoperability between an Industry Sandbox and a Regulatory Sandbox.

Learning from the first Regulatory Sandbox, cohorts suggest that applications to a Regulatory Sandbox could be supported by preparatory work in an Industry Sandbox. For example:

- **Partner arrangements:** if a non-regulated startup needs to work with a regulated institution during Regulatory Sandbox testing, such partnership can be tested and secured in an Industry Sandbox first;
- **Technical development of the product:** in order to show readiness for testing, regulators usually expect a firm to prove that the technical development of their product is as complete as possible, which can be done in an off-market Sandbox.
- **Cyber-resilience:** penetration testing is often required.

### Testing RegTech for Regulators

The development of RegTech solutions for regulators is an increasing focus area addressed through internal research and adoption programmes, accelerators or hackathons.

An Industry Sandbox could be viewed as a RegTech tool for regulators in itself, as it supports both an infrastructural transformation and helps develop an active tech ecosystem feedback loop, both for market understanding and internal deployment.

At minimum, knowledge sharing between regulator initiatives, POCs and equivalent industry projects would be beneficial. For example, an Industry Sandbox can be used to further develop solutions originating from a regulator's RegTech tech sprint.

A more sophisticated engagement can involve RegTech POCs developed between industry and regulators on solutions such as regulatory data APIs or sharing information via a distributed ledger.

Finally, developing RegTech solutions is a prime area where either an informal steer or a more formalised guidance from a regulator can accelerate product development, if made available in a sandbox context.

In turn, engagement with RegTech solutions could inform regulators on how compliance obligations may be met.

### Policy Development

While many grey areas of compliance can be addressed by either increasing the knowledge of product developers or clarifying supervisory expectations, some barriers to innovation could require policy change to be removed.

Industry has called for continuity between regulatory teams both within national regulators and across regulators internationally. Industry Sandbox outputs should be available to observer regulators to support policy development by providing analysis of the potential impact of a policy change on customers. It may also be helpful if guidance issued by regulators in direct engagement with industry participants, such as the FCA's Direct Support function in its Innovation Hub, is shared on an anonymised basis with other industry participants facing the same issues during Sandbox testing.

At minimum, regulators should adopt an ecosystem approach to understand the role new tools could play, such as Industry Sandboxes, POCs and accelerators to engage, understand, deploy.

# ACADEMIC COLLABORATION CASE STUDY - MIT CONNECTION SCIENCE LIVING LABS



**MIT  
Connection  
Science**

David Shrier, Managing Director,  
MIT Connection Science

Living Labs are a research solution developed at the Massachusetts Institute of Technology ("MIT"). It brings together interdisciplinary experts to develop, deploy, and test in actual living environments new technologies and strategies and designs, enabling companies to quickly respond to our ever-changing world with market-tested new digital solutions and collaborations. Living Labs are the successor to the focus group: instead of measuring what people say they do, we measure what they actually do.

## Testbed for Data Innovation at MIT Connection Science

Testbed for Data Innovation at MIT Connection Science  
MIT's Living Lab in Andorra is helping the government and businesses to better understand the economic vitality of their main city, and quickly rearchitect the dynamics of human interactions to respond to changing conditions. A rich data set compiled from anonymised, aggregate mobility and social interaction data streams enables very fine-grained understanding of critical dimensions such as transportation, tourism, and health. Our new program in Colombia is helping the government to realize the peace dividend, and use advanced data analytics to spur economic development. Topic areas in process across our Living Labs network include topic areas such as transportation, health, and prosperity, as well as enabling infrastructure areas such as digital identity, digital privacy, cybersecurity, and digital currencies.

MIT Living Labs help organisations develop best practice for leveraging data, improving how we collect, manage, and use personal information, with outcomes ranging from setting appropriate privacy policies to demonstrating systems that can be implemented in practice.

## Example of Living Labs in Financial Services

Working with a real bank in Europe, against over 400,000 customer accounts, we have demonstrated an improvement to credit modeling for behaviors such as late payment, over limit, or credit default that are 30% to 50% better than traditional demographic or linear regression models. Furthermore, our models predict adverse credit events 30 to 60 days in advance, unlike credit bureau-based solutions (FICO, Experian, Equifax, TransUnion) that utilize a "rear view mirror" approach. This solution helps banks better manage their existing customer base, and extend credit to the unbanked or underbanked, a population estimated to be over 2 billion people worldwide. We also devised a credit model for Small & Medium Sized Enterprises (SME's), which is about 35% more predictive than the bank's existing SME credit modeling. SME's are estimated to have a \$2.6 trillion credit gap globally, and new analytic models based on real-world evidence can help financial services companies to bridge

that gap without assuming disproportionate risk. Virtual Living Labs are also possible: one we ran in the fall of 2016 harvested financial market predictions from over 130 countries, combining human intuition with machine learning, to predict the closing price of the S&P index within 0.1% of actual.

## Tiered Sponsors Consortium Membership Model

MIT Living Labs are funded through sponsorship. Sponsorship is available at several different levels giving sponsors access to valuable advanced resources by conducting research and development that is too costly or too far out to be accommodated within a corporate environment. It is also an opportunity for corporations to bring their business challenges and concerns to the group to see the solutions our researchers can invent.

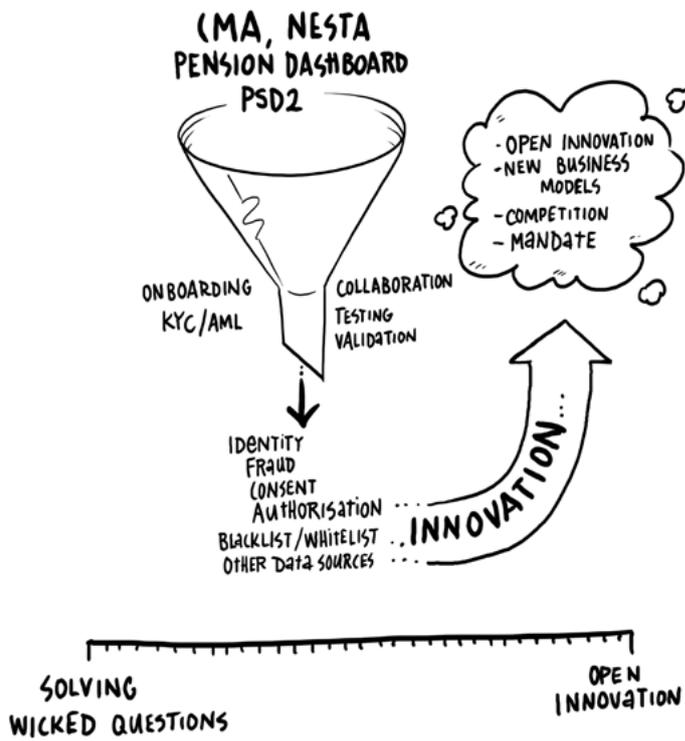
### Sponsors Benefits Highlight

- Opportunity to stay informed about emerging technologies, design ideas, and business strategies;
- Opportunity to meet potential competitors and partners in a pre-competitive environment;
- Senior Executive Workshop: at higher levels of sponsorship, a sponsor may request one focused workshop at MIT or at the sponsor's facility to explore issues of mutual interest;
- Right to propose collaborative research projects that are of mutual interest.
- Company Fellowship: Each full sponsor may elect to send one staff member to MIT for up to one month as a visiting researcher to participate in research activities, attend lectures, pursue company research, and make use of many MIT facilities;
- Opportunity to host MIT faculty and research assistants at company sites so they can learn more about the company and provide relevant updates on the latest MIT research;
- Ability to meet MIT graduate students who could be recruited to work at sponsor companies.

## Connection to Industry Sandboxes

Interoperability between MIT Living Labs and an Industry Sandbox is an opportunity to combine institutional test data, market data and open data with our expertise in setting up industry collaborations to resolve shared challenges—or wicked problems, to use the language of the Industry Sandbox Consultation.

Additionally, Living Labs are a method to connect the off-market testing environment of an Industry Sandbox to living environments where FinTech products are deployed.



# 5 IMPLEMENTATION CHOICES

Consultation responses provide sufficient evidence to conclude that there is demand for an Industry Sandbox as a shared collaborative environment, particularly as it supports the evolution of banking-as-a-service business models, and could provide acceleration of FinTech adoption.

While design principles identified in this Consultation would apply to most Industry Sandboxes, different design components might be selected at the point of implementation. Similarly, there is optionality in funding and governance models within the core principles identified.

Industry Sandbox implementation choices can vary in the objective, complexity, and respectively cost of the solution.

## ▶ 5.1 INDUSTRY SANDBOX CATALOGUE

A low-cost, low-impact solution could constitute a catalogue of existing sandbox environments with details on available assets and access criteria. Such an environment would generate visibility and comparability of existing sandboxes or API marketplaces, creating a one-stop shop for developers. It will not require the opening of data or APIs that are not already available.

A more sophisticated version of this environment might seek to create a single point of entry to different Industry Sandboxes by aggregating and streamlining the process of self-certification usually required to access these.

Critical success factors for this Industry Sandbox will be to aggregate information from as many sandbox environments as possible, globally, and create an efficient mechanism through which the catalogue can expand.

We can call these options an Industry Sandbox Catalogue and an Industry Sandbox Gateway.

## ▶ 5.2 INDUSTRY SANDBOX FOR WICKED INDUSTRY PROBLEMS

Adopting an Industry Sandbox can be created around a specific Wicked Industry Problem such as digital identity, prudential risk monitoring or RegTech.

The data, APIs and reference architectures in this environment will be curated to meet the testing needs of solutions solving any particular Wicked Industry Problem. Certification parameters, including self-certification, best practice guidelines, open standards or less formalised components will have to be tailored to the Wicked Industry Problem.

Eligible users will have to demonstrate a connection between their solution and the sandbox focus area. Parameters around the wicked problem can be set by sponsors of the sandbox, according to an established governance practice.

Success factors for this environment would be that a critical mass of collaborators gather around a specific industry challenge. As most such challenges are linked to regulatory issues, the participation of relevant regulators as observers will likely be a key driver to bring this type of collaboration together.

Consultation feedback from financial institutions was that supporting a testing environment with clearly defined scope and purpose will be preferable to an issue-agnostic environment.

## ▶ 5.3 FULLY FLEDGED INDUSTRY SANDBOX

A maximum-impact, high-cost Industry Sandbox can be built to meet all three identified objectives – supporting product development, industry collaboration and effective regulation.

This type of environment would be consistent with all the design principles and incorporate most design components identified in this consultation, and will likely evolve further in scope and sophistication.

We note that securing funding for this type of environment might be a key challenge. Starting from an ambitious project also would not allow Industry Sandbox developers to learn from building smaller, more focused testing environments. Therefore, this type of sandbox is likely an end-phase of a more measured project plan.

# 6 NEXT STEPS

## 6.1 UMBRELLA SANDBOX

The FinTech market continues to grow and many regulators are assessing how they address the needs of startups for direct support and guidance through the regulatory process.

Regulators could participate directly in the Industry Sandbox community to help promote understanding of new technologies and trends within financial services firms. Their involvement may also provide early sight of possible regulatory questions arising from new and innovative technology, helping to prioritise key resources and optimise operational approaches.

New technologies need time and space to develop a better understanding of their potential impact before any regulatory assessments can be made. Yet, making that first step as a startup, investor, or financial institution requires a great degree of certainty in regulatory treatment. Greater collaboration with regulators would allow for a more consistent link between the innovation hubs sitting within financial institutions and the rest of the organisation, ultimately allowing a better opportunity for FinTech to be adopted and integrated.

