



U-BOX

Concept Note by

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What is a Sandbox?

The concept of a Sandbox was introduced in 2015 by the Financial Conduct Authority (FCA), UK as a mechanism to allow FinTech businesses 'to test innovative propositions in the market, with real consumers.' While the sandbox model of UK has been adopted by several other countries, the context has remained the regulatory and compliance aspects of FinTech products and solutions.

The concept of sandbox evolved out of the practices in the software development field requiring a testing environment that isolates untested code changes from the production environment. Since it has been adapted to the area of financial regulation, it is viewed as mostly as a Regulatory Sandbox, and its functionality is limited by such a context-specific view. A few countries like Korea and India have diversified the concept to other sectors such as healthcare, insurance, and mobility.

RBI, IRDA and NDHM have established sandbox environment in India.

Why Sandbox?

A conventional sandbox brings the following benefits.

- a. It promotes innovation by enabling the entrepreneurs
 - to test products and services in a controlled environment
 - to achieve reduced time-to-market at potentially lower cost
 - to identify appropriate consumer protection safeguards to build into new products and services.
 - to access finance and/ or attract funding.
- b. It benefits the citizens by making innovative services at competitive prices and quality.
- c. It spurs the economy through creation of new business opportunities.

In circumstances where it is less clear whether an innovation complies with legal and regulatory requirements, entrepreneurs and start-ups may err on the side of caution and choose not to implement it. This outcome is undesirable as promising innovations may be stifled and this may result in missed opportunities. A sandbox resolves this dilemma precisely.

The concept of sandbox is highly essential in the urban development context as '*smart cities revolve around initiatives that use digital innovation to make urban service delivery more efficient and thereby increase the overall competitiveness of a community.*'[OECD].

Since the concept of sandbox was introduced, much has changed in terms of the opportunities offered by technologies, new business models and the regulatory environment. **It is therefore necessary to redefine the functions of the sandbox and redesign the same.**

U-Box

A multi-functional sandbox -**U-Box**- is proposed to be established for serving the innovation needs of the urban development sector in an integrated manner. U-Box builds upon and expands the scope of the conventional 'regulatory sandbox', by adding to it the dimensions of digital technologies, emerging technologies, business models, proof-of-value, and regulated access to production data. The

federated nature of the subject of urban development and the roles of the central and state governments, and urban local bodies would be factored into the model to ensure its sustainability. In essence, U-Box would act as the one-stop-shop and offer **Innovation-Support-as-a-Service** for the entire urban development sector.

U-Box Vision

'U-Box shall catalyze innovation through an environment that enables entrepreneurs to test their solutions in urban development space comprehensively in near-real world operational environment.'

U-Box Functions

U-Box shall comprise of a state-of-the-art technological and institutional environment and shall perform such functions as are necessary to enable the processes described below.

- a. **Testing of Digital Technologies:** The developers can test their solutions from the perspectives of functionality, performance, security, usability, user experience and error handling by accessing runtime data of a predefined nature and size.
- b. **Testing of Emerging Technologies:** The developers can establish that their solutions, algorithms, and devices conform to the specified norms of transparency and ethics, besides performance.
- c. **Conformance to Regulations:** The agencies of the government/ ULBs can satisfy themselves that the solutions, algorithms, and devices conform to the extant regulations, and that they comply with the principles of '**Security-by-Design**' and '**Privacy-by-Design**'.
- d. **Proof-of-Value:** The value proposition of the solutions would be validated and estimated qualitatively and quantitatively, following a set of guidelines that include user/customer feedback and observation over a defined period. The process also includes deriving an assurance that the value proposed is unique and not already being provided by other solutions, or that the value can be created in a more cost-effective manner.
- e. **Business Viability:** A business appraisal of the solution/ product would be carried out to assure that it is affordable by the intended users and that it has a long-term demand. The feasibility of a revenue sharing arrangement with the concerned government agency would also be explored as part of this function.

U-Box shall be designed to meet the above requirements and have the needed capabilities.

Unlocking Value in Phases

Sandbox environment in the form of U-Box can not be established with the entire functionality at once. Moreover, the entity managing the U-Box cannot throw it open to all the functional areas of urban development at the same time. An observed good practice is to notify various thematic areas of urban sector, preferably one at a time and invite applicants intending to enter the sandbox. The advantages of such a phased implementation are obvious. UK, the pioneer in the practice of sandbox, has notified 7 thematic areas, called Cohorts, over the last 5 years. RBI has announced its second cohort, namely, 'Cross-border payments'(2020), following the initial one on 'Retail Payments'(2019).

It is suggested that a stakeholder consultation may be conducted by the Ministry to identify and prioritize the themes for notifying the cohorts.

Establishing U-Box

Establishing the sandbox environment for the urban development sector involves planning, architecture, and a coordinated implementation. The following key tasks are particularly important.

a. **Eligibility, Entry, Exit and Termination Processes:** The rules of engagement specify the eligibility, entry, exit and termination processes.

