



the sandbox is in a use acceptance testing (UAT) environment.

- 3 A sandbox could also make partnerships between investors and start-up companies easier.

So, Fintech sandbox is necessary for all Fintech start-ups and companies before launching financial products and services.

There are many approaches to develop Sandbox in banking system. The three main ways for banks to master the sandbox approaches are as discussed below.

### 1.1 Business design

Since a sandbox designed in a way that encapsulates the business logic and data necessary, it represents multiple banking functions such as APIs, products, services and transaction flows. This will help developers to achieve a more comprehensive view of the bank. Data on all critical banking functions should be in a sandbox to ensure coverage and equal innovation opportunities across all lines of business. In this part, we show some key APIs that banks should offer: User creation and validation, Virtual account creation, Test data creation, Trade and treasury services, etc.

### 1.2 Easy access

One of the key features of a sandbox is easy accessibility. This is related to physical space or virtual cloud presence to ensure that location limitations can be overcome. In fact, companies of all sizes should access to related industry sandbox easily. It contains virtual users and transactional capabilities which are similar to the production system in all aspects.

### 1.3 Collaboration

A Sandbox provides developers with the necessary tools to create and share codes and should be conducive to a collaborative environment. Developing a forum to discuss relevant topics or enabling digital hang-outs to overcome regional constraints could be some ways to do it. Through tutoring services, developers can create a truly customized solution, and it could be called Capabilities.

## 2 The sandbox ecosystem in 5 countries

Fintech changes traditional financial services in a new form by using technology (Chen and et al., 2016). So, the market size of fintech is growing rapidly all over the world. Fintech industry has different areas such as payment, billing, lending, wealth management, money transfer, mortgage, and real estate to insurance, personal finance (The Economist, 2015 Finextra, 2019, Vives, 2017). Since the 2008 financial crisis, governments have been writing rigorous regulations for protecting consumers and maintaining sustainability in the market (Magnuson, 2018).

UK is the first country that has introduced a fintech regulatory sandbox. So, UK's guidelines of a regulatory sandbox were recognized as a basic role model in most countries. For instance, in 2016 Hong Kong introduced the regulatory sandbox to its financial sector. Financial institutions, organizations and startups working with or without fintech firms were allowed to participate in this ecosystem. Moreover, Securities and Futures Commissions (SFC) have the authority to attach accreditation conditions to minimize the risks that investors may incur during the testing period (SFC, 2019, CBInsights, 2019). In 2019, 48 new technology products or services have been allowed in the regulatory sandbox and 32 pilot trials have been completed, and the products have

subsequently been rolled out (Jones, 2018).

Classification	Continent	Countries
Introduced countries	North America	Canada
		Denmark
		UK
	Europe	The Netherlands
		Norway
		Switzerland
		Brunei
		Hong Kong
		Japan
	Asia	India
		Malaysia
		Singapore
		Taiwan
		South Korea
		Thailand
Abu Dhabi		
Middle East	Bahrain	
	Dubai	
Oceania	Australia	
	Africa	Sierra Leone
Proposed countries	North America	USA
		Ireland
	Europe	Spain
		Indonesia
	Asia	

Figure 2. The countries introduced and proposed the regulatory sandbox (2019), Source: SFC: Hong Kong, China

In this part the detailed features of each 5 country's regulatory sandbox are explained:

- 1 UK: As we mentioned, UK is the first country that has introduced a fintech regulatory sandbox. In this country, Organization in charge is FCA (Financial Conduct Authority), and the Sandbox targets are Finance/IT companies & Fintech companies. Also, the Sandbox features are:
  - Testing period in the regulatory sandbox: 3–6 months.
  - FCA seeks to provide the applicants with five advantages: the ability to test products and services in a controlled environment, reduced time-to-market at potentially lower cost, support in identifying appropriate consumer protection, safeguards to build into new products and services, and better access to finance.
- 2 Hong Kong: In this country, Organization in charge is HKMA (Hong Kong Monetary Authority), and the Sandbox target is banking industry. Also, the Sandbox features are:
  - Testing period in the regulatory sandbox: case-specific decisions. They do not clearly specify which regulations can be relaxed or exempted, and the level of deregulations is being set flexibly according to the circumstances of companies.
- 3 Singapore: In this country, Organization in charge is HKMA (Hong Kong Monetary Authority), and the Sandbox target is banking industry. Also, the Sandbox features are:
  - Testing period in regulatory sandbox: case-specific decisions. The purposes of the regulatory sandboxes are a. increase efficiency; b. manage risks better; c. create new opportunities; or d. improve people's lives.
- 4 Australia: In this country, Organization in charge is ASIC (Australian Securities and Investment Commission), and the Sandbox targets are Fintech companies. Also, the Sandbox features are:
  - Testing period in the regulatory sandbox: 6–12 months. The number of investors and Investment amounts are limited.

5 India: In this country, Organization in charge is RBI (Reserve Bank of India), and the Sandbox targets are FinTech companies including startups, banks, financial institutions, and any other company partnering with or providing support to financial services businesses. Also, the Sandbox features are:

- Testing period in the regulatory sandbox: case-specific decisions. Time and degree of deregulation are determined and applied on a case-by-case basis (Goo and et al., 2020).

### 3 The sandbox ecosystem in Iran

In the recent years, some Middle East countries such as Kuwait, Bahrain and UAE find an appropriate Sandbox approach. In 2019, a guideline for using an integrated ecosystem management system and innovative business in cyberspace was approved. This document was published in 2020 and 10 plans for this field was set. A sandbox for stock market is one of the most important plans that it was implemented in June 2021. There are some Sandbox projects in Iran in different organizations such as Central Bank of Iran, Iran Fara Bourse and Ministry of Economy. Central bank of Iran is responsible for monetary section in Iran, and Shaparak Company has responsibility for technical issues in this field. Based on Center of Information Technology and Intelligent Economy Development, It will be launched during 2021. So, this year could be a very important time for launching Sandbox ecosystem in Iran.

### 4 Conclusion

It is clear that, regulatory sandboxes had positive effects on venture investment, and risk factors in fintech industry. Since there are many countries that have launch Sandbax ecosystem, it is possible to use their guidelines for other countries. When we compare this ecosystem with other countries (5 countries in this article), we can find some problems for Iran. The main problem is that in other countries the as UK the organization in charge and Sandbox targets are clear. However, we cannot find this structure in Iran. For instance, in UK, Organization in charge is FCA (Financial Conduct Authority), and the Sandbox targets are Finance/IT companies & Fintech companies. Also, the second ambiguity is Sandbox features in Iran. Since there are 3 separate sections in this field in Iran, we can find a comprehensive policy and features for Sandbox ecosystem in Iran. However, Iran started it recently and it will be improved in the future.

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