There is also a balance to be struck between the use of principle-based regulation and an industry that may appear at times to be asking for a rules-based approach. Unintended consequences, or a blurring of the lines between the two approaches, can be avoided by the greater collaboration and sharing of knowledge afforded by an Industry Sandbox.

Industry could arguably fill a gap in curating these necessary conversations, lifting some of the burden currently on regulators to effectively and productively share regulatory knowledge in the FinTech community. Ultimately this raises the question: 'is there space for industry players to have any delegated authority as a step to reduce the regulatory burden?'

In the FCA Regulatory Sandbox Report of November 2015, industry was invited to consider an "umbrella sandbox"-a not-for-profit sandbox umbrella company that could seek authorisation from the FCA and then allow innovative businesses to act as 'appointed representatives' for the duration of the trial in question.

As per that report, the FCA would help with setting up the umbrella and provide ongoing support and advice.

We believe this question can only be properly explored in a separate consultation process.

## 6.2 ACCESS TO LIVE CUSTOMER DATA

Access to live customer data was left out of scope for the purposes of this Consultation. It needs to be noted, however, that the issue was repeatedly raised as the concept of developing a community

of real-life beta-testers was reviewed in this Consultation. Most retail market products would seek to access such a community as part of their product development.

In financial services, access to live customer data would clearly need to comply with relevant data protection regulation. In the context of the EU General Data Protection Regulation, any third party accessing non-anonymised customers' transactional data would need to receive explicit consent. Under PSD2, the third party would also need to be formally authorised as such.

This leaves a potential gap, whereby a startup cannot access the data of a limited number of consenting customers prior to seeking third-party authorisation under PSD2, for product validation purposes. Such access, with any associated liability management and insurance cover, could be contractually arranged between an Industry Sandbox and a financial institution.

Using such governance arrangement to equip an Industry Sandbox with a community of willing beta-testers can further support the validation of innovative products.



*We often talk about sandboxes emulating Federal Drug Administration drug trials in financial services. The reality is that a Regulatory Sandbox can be compared to the final stage of a drug trial, where a medicine is tested on a large patient sample. This leaves a gap in developing testing environments for earlier stages, when the sample populations are in the tens or hundreds. Allowing digital access to volunteer beta-testers in an Industry Sandbox could be that mechanism.*

- Michael Meyer, Founder, RegTechLab



## 6.3 DEVELOPING AN INDUSTRY SANDBOX

As per the agreed scope of this Consultation, this Report assesses the demand for, feasibility of and role of regulators in an Industry Sandbox. A next step for the Industry Sandbox initiative would be leveraging these findings towards the development of one, or multiple, Industry Sandboxes. The Consultation team anticipates that different groups of industry players would come together to build shared sandboxes that align with their respective priorities and stakeholders. A key consultation recommendation is that such projects are open, collaborative and interconnected to avoid the duplication of effort and spread of resources in the next phase of FinTech open innovation. Maintaining transparency and efficient flow of knowledge would be critical. To that end, sandbox developers could consider what design components could be shared between different Industry Sandboxes. Participants' Forums, Regulators' Observer Forums in particular, or Certification Capability might be two such components.

# ANNEXES

**Annex 1:** FCA Invitation Letter

**Annex 2:** Innovate Finance Member Sandboxes Proposal

**Annex 3:** Summary of Consultation Governance and Input

**Annex 4:** Survey Results

**Annex 5:** Detailed Summary of Sample Sandboxes (incl. Pistolia & Boston)

**Annex 6:** BBA Response to Call for Input

**Annex 7:** What are Industry Sandbox Design Sessions?

**Annex 8:** Company Descriptions

**Annex 9:** Glossary

**ACKNOWLEDGEMENTS**

# ANNEX 1: FCA INVITATION LETTER



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6<sup>th</sup> April 2016

Dear Lawrence

## **Invitation letter**

I am writing to you in relation to the industry options for developing a regulatory 'sandbox' as discussed in our November paper and in particular to invite Innovate Finance to form and lead a working group to consider the need for and potentially develop industry led sandbox initiatives.

## **Objective of industry led sandboxes**

The objective of both the FCA sandbox and industry led sandbox(es) is to deliver more effective competition in the interests of consumers by:

- reducing the time and, potentially, the cost of getting innovative ideas to market;
- enabling greater access to finance for innovators; and
- enabling more products to be tested and, thus, potentially introduced to the market.

The benefits the sandbox(es) could provide firms should lead to better outcomes for consumers through, for example, an increased range of products and services, reduced costs, and improved access to financial services.

While the FCA sandbox should reduce some of the existing regulatory barriers to firms that are testing new ideas, the FCA is limited by legal and EU requirements in some areas. Where the FCA is constrained, we believe the industry acting collectively could help address the challenges that innovators face when testing a new product or service.

## **Feedback and criteria**

Since publishing our sandbox paper, we have been collecting feedback on our thinking. Our stakeholders have expressed considerable appetite for an industry led initiative.

We recognise that first there needs to be further consideration of the need for and feasibility and design of an industry led sandbox initiative, whether it is the virtual sandbox, sandbox umbrella, or a different sandbox solution. Taking account of the feedback we received on the industry led proposals, we would envisage that any industry led sandbox should meet the following criteria:

- a. clear and consistent requirements for access to the sandbox, including that the product or service being developed should be in the interests of consumers;
- b. funded and operated by industry;
- c. affordable for small start-ups;
- d. clear policy on data handling and storage in compliance with legal and regulatory requirements;
- e. data and MI from the sandbox accessible to the FCA, subject to legal constraints and considerations of proportionality.

For a virtual sandbox, we envisage that it provides users with data for modelling and testing new products and services in an early stage of product/service development. A sandbox umbrella solution should also take into account that risks from testing novel solutions should not be transferred to consumers, so there should be sufficient safeguards to protect consumers.

On 9th February 2016, the Open Bank Working Group (OBWG) published a report 'The Open Banking Standard' where they also discuss the development of a central sandbox for the reference core Open Banking API. Due account should be taken of this work.

#### **Invitation**

We would like to invite Innovate Finance to convene a working group to:

1. ascertain the demand for industry led sandbox initiatives and develop a clearer idea of the solutions desired (e.g. virtual sandbox, sandbox umbrella company, or a different industry led sandbox);
2. consider the feasibility of the identified sandbox solutions, taking into account governance, funding, commercial viability, legality, provision of data, access to sandbox, etc.;
3. in collaboration with the FCA, consider what (if any) role the FCA could have in the implementation and operation of an industry led sandbox(es);
4. if the working group establishes that there is a need and it is feasible, develop the industry led sandbox(es).

Should you agree, we will share with you the contact details of a number of organisations and firms who have said they would be willing to assist in taking forward these proposals.

We look forward to hearing from you, and please do not hesitate to get in contact with Anna Wallace or Helen Ginter in the Innovation Hub if you would like to discuss anything further.

Yours sincerely,



David Geale  
Director of Policy  
Financial Conduct Authority

# ANNEX 2: INNOVATE FINANCE MEMBER SANDBOXES PROPOSAL

## Member & Regulatory Sandboxes

December 2015

INNOVATE|FINANCE

As an Independent non-for-profit members association, InnFin is well positioned to support different uses for Regulatory Sandboxes

- Innovate Finance has over 170 members where innovation in Financial Services is the common theme
- Across the membership continuum Innovate Finance members have expressed a number of issues and barriers they seek assistance with
- A number of issues and barriers can be addressed through the deployment of Member Sandbox solutions
- A sandbox is a contained safe place to play – often an environment that is used to “test” a technological proof of concept prior to public release
- A Regulatory Sandbox should be designed to use the knowledge of the greater community to accelerate new (little known) innovations
- A number of key design principles MUST be adhered to regardless of Virtual or Umbrella Sandbox model
- A Virtual Regulatory Sandbox can be up and running in Q1 2016
- An Umbrella Sandbox could help expedite complex innovations that require extended consumer testing... but will need time to be evaluated

2 |

InnFin has over 170 members... innovation in FS is the common theme



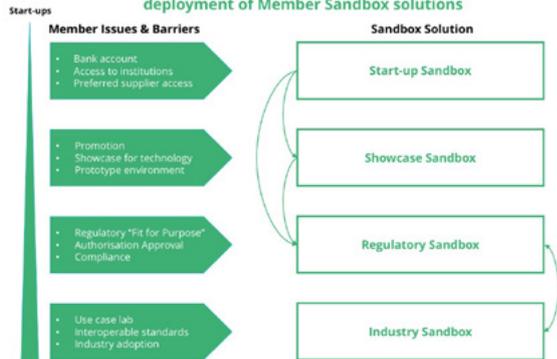
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Across the membership continuum InnFin members have expressed a number of issues and barriers they seek assistance with



4 |

A number of issues and barriers can be addressed through the deployment of Member Sandbox solutions



Institutions

5 |

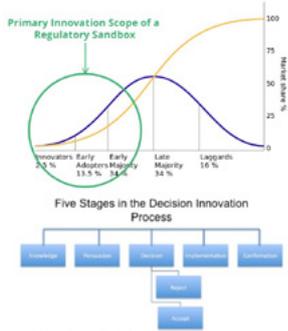
A sandbox is a contained safe place to play – often an “environment” that is used to “test” a technological proof of concept prior to public release

*“A sandbox is a testing environment that isolates untested code changes and outright experimentation from the production environment or repository, in the context of software development...”*  
Wikipedia – Software Development

*“A sandbox is a security mechanism for separating running programs. It is often used to execute untested code, or untrusted programs from unverified third parties, suppliers, untrusted users and untrusted websites.”*  
Wikipedia – Computer Security

6 |

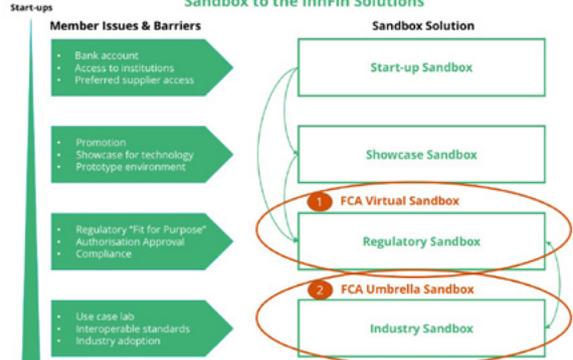
**A Regulatory Sandbox should be designed to use the knowledge of the greater community to accelerate new (little known) innovations**



- One of the largest barriers regulators face is new innovations and ways of working
- Often, the knowledgebase of new innovations - how they work, and potential risks are rewards - is difficult to baseline and assess
- By engaging the great community of financial services professionals in a structured process, knowledge and experience can be more rapidly built
- The objective of defining this as a formal process in a Regulatory Sandbox should be to make transparent and accelerate the DECISION

7 |

**We have mapped the proposed FCA Virtual Sandbox and Umbrella Sandbox to the InnFin Solutions**



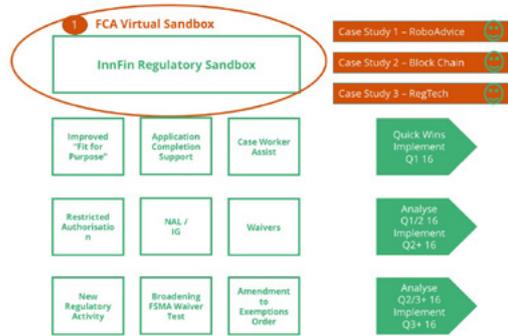
8 |

**A number of key design principles MUST be adhered to regardless of Virtual or Umbrella Sandbox model**

- The ultimate objective of a Sandbox is to accelerate greater market competition and range of access to quality financial solutions by consumers
- Sandboxes need to be open and accessible to all FinTech players, from seed start-ups to Institutions
- All Sandbox applicants must pass a "fit for purposes" test prior to entry into the Sandbox
- A joint working Steering Group should be established between Project Innovate and Industry / Memberships Associations to foster collaboration
- The collaboration should focus on the improvement of working processes and skill levels of ALL of the involved parties