Besides the pre-qualification criteria on minimum standing and turnover, the following considerations should weigh with the criteria for entry of an applicant to the sandbox:

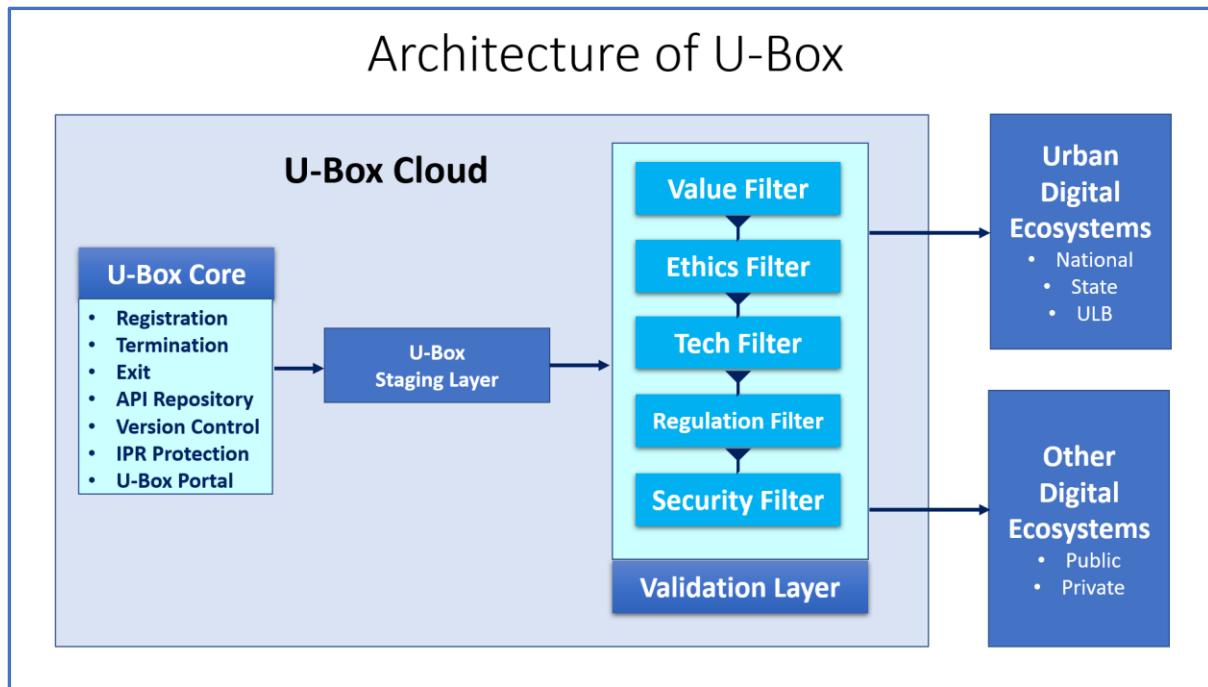
- i. The proposed innovation includes new or emerging technology or uses existing technology in an innovative way. Secondary research should show that few or no comparable offerings are available in the domestic market.
- ii. The proposed financial service addresses a problem or brings benefits to consumers or the industry. For example, these could be supported by evidence from relevant consumer or industry research.
- iii. The applicant has the intention and ability to deploy the proposed service.

The criteria for exit and termination could include the following:

- i. U-Box Authority is not satisfied that the sandbox has achieved its intended purpose, based on the latest test scenarios, expected outcomes and schedule mutually agreed with the entrepreneur.
- ii. The entrepreneur is unable to fully comply with the relevant legal and regulatory requirements at the end of the sandbox period.
- iii. A flaw has been discovered in the service under experimentation where the risks posed to customers or the system outweigh the benefits of the service under experimentation, and the entrepreneur acknowledges that the flaw cannot be resolved within the duration of the sandbox.
- iv. U-Box Authority may terminate the experimentation due to reasons such as the entrepreneur breaching any condition imposed for the duration of the sandbox; or has informed of its decision to exit the sandbox at its own discretion.

b. **SLA's:** The U-Box Authority shall establish transparent processes for entry of applicants, the testing and certification of products and solutions and prescribe the period for each phase of the process. This is to ensure that all products and solutions receive equal treatment at the U-Box, and to avoid arbitrariness in dealing with innovative ideas. More importantly, strict adherence to the SLAs would enhance the **Ease-of-Doing-Innovation**.

c. **U-Box Architecture:** Designing a full-fledged architecture for the U-Box involves a consultative process to be undertaken with the assistance of domain and technology experts. However, a high-level functional architecture of the proposed U-Box is provided here. The salient features of the architecture are outlined in what follows.



- i. The **U-Box Core** consists of a Portal that provides services to the applicants and other stakeholders. It also contains a repository of APIs to be used by the entrepreneurs for developing solutions in the thematic area/ cohort space. The core also contains tools for version control and IPR Protection.
- ii. The solutions offered by the applicants are positioned in the **staging area** with controlled access to authorized personnel of the applicant/ entrepreneur or of the U-Box Authority.
- iii. The key value of the U-Box is provided in the **validation layer**, which consists of a few 'filters' to be applied to each solution. The filters are not necessarily technology components. For instance, the Value Filter, Ethics Filter and Regulation Filter could be empowered committees that scrutinize the features, processes, outputs and outcomes of a solution from the perspectives of Value, Ethics and Regulation as per pre-defined norms and templates.
- iv. Once a solution passes the validations in a single or iterative process, it is allowed to **access** specific datasets and/or interact with specified applications in the Urban Digital Ecosystems or other external digital ecosystems for a pre-defined period for 'field trials'.
- v. **U-Box Guidelines:** It is a good practice to notify a set of guidelines encompassing all the processes, technologies and architecture relating to U-Box, before it is formally launched. This would enhance transparency and ease of doing innovation. Review of the sandbox experiences in other geographies/ domains indicates that despite best intentions, the processes tend to be conservative and tedious, and frustrate the entrepreneurs. It is desirable to develop the guidelines through a multi-stakeholder approach. It would also be appropriate to establish a 'U-Box Promotion & Support Unit' for handholding the start-ups, which are most often tech-savvy but deficient in processes and 'paper work'.

Way Forward

The concept of U-Box and the architecture proposed here may be taken through a consultative process involving the key functionaries and entrepreneurs associated with such sandboxes established in other geographies.