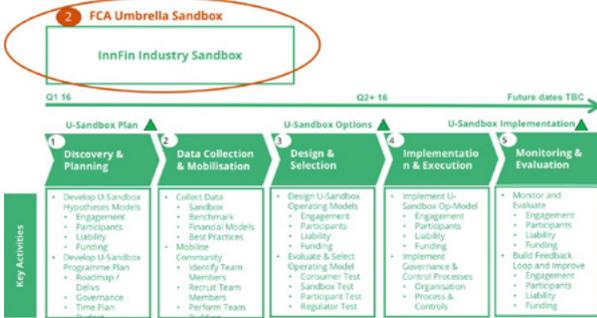
9 |

**A Virtual Regulatory Sandbox can be up and running in Q1 2016**



10 |

**An Umbrella Sandbox could help expedite complex innovations that require extended consumer testing... but will need time to be evaluated**



11 |

**As an Independent non-for-profit members association, InnFin is well positioned to support different uses for Regulatory Sandboxes**



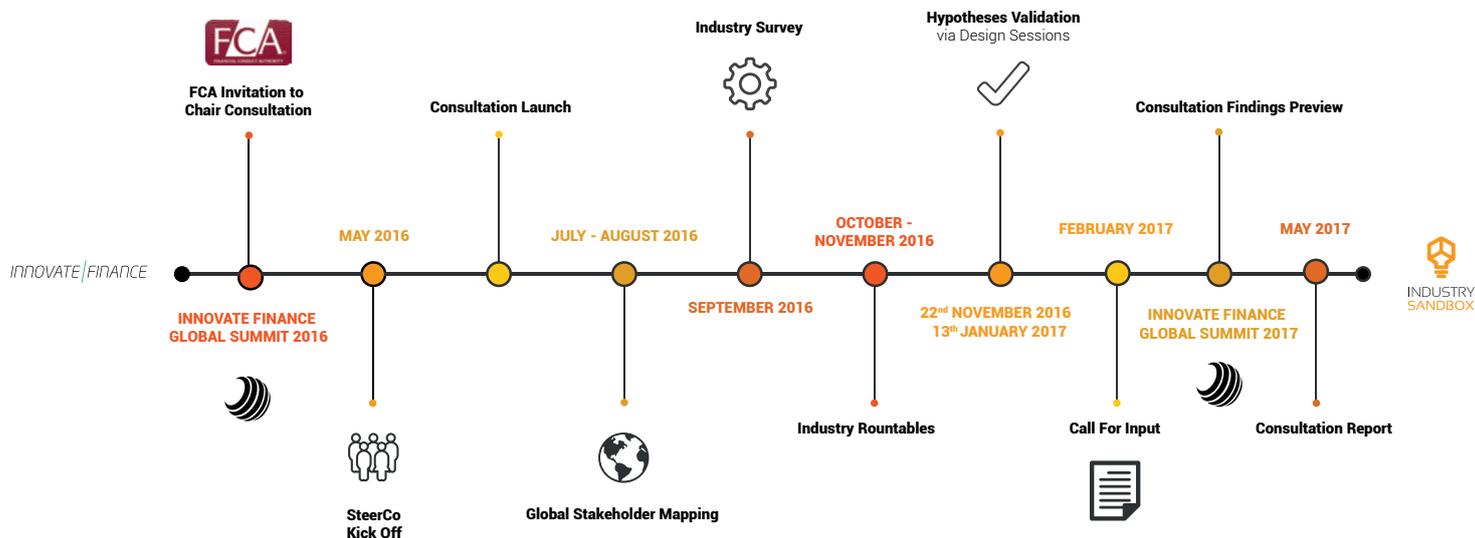
12 |

**End**

13 |

# ANNEX 3: SUMMARY OF CONSULTATION GOVERNANCE AND INPUT

## Consultation Timeline



### Technical Advisory Board (technical expertise)

1. Jean Donnelly, Executive Director, FinTech Sandbox
2. Chris Gorst, Prize Lead, OpenUp Challenge, NESTA
3. Keith Saxton, Chair Financial Services & Payments Programme, techUK
4. Peter Smith, Global Head of Industry Policy Liaison, TISA
5. Barry West, Senior Associate / RegTech Team, FCA

### SteerCo

1. Lawrence Wintermeyer, CEO, Innovate Finance (chair)
2. Sarah McKenzie, Anna Wallace, Innovation Hub, FCA
3. Rachel Kent, Global Head of FIS, Hogan Lovells
4. Ozlem Bas, Policy Adviser, HMT (observer)

### Industry Advisory Board

1. Matthew Field, Policy Adviser, Digital, BBA
2. Ruth Milligan, Head of Financial Services & Payments, techUK
3. TISA

### Secretariat: Innovate Finance

1. Dea Markova, Head of Programmes (project lead)
2. Daniel Morgan, Director of Policy and Regulation

### Delivery Partner, Design Sessions:

Innovation Arts

### Delivery Partners: Legal and Governance

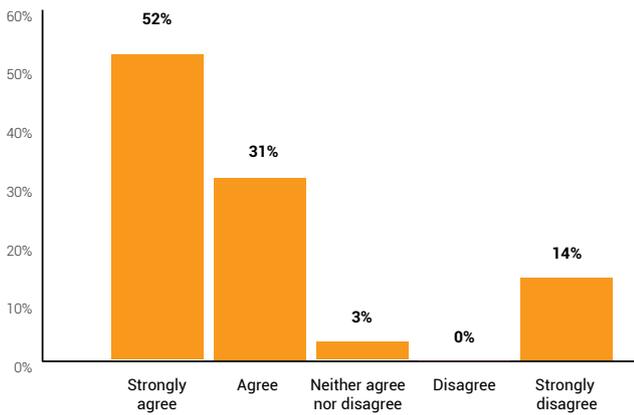
Hogan Lovells

Global subject matter experts (technological, sandbox, ecosystem etc)

# ANNEX 4: SURVEY RESULTS

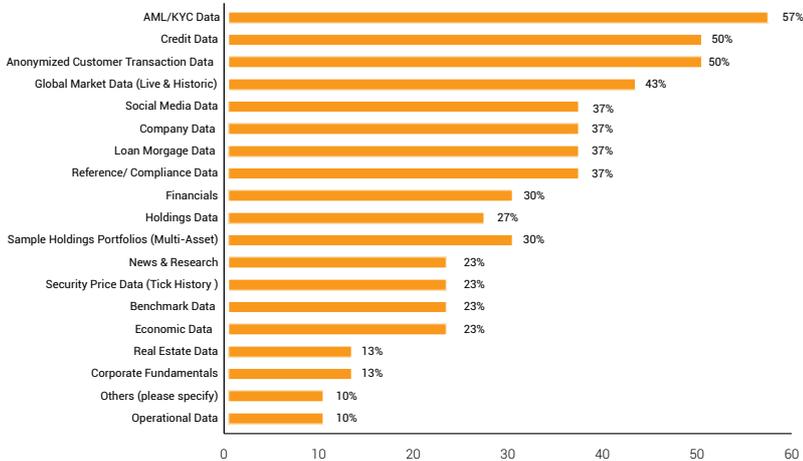
## Q1 STARTUPS

Facilitated access to relevant datasets will expedite my company's route to market



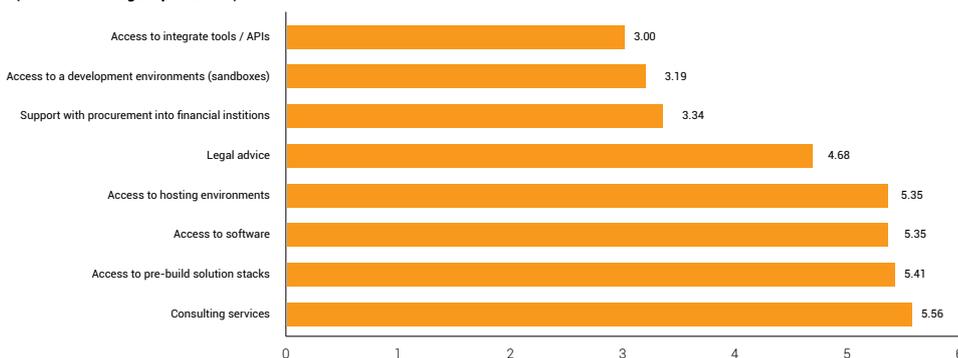
## Q2 STARTUPS

What datasets would your company be interested in having access to in an off-market testing (e.g. sandbox) environment?



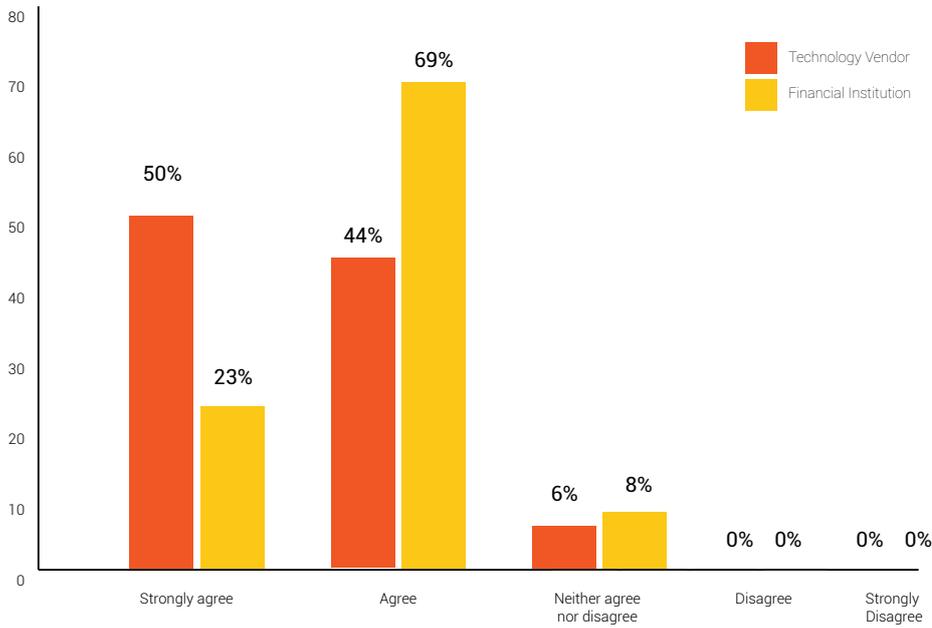
## Q3 STARTUPS

What other sandbox 'assets' could decrease the time and cost associated with developing your product / service? (lower score = higher preference)



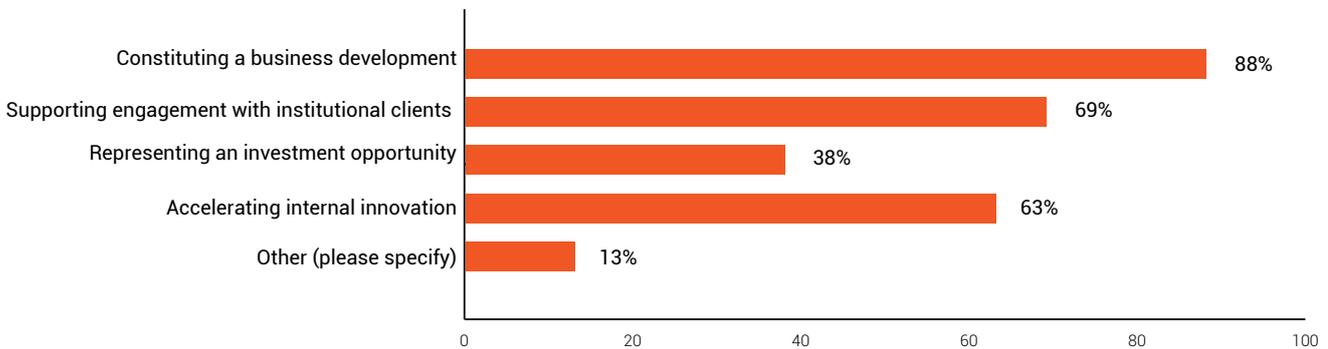
## Q4

My Institution current actively engages with FinTech startups



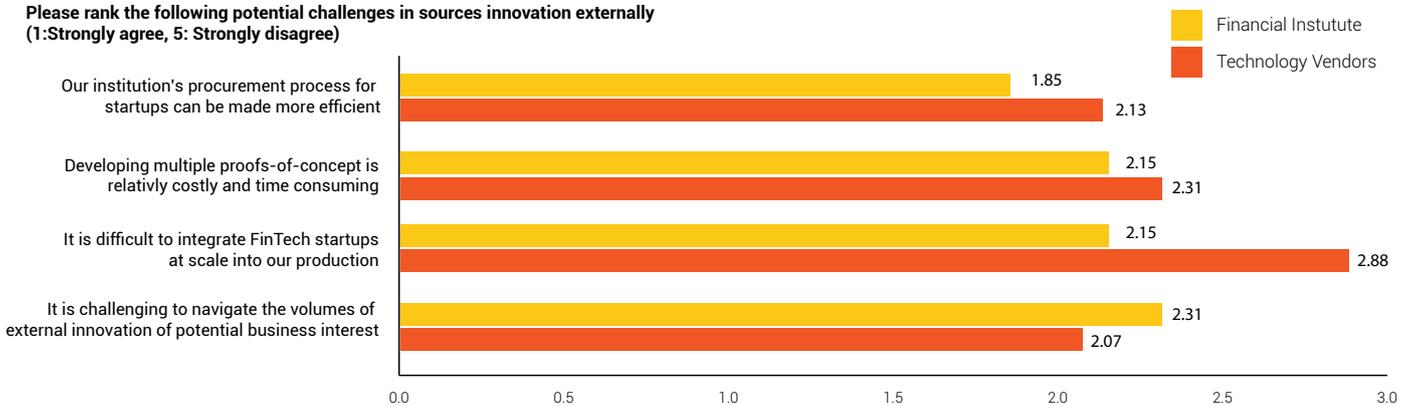
## Q5 TECHNOLOGY VENDORS

Engagement with FinTech and Startups supports our business by



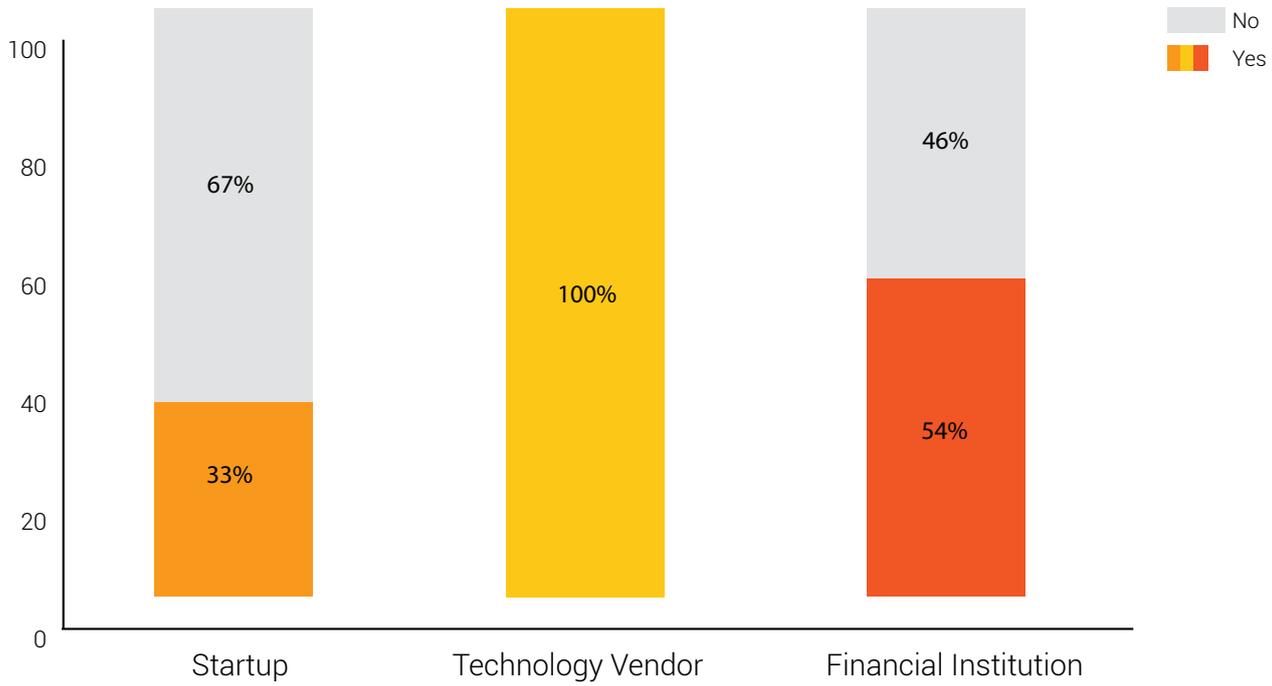
## Q6

Please rank the following potential challenges in sources innovation externally (1: Strongly agree, 5: Strongly disagree)



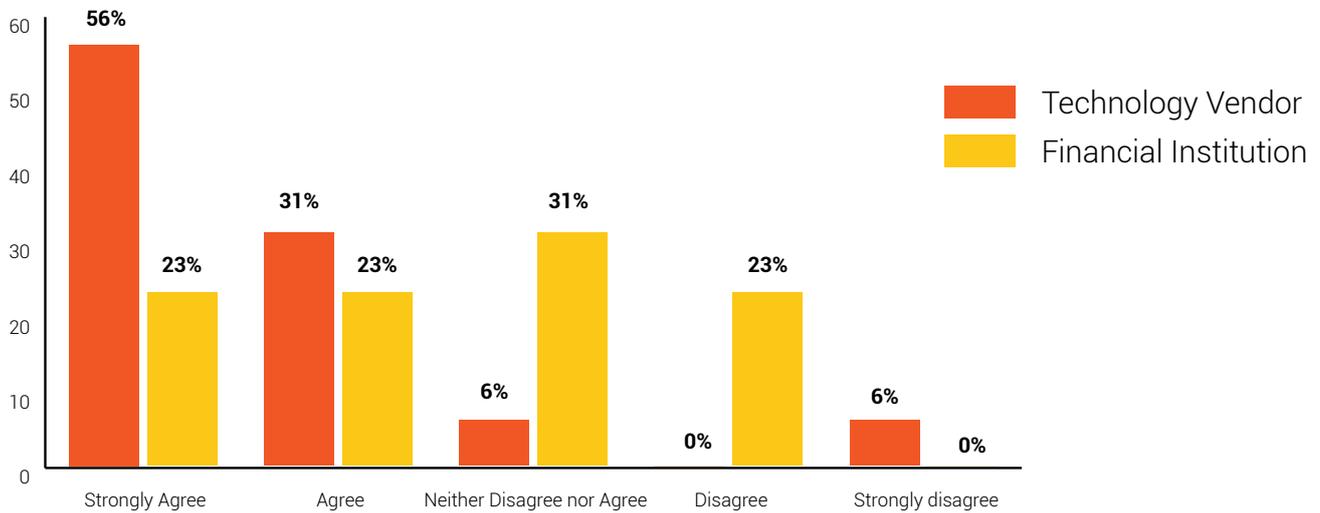
### Q7

Have you or your company worked in sandbox environment before?



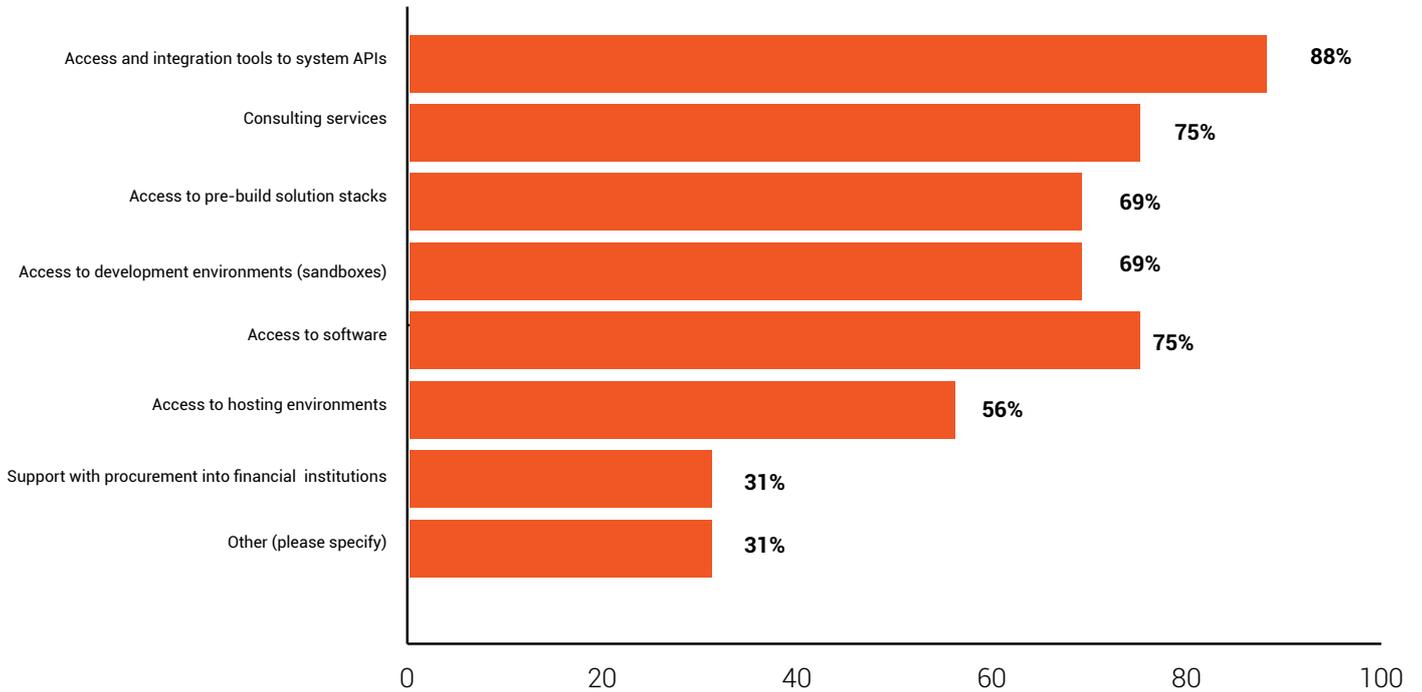
### Q8

My organisation would contribute to the development of a sandbox as shared industry utility



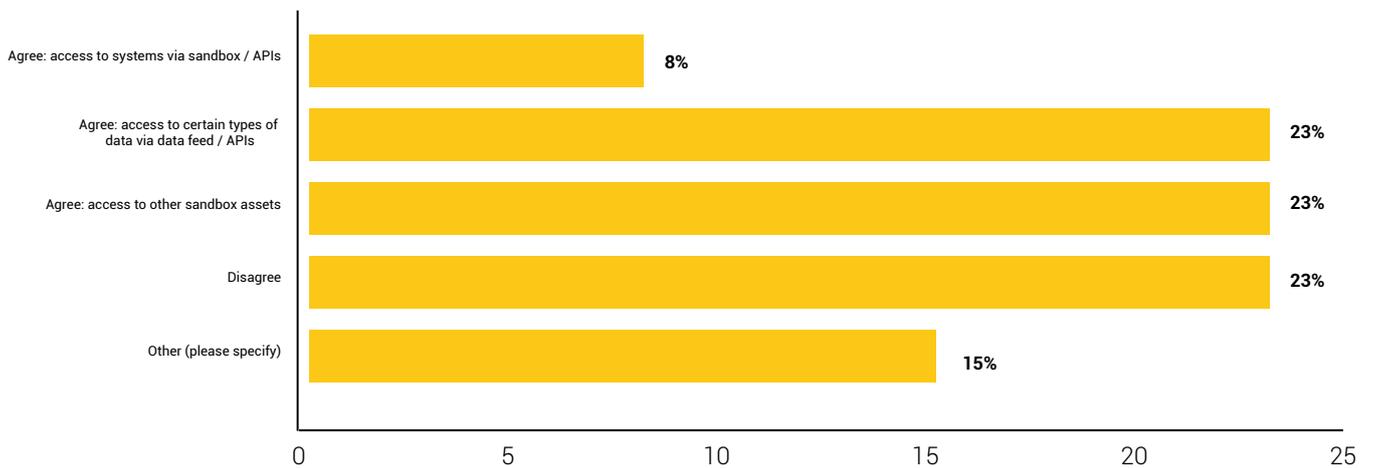
## Q9 TECHNOLOGY VENDORS

### What Sandbox 'assets' could your organisation contribute to a sandbox environment?



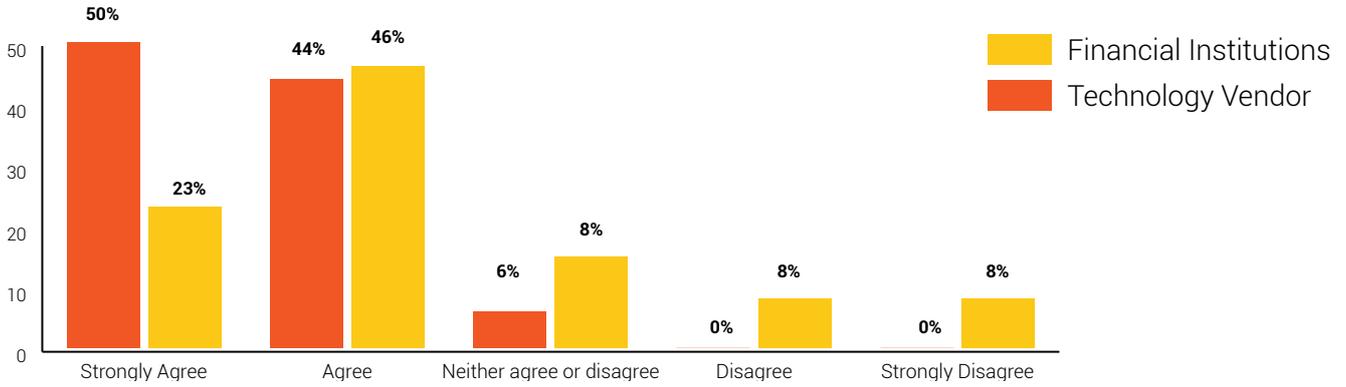
## Q10 FINANCIAL INSTITUTIONS

### My business area and / or organisation will be able to contribute any assets to an industry sandbox



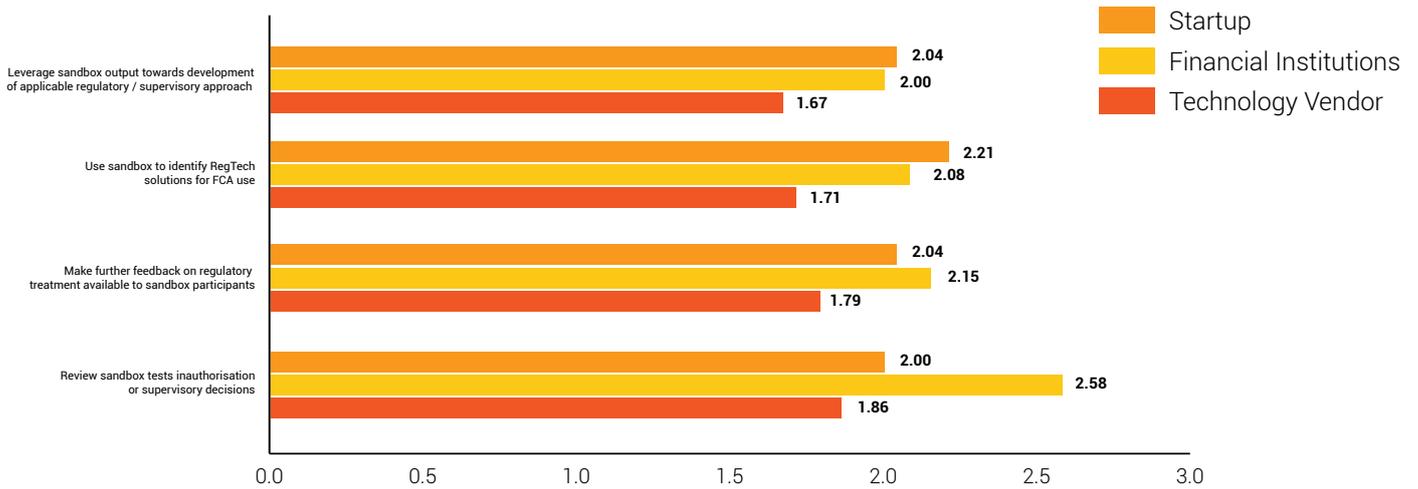
## Q11

My Organisation could benefit from the development of an sandbox as a shared industry utility



## Q12

This type of FCA engagement would contribute to a sandbox environment:  
(1: Strongly agree, 5: Strongly disagree)



# ANNEX 5:

## DETAILED SUMMARY OF SAMPLE SANDBOXES



Sandbox (Country)	Description	Users	Funding	Data	Technologies
 Boston FinTech Sandbox (United States)	Boston-based non-profit providing eligible startups with free access to predominantly market data.	FinTechs. Businesses should be physically located in one of the four cities: London, Boston, New York or San Francisco.	Platinum Sponsors: Fedetyl , F-Prime Capital, Thompson Reuters, Silicon Valley Bank, Amazon Web Services, Intel, State Street  Silver Sponsors: SIX, Goodwin Procter LLP, 406 Ventures	Market and Industry Data Providers include: Thomson Reuters, FACTSET, Morningstar, S&P, CME, Moody's Analytics, etc	Infrastructure and Platform as Service solutions offer up to \$15,000 in credits per startup to Amazon Web Services plus Business-level AWS Support up to \$5,000 per startup.
 Level One Project (United States)	Funded by Bill and Melinda Gates Foundation. Level One Sandbox is intended for those who have a need to access a reference ecosystem as part of their development work. It has 3 mobile wallet providers, an interoperability service for transfers, a bulk payer and a bank represented within the ecosystem. The downloadable API would be used to integrate into the system. The sandbox is representative of a vision for a pro-poor digital financial services ecosystem, but does not map directly to any systems deployed in the real world today.	FinTechs, Banks, Telecoms	(1) Not-for-profit/cost recovery model. (2) Participants pay fees (as determined by predetermined rules) sufficient to cover costs, as well as any investment or innovation capabilities deemed necessary to the system. (3) Private-sector entity is commissioned to operate some shared component of the system while the profits of that entity should be subject to scrutiny and limits.		Framework/Infrastructure (1) Open Loop interoperability between all providers – the system should be open to all actors, including FIs and regulated non-traditional financial services providers. (2) Immediate Funds Transfers and Same Day Settlement – Provides immediate notification of payment from the payer to the payee, transfers funds. The system should settle funds among participants at least once a day, on the same day. This is the most efficient way of managing liquidity. (3) Push Payments – Person who initiates transaction should always be the payer. May provide 'request to pay' service, but authorization rest with the payer. (4) Adherence to Open, International Standards – The system should adhere to internationally accepted payments standards (ISO20022). (5) Adequate and Shared Fraud Service – Shared risk management leads to lower fraud and more secure schemes. (6) Efficient and Tiered KYC – Account opening requirements should vary based on need, level of transactions, services provided. (7) Transaction Irrevocability – The system should not allow transaction reversal unless in extreme circumstances in order to reduce complexity and cost.
 NESTA Open Up Challenge Sandbox (United Kingdom)	A new £5m challenge prize for the future of small business banking, getting ready for UK "Open Banking" in early 2018. Open Banking Ltd (formerly the Implementation Entity) is the delivery body responsible for developing the open banking API standards and frameworks. Its work will be led by a Steering Group and informed by Advisory Groups.	FinTechs	The Open Up Challenge is run independently by Nesta's Challenge Prize Centre, with backing from the CMA and funding from eight of the UK's largest providers of SME banking Barclays, HSBC, Lloyds Banking Group, RBS, Santander, AIB Group (UK) p.l.c, Bank of Ireland UK and Danske Bank.	Open Banking APIs	Open Banking APIs

Sandbox (Country)	Description	User	Funding	Data	Technologies
 TISA Exchange (United Kingdom)	Having open standards and a structure which encourages multiple players, TISA Exchange promotes competition, and instigates the drive to improve performance and reduce cost.	It is only open to custodians, trustees and firms that run institutional and retail funds.	Subscription model, where a schedule of payments was design to cover the initial setup cost and the ongoing operational costs, with founding members effectively receiving a rebate. Initial fees were £12,000 pa, reduced to £5K and £2K. Set up cost was near £500,000.	Market Data	
 Open Stack India (India)	The OpenStack Foundation is an independent body providing shared resources to help achieve the OpenStack Mission by Protecting, Empowering, and Promoting OpenStack software and the community around it, including users, developers and the entire ecosystem.	OpenStack is for service providers, enterprises, government agencies and academic institutions that want to build public or private clouds. Industries range from IT and telco to SaaS and eCommerce to finance and healthcare.	Platinum Members : AT&T, ubuntu, Huawei, IBM, Intel etc. Gold Members: Cisco, Dell EMC, Ericsson, Fujitsu, NetApp Infrastructure Donors: Rackspace, Vexxhost, Hewlett Packard Enterprise Corporate Sponsors: Accenture, BBVA, Comcast, Lenovo, Nokia, Orange Supporting Organizations: AppDynamics, Catalyst, Cognizant, Dynatrace <a href="http://www.openstack.org/foundation/companies">www.openstack.org/foundation/companies</a>		
 Capital One DEVEXCHANGE Sandbox (United States)	Philosophy: We've done the heavy lifting so you can focus on creating great customer experiences. Powerful technology that goes beyond banking. Testimony: By making available the foundational blocks to abstract complex financial rails and core backend processes as well as their other natural assets (access to low-cost capital, strong customer base and brands) banks will help unbundle the financial services sector, create new vibrant verticals, and build alternatives to traditional banking consumer experiences.	Open to all customers with registrations	Capital One	API products covers, (1) identify authentication through registered mobile device, (2) Credit Offers of personalized list of credit cards, (3) Rewards on miles, points, and cash earned on bank accounts and (4) Bank Account.	
 Salesforce Sandbox (United States)	Four sandbox types available: 1. Developer Sandbox – intended for development and testing in an isolated environment 2. Developer Pro Sandbox – host larger data sets than a Developer sandbox, and to handle more development and quality assurance tasks and for integration testing or user training. 3. Partial Copy Sandbox – support UAT user acceptance testing 4. Full Sandbox – support performance testing, load testing, and staging.		Premium on licences-based model. Different sandbox environments and licenses that depend on customers' needs for storage, templates, copy configuration, and frequency of refresh. Sandbox Licence: (1) Full Sandbox licence (2) Partial Copy Sandbox licence (3) Developer Pro Sandbox licence (4) Developer Sandbox licence	Salesforce data	(1) Analytics (2) Reports and Dashboards (3) Salesforce Development Tools (4) Debugging Suites (5) Testing framework.
 Cisco DevNet Sandbox (United States)	There are two types of sandboxes, Always-On and Reservation. Each sandbox typically highlights one Cisco product (think, CallManager, APIC, etc). Sandboxes can be used for development, testing APIs, learning how to configure a product, training, hackathons, and much more	Developers	Cisco	Third-party data	Sandbox Catalog (1) Networking (2) IoT (3) Datacenter (4) Collaboration (5) Cloud (6) Analytics & Automations (7) Security.
 RBS Bank of APIs (United Kingdom)	Driven by 48-hour Hackathons, in a team of coders, designers, and business people to create a working prototype to showcase. IP belongs to participants.	FinTechs, Banks, Individual developers	RBS	Blue Bank API allows you to log on as a simulated customer, enumerate the set of accounts belonging to the customer, enumerate transactions and make simulated payment requests. The API also provides branch and ATM information.	
 Starling Bank Sandbox (United Kingdom)	The first UK licensed bank to launch a public API that's ready for PSD2 Starling has built a public API that will enable third-parties to access customer data (with their permission, of course) and build on top of the Starling Platform to create products and services that customers will love.	Beta version users FinTechs, Banks, Individual developers	Starling Bank	PSD2 APIs	
 BBVA API Market and Sandbox (Spain)		FinTechs	There is no cost associated with accessing and using the APIs in the sandbox environment. For using the APIs in the production environment there is a cost based on the services to consumed and their intended use.	API catalog include Payments, PayStats, Notifications, Customers, Accounts, Cards, and Loans.	In response to Revised Directive on Payment Services (PSD2) to promote secure and fast online, mobile, and cross-border payment transactions and to accelerate digitalisation of banking industry, BBVA implemented account information services (AIS) and payment initiation services (PIS) available at its API marketplace.
 Fidor Banking API (Germany)	Munich-based Fidor is the first digital-only bank in Germany. Fidor commercializes its tech stack to banks and startups around the world. The sandbox in test environment offers users the same functionality as the live API, so users can start developing their applications without risk of losing money or unintentionally altering data.	FinTechs	Registering, using, and testing with the APIs in the sandbox is free of charge. If members plan to offer third party services to existing Fidor Bank customers or need extended services (e.g. trust account), contact Fidor Business Development. Potential monthly flat fee: EUR 14,90.	API specific for mobile app development, Money Transfer, Transactions Filtering, Future payments, High-level user information, Create a Customer, etc	RESTful API, JSON format, and OAuth2.0 authorization.

Sandbox	Description	Users	Funding	Data	Technologies
 programmableweb (United States)	ProgrammableWeb provides daily industry news, analysis, case studies, developer tools, technical resources, and the world's largest directory of APIs.	Developers  All members listed in public directory	Advertisement  Request a Media Kit Feature 1. run-of-site or targeted ads 2. content and channel targeting 3. geographic filter 4. network advertising 5. social media advertising 6. newsletter advertising	Third-party APIs	Features (1) API news and analysis (2) API directory listing and search (3) API showcase in applications (4) API research, whitepaper, conference (5) API education, how-to, source code (6) Member directory
 MashApe (United States)	MashApe's mission is to facilitate a new revolution in software production by serving as the backbone of the distribution and consumption of data and services through APIs.	Developers	MashApe	Third-Party APIs	The open-source API Gateway (1) RESTful interface (2) Plugin Oriented (3) Platform Agnostic (4) Simple Scaling  The Analytics Platform for APIs, Microservices and Serverless Software.
 Akana API Economy Platform (United States)	The Akana Platform provides an end-to-end API Management solution for designing, implementing, securing, managing, monitoring, and publishing APIs. It is available as a SaaS platform, on-premises, and as a hybrid deployment.	The world's largest companies including Bank of America, Pfizer, and Verizon use Akana products to harness the power of their technology and transform their businesses.	Akana is a privately held company backed by leading investors including: (1) Redpoint Ventures (2) Draper Fisher Jurvetson (3) Palisades Ventures (4) Paladin Capital Group (5) Navigation Capital Partners	Akana APIs	The Akana (formerly SOA Software) API Gateway solution streamlines management, deployment, development and operation of APIs, enhancing security and regulatory compliance through authentication, authorisation and audit capabilities. (1) Authentication and Authorisation (2) Message Security (3) Threat Protection (4) Orchestration, Mediation and Transformation (5) Analytics and Monitoring (6) Unified API and SOA (REST/XML, REST/JSON and SOAP)
 Sandbox (United States)	A software deployment platform that empowers regional banks and credit unions to quickly and safely try new software from third party developers often startups. The product solves data security and legacy system integration problems that currently cripple a financial institution's (FI) ability to work with unproven vendors.	Developers, Banks and Credit Unions	For-profit company	banking APIs	For developers: (1) Build software using standardised, RESTful banking APIs (2) Add configuration and wrap services in Docker (3) Use the CLI to upload new releases of software to the catalog (4) Bank employees install the software against data sources they select  For Banks & Credit Unions: (1) Pick a vendor or bring your own (2) Sandbox connects to your systems quickly (3) Safely try out software throughout your organisation without burdening IT (4) Once you're happy, deploy to production with confidence
 TESOBÉ Open Bank Project (Germany)	Banks can start using Open Bank Project (OBP) in sandbox mode for innovation programs or proof of concepts (POCs) with startups and then quickly transition to a production configuration in which OBP interacts with the core banking systems of the bank.	FinTechs, Banks, Individual developers	For-profit company	130+ RESTful APIs covering transaction history, payments, entitlements and metadata.	Built on a secure, enterprise ready technology stack that supports secure Internet protocols such as OAuth
 GOV.UK Verify Sandbox (United Kingdom)	The Verify Sandbox Environment will enable interested parties test how their services would incorporate digital identities that meet GOV.UK Verify standards. It allows these interested parties to consider the operational and technical implications of adopting Verify through a test infrastructure so as to inform their business cases and roadmaps for adoption.	Any organisation that wants to test and learn about Verify can do so by engaging with a self-certified hub provider.	UK Government Initiative	The Identity Providers will enable a credential Authentication and the return of the matching data set.	Where the Hub Provider offers the OpenID Connect protocol it is best practice to align with the self-certification requirements defined by the OpenID Foundation defined via the OIXnet website.

# ANNEX 5: BEST PRACTICES FROM LIFE SCIENCES: THE PISTOIA ALLIANCE

by Rob Gill, HCL

The Pistoia Alliance is a non-profit membership association set up to solve shared challenges in life science R&D by means of pre-competitive collaboration. Data analysis and management software, data format and communication standards, and information management best practices were all identified as areas where significant efficiencies could be achieved without affecting competitive advantage. Solutions generated are released free of charge and without restriction for the benefit of the whole life science industry. Pharmaceutical company members are able to achieve early wins by supporting projects that directly meet their requirements, while technology vendor members are able to demonstrate their expertise and goodwill while gaining an improved understanding of their customer's needs that can develop into new product opportunities.

Tiered annual membership fees cover the running costs of the organisation and also contribute towards the development of business cases for potential projects. Projects are funded separately with dedicated fundraising from members, and only members may volunteer their staff to participate in a project. The membership is diverse and includes pharmaceutical companies, academic research groups, technology vendors, publishers, and SMEs. Most of the world's largest pharmaceutical companies are involved. Tightly defined policies set out the rules by which conflict of interest, intellectual property, and monopoly issues are managed, and all members are bound to follow them at all times while working on a Pistoia Alliance project.

Newly proposed project ideas are socialised among key member contacts with only the best taken forward for development of a business case. Once the business case is written and has attracted sufficient funds to proceed, a paid project manager is appointed, overseen by a steering committee with one volunteer representative from each funding organisation. The committee defines the project's priorities while also bearing in mind the needs of the wider community. The remainder of the project team, tasked with actually delivering the work, are volunteers from Pistoia Alliance member organisations. All work is monitored by the Pistoia Alliance operations team which in turn reports to an elected board of directors. A separate advisory board provides guidance on strategy

A recent successful Pistoia Alliance project has been Ontologies Mapping. Life science research is a distributed task, with pharmaceutical companies simultaneously consuming publicly available academic output, contracting out routine experiments, and privately generating commercially sensitive data within

their own four walls. Each of these flows of information must be combined and analysed to produce the results necessary to progress candidate drugs through the pipeline, to verify their safety and efficacy, and ultimately gain confirmation from the regulatory authorities that the product can be launched to market.

Combining these data sources effectively requires an understanding of what data is represented and what the values mean, both of which can be facilitated by the use of dictionaries of controlled vocabularies, also known as ontologies. When data moves between organisations, the ontologies used in that data must be shared and translations made to facilitate linking of data. These translations, or mappings, must be continuously maintained over time as the underlying ontologies evolve. Any organisation using a private ontology not known to others must produce its own mappings for internal use. Publishers of academic data using obscure ontologies also benefit from providing mappings to established standards that make their resources accessible to a wider range of users.

The Pistoia Alliance set up the Ontologies Mapping project to establish best practice and a common toolset to enable organisations to create and maintain these mappings, replacing what was previously an ad-hoc and time-consuming process that varied significantly from one organisation to the next. Over 100 individuals signed up for the kick-off meeting, and almost 400 for the most recent project webinar, clearly demonstrating the high level of interest and engagement that this project has generated across the industry.

# ANNEX 5: BEST PRACTICES FROM FINANCIAL SERVICES: FINTECH SANDBOX

by **Jean Donnelly, Executive Director, FinTech Sandbox**

## The Basics

The financial services industry relies to a great extent on FinTech startups to tackle difficult technological challenges, create new paradigms, and drive innovation. But FinTech entrepreneurs have a unique problem, which is the high cost of data they need to build applications. FinTech Sandbox is a Boston-based nonprofit fostering innovation by providing free, streamlined access to critical data and resources to FinTech entrepreneurs and startups around the globe. Since 2015, we have worked with startups, data providers, and financial institutions to accelerate product development for financial services.

By having a Sandbox where startups can iterate on their product, significant advances can be made. The goals of the FinTech Sandbox are to:

- Provide a functional leg-up for FinTech entrepreneurs
- Foster a GLOBAL collaborative FinTech community
- Make an enduring impact on the state of FinTech data and API access

"As FinTech entrepreneurs and investors we started FinTech Sandbox because we saw that access to data was a large barrier to innovation. By providing free data and infrastructure for FinTech entrepreneurs, we can fuel the development of important new technologies to the benefit of the entire industry."

- David Jegen, co-founder of the FinTech Sandbox

For the Startups – The FinTech Sandbox provides access to premium data sets to advance product development, interactions with financial institutions and investors who can help guide product development, as well as participation in events to enable proof of concept engagements with financial institutions.

"Data – especially financial data – is expensive, and obtaining it can prove prohibitive to fintech startups. Our partnership with FinTech Sandbox allowed us to access the level of data we needed and determine what information was truly beneficial to what we were trying to achieve..."

- James Isilay, co-founder of Cognism, FinTech Sandbox alumnus

For the Data Partners – By providing access to their data sets, data partners are front row to the next generation of products being developed and to get feedback on their existing data sets and APIs for development

"Today's innovations happen through ecosystems and communities..."

- Ranjit Tinaikar, former MD Thomson Reuters

For the Financial Institutions – By providing sponsorship and feedback, corporations can gain early access to new and innovative technologies, collaboration with a smart community, and participation in events promoting advancement of FinTech.

"Getting the right introduction to the right people within these institutions – can be challenging for small firms. FinTech Sandbox makes that happen for its members. That is huge."

- Charles Pardue, CEO of Prophis Technology, FinTech Sandbox alumnus

Since launching in March of 2015, FinTech Sandbox has partnered with 32 data partners, 62 startups and worked directly with eight financial sponsors as well as countless event sponsors. We have facilitated over 300 conversations with partners and potential customers to advance the goals of the startups we work with.

## The Opportunity

In 2017, we are seeing more financial institutions, technology and consulting firms, and accelerators looking to advance the Sandbox concept to create the full infrastructure to allow institutions to have "innovation technology stacks" where they can plug and play different new applications and get a better understanding of the impact on their architecture and integrations. This also allows greater integration testing for the startups, as well as ability to invite expanded stakeholders, including regulators and end customers, to participate.

Innovate Finance and partners have pulled together a detailed blueprint of how to move forward the concept of the FinTech Sandbox to a more developed model that can further benefit multiple stakeholders groups.

# ANNEX 6: BBA RESPONSE TO CALL FOR INPUT



The voice of banking

A response by the British Bankers' Association to Innovate Finance's call for input on their blueprint for an industry sandbox

March 10, 2017

The BBA welcomes the opportunity to respond on behalf of its members to Innovate Finance's (IF) call for input on its blueprint for an 'industry sandbox' (IndS). The BBA is the leading trade association for the UK banking sector with 200 member banks headquartered in over 50 countries with operations in 180 jurisdictions worldwide. Eighty per cent of global systemically important banks are members of the BBA. As the representative of the world's largest international banking cluster the BBA is the voice of UK banking.

The BBA's members have participated, both individually and at industry level, throughout IF's consultation programme to determine the feasibility of an IndS. We welcome the opportunity to support the growth of the UK's FinTech sector and note that any models which encourage increased competition and technology innovation ultimately benefit our customers. Further, there has been a significant shift in the last 24 months towards increased levels of cooperation between established banks and technology start-ups, some of which are part of IF's membership. We consider this a positive development for our customers, the strength of the banking sector and ultimately for the UK as a leading centre of technology and financial services.

We welcome the opportunity to comment on the draft blueprint and we acknowledge the significant progress IF have made over the past months on the thinking around the IndS. Having reviewed the draft blueprint, the BBA's members would like to raise several points with an eye toward shaping a design for the IndS that would most encourage participation on behalf of UK banks. These are given below and we welcome any further discussion that IF or the FCA would like to engage in on these topics.

## Key Points:

- Importance of voluntary participation
- Avoidance of duplication with ongoing data-related initiatives
- The need for further clarity of funding requirements and other requirements
- The role of the regulator

## Overarching Comments

### Importance of voluntary participation:

There are a number of initiatives under way in the UK to support the growth of financial technology and the many start-ups active in that field. These include not only government and regulator-led initiatives like the FCA's Regulatory Sandbox and the new cyber security retraining academy, but also several industry and firm specific accelerators. It was thus clear to the BBA's members that in order to be successful in the long term the IndS would need to be a market-led solution with participation and funding achieved on a strictly voluntary basis.

We are pleased to see that this principle has been built into the design of the IndS, as it remains important for any initiative to respect firms' existing authorities and capabilities to test and innovate. Furthermore, the appetite of firms varies based on several internal factors

including the status of their existing work on innovation, the location of their research facilities and the funding allocated to testing activities. These factors of course change with time and thus we anticipate a varying level of participation amongst member banks.

The IndS is likely to achieve the highest level of participation if it focuses on adding value beyond what can be achieved by in-house or existing industry-led accelerators and regulatory sandboxes. The involvement of the regulator, subject to the specific details, could be a key differentiator in this area, as could the focus on industry wide ('wicked') problems.

#### Avoidance of duplication with ongoing data-related initiatives:

As IF is well aware, there are a number of ongoing initiatives related to the use of bank held data. These include the CMA's Open Banking remedies and the Nesta Sandbox, but must also include the forthcoming Second Payments Services Directive (PSD2). As a result there is significant change and fluctuation in the market to which it would be unwise to add.

It is positive that this is acknowledged in the draft blueprint and we believe the IndS will best serve the market (at least in its initial years) by looking to complement or add value in other areas apart from these existing pieces of work. To that end, where necessary we encourage the use of synthetic and publically available market data as an initial case for the IndS. The use of customer data, even in an anonymised format would be prohibitively difficult and costly to include in the early form of the IndS. The BBA's members further agree with the blueprint in its assessment that the use of live transaction data would require significant governance, security and compliance requirements which we believe would exceed the early market viability for the IndS in terms of cost.

Where our members do see potential is in the role of the IndS as a facilitator of experimentation between large institutions and start-ups or between multiple firms addressing a shared problem. Such collaboration can be frustrated by the contractual and legal questions surrounding shared work such as IP or, often, data protection/sharing concerns. The establishment of a forum to address these issues, or even the establishment of a venue for engaging in such questions, could benefit innovation in the industry overall. However, any solution would have to be agreed by as wide a group of established firms as possible in order to be successful in facilitating collaboration. In providing such a resource the IndS could add value above other ongoing initiatives without creating duplication.

#### The need for further clarity of funding requirements and other arrangements:

The blueprint usefully sets out a three tiered model describing low, mid and high-cost solutions. The view of the BBA's members is that in the short term, a low-cost, low-impact model is the most appropriate starting point. We expect the priorities of industry to change rapidly as the rate of technology adoption and experimentation increases in the coming years. Thus, if continuing to adhere to the market-led principle, the focus of the IndS may need to adapt as well. It will be most able to do this if the IndS does not commit itself to a costly and high commitment goal from the outset while still trying to work through the normal difficulties incumbent to any new initiative.

The BBA's members further agree with the categories of participation set out in the draft blueprint and the corresponding funding models outlined on page 19 of the blueprint. We do recognise the difficulty in setting details in regards to funding from an early stage in a project, nevertheless, we find it difficult to answer IF's questions regarding participation without understanding more exactly the costs involved.

One important consideration is the source of this funding within the industry. In the case of the BBA's members, funding for participation will come from existing innovation budgets.

This means that resources for the IndS are only justifiable to the extent that they add value beyond what could be achieved through increased funding to existing accelerators/incubators or through in-house testing. Understanding the source of the funds may also provide some idea of the actual figures involved and allow IF to set some bounds for the funding that might be available should an individual firm choose to participate in the IndS on whatever agreed basis.

In addition to funding arrangements, further clarity is required on the specific design of the IndS. Without this, it remains difficult to answer many of the specific questions. For example, IF are right to note that IndS governance principles, amongst other things, are a key design consideration and that any IndS would need robust governance requirements. However, it is the view of the BBA's members that IF do not propose specific governance principles in sufficient detail to consider what, if any, industry problems would be suitable for the IndS.

We recognise the circular nature of providing further details, but encourage IF to consider the following questions as they finalise the plans for the IndS:

- Regardless of choosing a low, mid or high-impact solution, what core team is required to run and manage the IndS day to day?
- For the three high-level models outlined in the Blueprint, can IF articulate the cost and work involved in bringing each use case to life and the support needed to manage it? We believe this may drive out the support model and expertise needed in the sandbox team or wider professional supports.
- If this is a pay as you go/engage commercial model, what volume of cases is required, and at what run rate, to support the core team and manage the IndS?
- In order to facilitate debate and understanding, can you articulate further the assumptions being made for decision and costing?

#### The role of the regulator:

IF correctly identifies the potential for the IndS to serve as a place for an exchange of information related to new technologies under development or consideration and as a way to provide engagement early in a product lifecycle. These would be helpful developments in the effort to industrialise the process of technology adoption in financial services. However, our members are also clear that this should not be the sole source of education and information exchange between the regulator and industry.

#### **Specific Questions**

Many of the specific questions posed by IF in their call for input cannot be answered from the point of view of the industry as a whole, however, in those instances where an industry wide response is possible the BBA has provided the view of its membership.

#### Question 3: From your practice, what are "wicked industry problems" that would lend themselves well to an Industry Sandbox, if any.

There are a number of recognised industry problems, some of which are already being addressed (e.g. blockchain standards) and some that remain to be considered (e.g. the AML use case for blockchain). Unfortunately, without further detail on the IndS itself it is difficult to determine the extent to which the IndS could be a useful mechanism for solving such issues.

#### Question 4: Do you see a role for the Industry Sandbox in the development of RegTech solutions, specifically? Please elaborate.

Question 9: Overall, which principles are essential and which aspirational for the initial launch of an Industry Sandbox?

Of the design principles given (p.13f), the industry considers seven to be imperative:

- Engaging the regulator
- Voluntary
- Neutral
- Secure
- Additive
- Economically viable
- Self-sustainable

The reasons for this have largely been given in our overarching comments and can be summarised as a market-led approach. However, it is worth emphasising that although we believe the role and outputs of an IndS may change over time the above principles will need to remain throughout in order for the IndS to be responsive to the market and maintain its relevance.

Question 20: What barriers to innovation would such regulatory involvement help address?

The market has witnessed acceleration in the exploration and adoption of new technologies in financial services. As a result, the regulatory environment is facing unforeseen challenges and, in order to respond appropriately from a supervisory/regulatory perspective, it will be important for supervisors to have the right expertise. UK policymakers have taken a number of steps that, amongst other things, will ensure increased levels of supervisory expertise; however, we expect that there will continue to be a lag between the pace of innovation and the pace of regulatory reaction. This is understandable, but in order for the UK to remain a hub of innovation in the technology and financial services sector it is essential that the industry and regulators work together to mitigate any possible gaps in understanding.

To that end, regulatory involvement in the IndS could help to increase the pace of innovation by providing an additional channel for an exchange of information between the regulators and industry. However, it is important to emphasise that broad exposure to the market is necessary if regulators are to understand the wide array of technology developments impacting the industry and therefore no single channel will be sufficient in achieving this.

# ANNEX 7: WHAT ARE INDUSTRY SANDBOX DESIGN SESSIONS?

by Charlie King, Director, Innovation Arts

## The challenge of open collaboration

Innovation Arts worked with Innovate Finance in their roles as chairs of the Industry Sandbox Consultation.

The ambition of the Consultation team was that the consultation process should be open, innovative, collaborative and accelerated. The FinTech sector, however, is evolving rapidly and has many different types of player, many of whom compete with each other. How, then, could we bring together a sufficiently broad representation of the industry, and have them collaborate and converge effectively within a tight timeframe?

Creating the optimal conditions for a diverse group of contributors to align on a complex organisational challenge is precisely the role of Innovation Arts, a globally-recognised hybrid strategy consultancy and design agency.

Using a 'Design Thinking' based approach, Innovation Arts facilitated a core group of sponsors through the co-design and delivery of a series of collaborative working sessions in which wider groups of industry representatives were able to converge rapidly on the requisite components and principles of an industry sandbox.

## Design Thinking

Simply put, Design Thinking is the application of the principles of design (that one might associate with product design, media design, or architecture) to a broader context, such as a business strategy or an industry-wide consultation on an innovative concept.

By applying principles like divergence, modelling, iteration, prototyping, and convergence, the outcomes of these working sessions were made robust and representative, and were arrived at more rapidly than by more conventional means.

Instead of trying to tackle the objective of building a blueprint for an Industry Sandbox right from the outset, Innovation Arts takes participants through a phased non-linear approach which builds to a shared, aligned and resilient outcome.

In 'Framing', the context and principles of the challenge are understood, as well as the participants' own divergent viewpoints and priorities. Through 'Architecting', these elements of raw material are tested and worked in various ways to generate models and prototypes which are, in turn, challenged and iterated. In 'Building', the elements and principles of a shared proposal are converged upon and assembled into a product that is ready to ship from the point of view of all of its co-creators. Finally, in 'Using', this final build is once again challenged by its stakeholders to test its

robustness: either it is ready to deploy, or it should return to the (re) Framing stage.

## Working Sessions

Innovation Arts facilitated industry representatives through a series of Working Sessions, along the normal consultation timeline, to arrive at an agreed Sandbox Blueprint that integrated the viewpoints and motivations of the widest possible industry representation.

On 5th May 2016, a core team from the Innovate Finance, The FCA, Hogan Lovells, and TISA defined the guiding principles and ambitions for the consultation process.

From this session, we identified a core set of design 'sponsors' to co-design a working session to be held in November.

On 22nd November 2016, we brought together 40 representatives from across the industry, to consider the working hypotheses emerging from the consultation to date, and to converge on the key elements of an Industry Sandbox; what it should do, and what components it should have.

On 12th January 2017, 19 stakeholders from across the industry took the elements emerging from the 22nd November session and iterated them to arrive at descriptions of feasible types of Sandbox, from 'Minimum Viable Product' to 'Ultimate Aspirational Product', together with requisite governance and funding frameworks.

## Overall approach

By taking this approach of integrating collaborative working sessions into the traditional consultation process, we were able to conserve the rigour of the consultation, while accelerating the process, and maximising the depth of collaboration, openness and innovative thinking – despite the complexity of the stakeholder landscape.

# ANNEX 8: COMPANY DESCRIPTIONS

- Sandbox** Sandbox (fka AlphaPack) is building an app-store for banks and credit unions. It helps financial institutions safely evaluate and quickly integrate innovative fintech products. Sandbox's platform provides a standardized banking API for fintech vendors to use across financial institutions and a deployment layer to keep bank data isolated. Sandbox is live in production at US financial institutions and moves real customer money every day. Over 15 fintech vendors are signed up to use the platform and they have raised funding from Y-Combinator and other venture investors.
- Bankable** Bankable is an enabler of innovative, global payment solutions providing "Banking as a Service". Our core virtual account management platform is available in white-label or via APIs enabling any regulated or non-regulated organisation to deploy payment solutions – including virtual account services, e-ledgers, virtual & plastic prepaid card programmes, and e-wallets & light banking solutions. Our client base ranges from global corporates, banks and insurers, to SME's and FinTechs who use our platform to streamline their payments processes and generate new revenue opportunities.
- BBA** The BBA is the leading trade association for the UK banking sector with 200 member banks headquartered in over 50 countries with operations in 180 jurisdictions worldwide.
- Bussmann Advisory** Oliver T. Bussmann has a worldwide reputation and proven track record driving large-scale digital transformation and innovation in both high-tech and financial services. Bussmann Advisory helps C-suite executives and decision makers in global enterprises stay ahead of the digital disruption curve.
- Consult Hyperion** Clients around the world choose us for our combination of domain knowledge, practical experience, innovative thinking, in-house specialist development skills and value for money. We help Project Leaders who have to deliver reliable digital transaction platforms. We help Business Principals who want to explore opportunities for rapid exploitation of transaction infrastructure. We help Product Owners who need to deliver cost-effective digital transaction products and services. We help Innovators seeking to create sustainable digital transaction businesses.
- Factern** The BDI Factern initiative is an online portal empowering SMEs to own their own business data. It provides a single conduit for the provision of data i.e. credit and AML/KYC data between UK businesses and prospective financial service providers. This initiative is market- led, with a common set of data standards for permissioned data.
- FinTech Sandbox** FinTech Sandbox is a Boston-based nonprofit that drives global FinTech innovation and collaboration. FinTech Sandbox's 6-month program provides access to data feeds and APIs from our industry leading data partners, top quality cloud hosting from our infrastructure partners, and much more. No equity. No fees. Simply contribute to the shared learning and collaboration within our community of FinTech professionals. Together we can make enduring contributions to FinTech innovation.
- GOV.UK Verify** GOV.UK Verify is the new way to prove who you are online. It gives safer, simpler and faster access to government services like filing your tax or checking the information on your driving licence. When you use GOV.UK Verify to access a government service, you choose from a list of companies certified to verify your identity. Each certified company has different ways of verifying your identity, and the options are growing all the time.
- MIT Connection Science** The mission of MIT Connection Science is to revolutionize technology-mediated human networks through analysis, prediction, data-driven design, and evaluation. MIT Connection Science is working to unlock the trapped potential of the digital networks that surround us - from social media, to civic infrastructure systems, to enterprise databases that house and protect personal information. With our novel "Living Labs" paradigm for research in the field, MIT Connection Science brings together interdisciplinary experts to develop, deploy, and test - in actual living environments - new technologies and strategies for design.

**NESTA** Nesta is an innovation foundation. We back new ideas to tackle the big challenges of our time. We combine our knowledge, networks, funding and skills to back new ideas that tackle big challenges. We operate across the globe and across sectors (including education, healthcare, the arts, technology, and economic policy), working with others to turn these good ideas into reality.

**Omidyar Network** Omidyar Network invests in entrepreneurs who share a commitment to advancing social good at the pace and scale the world needs today. Omidyar Network focuses on five key areas believed to be the building blocks for prosperous, stable, and open societies: Education, Emerging Tech, Financial Inclusion, Governance & Citizen Engagement, and Property Rights. We take calculated risks in the earliest stages of innovation, helping to transform promising ideas into successful ventures.

**Onfido** Onfido delivers next-generation identity verification, helping businesses verify that their customers are who they claim to be, without the need to meet them face-to-face.

In particular, Onfido specialises in streamlining the KYC & AML process for financial clients. Through intelligent automation and a machine-learning powered Document Check, Onfido's solution helps businesses onboard more customers, increasing revenue and reducing manual overheads.

Onfido works with 1,000 clients globally including GoCardless, Nutmeg, Monzo and Pockit .

**Qumram** Qumram enables every digital interaction – web, social and mobile – to be recorded and replayed (in movie-like form), at any time, providing a complete digital audit trail for banks and financial services organisations, in accordance with key global regulatory requirements (MIFID-II, SEC, FINRA, Department of Labor, and more). In addition to recording incoming Customer digital activity, Qumram is used for employee governance to detect data leakage and mitigate conduct risk. Qumram is the foundation that Risk and Compliance professionals rely on for true digital business compliance. We create a single source of truth, recording indisputable proof of every keystroke, button click or mouse movement. In doing so, Qumram satisfies the regulator, resolves disputes, aids fraud detection and enriches customer experience initiatives that drive revenue growth.

**Sybenetix** Sybenetix is the leading Enterprise Behavioural Analytics company working with hedge funds, banks and asset managers to systematically improve investment performance and conduct management at the individual, team and company-wide level.

**techUK** techUK represents the companies and technologies that are defining today the world that we will live in tomorrow. More than 900 companies are members of techUK. Collectively they employ approximately 700,000 people, about half of all tech sector jobs in the UK. These companies range from leading FTSE 100 companies to new innovative start-ups. The majority of our members are small and medium-sized businesses. techUK is committed to helping its members and the sector.

**TESOBE** With the idea to increase transparency in financial transactions in mind, TESOBE initiated the Open Bank Project (OBP). The OBP aims to create a RESTful API so that banks and their customers can securely and cost effectively adopt Web 2.0, Open Source and 3rd party tools, services and strategies. We are still looking for industry partners, banks and large software companies with banking related products and services are especially welcome.

**TISA** TISA is a growing cross-industry body with over 160 member firms from all areas of UK financial services (Banks, Investment Managers, Life and Pensions Providers, Wealth Managers, Distributors, Online Platforms and Services Providers). Our mission is to develop policy, services and infrastructure that promotes consumer's financial wellbeing and the strength of the nation. We have a strong track record in successfully developing and promoting policy with regulators, government, government bodies and other major industry stakeholders.

**UKAS** The United Kingdom Accreditation Service (UKAS) is the national accreditation body for the United Kingdom, appointed by government, to assess organisations that provide certification, testing, inspection and calibration services. UKAS is a signatory to international accreditation agreements which provide for mutual recognition. This reduces the need for multiple assessments of suppliers, and as a consequence helps to reduce barriers to trade for organisations who have UKAS accreditation.

**500 Startups**

500 Startups is an early-stage venture fund and seed accelerator founded by Dave McClure and Christine Tsai in 2010. The fund admitted a first "class" of twelve startups to its incubator office in Mountain View, California in February, 2011. They expanded to a second class of 21 in June 2011 and a third class of 34 in October 2011. As of August 1, 2015, 500 Startups had invested in over 1,200 companies. Of current investments, more than 20% have participated in other incubators, 20-30% are international, and over 60 have been acquired.

**Fidor**

Fidor is the global digital banking solutions provider behind the success of Fidor Bank. The company's mission is to become the partner of choice when it comes to launching and running a digital bank. Our specialty is digital banking including middleware solutions, customer support, marketing and customer acquisition services in a hosted or cloud environment. We have built Fidor OS, an innovative digital platform using open APIs which enables a digital banking ecosystem for digital brands as well as developers and Fintech who can easily plug into our platform to offer their own financial products.

**UK  
CrowdFunding  
Association**

The UK is a world leader in the creation of new forms of crowdfunding from simple donations and rewards based schemes to fully regulated investments in the businesses and projects that shape our world. The UKCFA represents this diverse and vibrant industry and gives our members a collective voice across government, media, regulators, and most importantly, to the general public. Our members provide the platforms necessary to bring investors and fundraisers together across many industries, providing choice in this ever expanding marketplace. Whether donating or investing, crowdfunding puts people in control of their money and how it is used to affect the world around them, whether for financial return or out of a desire to make a difference for the wider good.

**Augmentum**

Augmentum Capital was formed in London in 2009 by Tim Levene and Richard Matthews. Its first fund, Augmentum I LP, is backed solely by RIT Capital Partners Plc, the FTSE listed investment trust in which Jacob Rothschild and family are substantial investors. We are always actively involved with our portfolio companies without getting in the way of our management teams in the day-to-day running of their businesses. Having been on the other side of the fence we understand the fine line between investor help and hindrance and strive to never cross it.

# ANNEX 9: GLOSSARY

**AI** means artificial intelligence;

**API** means application programming interface;

**ATM** means automated teller machine;

**CMA** means the Competition and Markets Authority;

**EU** means the European Union;

**FCA** means the Financial Conduct Authority;

**FSMA** means the Financial Services and Markets Act 2000;

**GNU Project** means a mass-software, mass-collaboration project begun on 27 September 1983 at MIT;

**Hosting Environment** means the industry-wide consultation led by Innovate Finance on the demand for, and viability of, and industry led sandbox being established in the UK;

**Industry Sandbox Consultation Team** means the team running the Industry Sandbox Consultation;

**Open Innovation** means combining internal and external ideas and paths to market to advance the development of new technologies;

**Open Source** means a decentralised development model that encourages open collaboration;

**PSD II** means the Revised Directive on Payment Services passed by the European Union on 16 November 2015;

**Regulatory Sandbox** means the sandbox led by the FCA which allows businesses to test innovative products, services, business models and delivery mechanisms in a live environment;

**Regulatory Sandbox Consultation** means the report published by the FCA in November 2015 relating to implementing the Regulatory Sandbox;

**SIM** means a sim card used in mobile devices; and

**SME** means small and medium sized enterprises.

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