BCA-IMDA
CALL FOR
SUBMISSION -
CONSTRUCTION
DIGITAL PLATFORMS
(CDP)
16 NOVEMBER 2018
AGENDA

• Welcome Note
  Samantha Su
  Director, Built Environment, Sectoral Transformation Group, IMDA

• Sharing on Construction ITM – Integrated Digital Delivery
  Cheng Tai Fatt
  Dy Managing Director, BERII, BCA

• Sharing on Digital Economy and Digital Platform
  Veronica Tan
  Director, Next Generation Platform, Technology & Infrastructure Group, IMDA

• Overview of Call for Submission on Construction Digital Platform
  Ebenezer Thomas
  Asst. Director, Built Environment, Sectoral Transformation Group, IMDA

• Q&A
  BCA & IMDA Panel
IMDA SUPPORTS THE CONSTRUCTION ITM: TO DIGITALISE, BUILD CAPABILITIES, STAY COMPETITIVE & GROW

GOAL

SINGAPORE AS A LEADING DIGITAL ECONOMY WHICH CONTINUALLY REINVENTS ITSELF

STRATEGIC PRIORITIES

ACCELERATE
DIGITALISING INDUSTRIES
Accelerate digitalisation of existing sectors

COMPETE
INTEGRATING ECOSYSTEMS
Grow Singapore’s competitiveness by fostering new ecosystems, enabled by digital

TRANSFORM
INDUSTRIALISING DIGITAL
Developing the next gen digital industry as an engine of growth

ENABLERS

TALENT
RESEARCH & INNOVATION
POLICY, REGULATIONS & STANDARDS
PHYSICAL & DIGITAL INFRASTRUCTURE

Singapore to be among the top digital economies in the world.
One where our sectors will embrace innovation and digital disruption
Identify new growth areas & technologies that are continuously reviewed and stay ahead
INTEGRATED DIGITAL DELIVERY: GREATER DATA INTER-OPERABILITY

- Need to leverage digital solutions to convey relevant, accurate & timely digital information that are inter-operable across the various platforms and segments.

- Must build digital capabilities of construction firms and be better plug into the IDD vision.

- Enhance the process of gathering, exchanging and harnessing data for efficiencies & Innovations.
KEY DELIVERABLES, ASPECTS & OUTCOMES OF CONSTRUCTION DIGITAL PLATFORMS

Deliverables

a) Better gathering & use of data to support integration of at least one aspect of the IDD
b) Enable interoperability of data through established open data formats commonly adopted in the construction industry
c) Enable firms to collaborate & allow innovative solutions and other third party solution providers to plug in through open APIs

Partnership Model

| IT vendors including: Digital platform providers, Technology and/or solution providers, System integrators | Service buyers in the Construction Value Chain like developers, contractors, engineers, manufacturers and FM |

3 Fundamental Aspects of Digital Platforms

1. Integration of Ecosystem
2. Technology Infrastructure including software
3. Use of Data
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CONSTRUCTION ITM

One of 23 ITMs to chart Singapore’s future economy

Part of Built Environment Cluster

Construction Industry is important
- 507,000 contractors and consultants, and 15,300 companies
- 5.8% of Singapore’s GDP and supports BCA to make Singapore safe, high quality, sustainable and friendly place to live in

ITM is a collective effort by Construction Industry stakeholders
- Took more than a year to develop
- Deep involvement by industry associations, companies, unions and various government agencies
3 Key Areas under the Construction ITM

1. Green Buildings
2. Design for Manufacturing and Assembly (DfMA)
3. Integrated Digital Delivery (IDD)
The McKinsey report indicated that the Construction industry has huge potential for digitalization, productivity and growth.
Many digital technologies can be applied along the E&C value chain

Planning

User interfaces & applications
Software platform & control
Digital/physical integration layer
Sensors & equipment

Design & Engineering

Big data & analytics
Simulation & virtual reality
Building Information Modelling (in the cloud)
Ubiquitous connectivity & tracking
Additive manufacturing
3D scanning
Smart constr. equipment & robotics
Unmanned aerial vehicles
Embedded sensors

Construction

Operations

Life-cycle integration

Technology integration

Cyber security

Source: Boston Consulting Group
INTEGRATED DIGITAL DELIVERY

Integrating and Digitalising the Built Environment Value Chain

- Design
- Fabrication
- Construction
- Asset Delivery & Management
Digital Design

Engaging stakeholders to achieve optimised and coordinated design that meets client’s, regulatory and downstream requirements.

Architect: Designs using BIM and computational tools

Engineers: Links BIM to structural analysis and design, MEP and sustainability design

Developer: Experiences Virtual Reality

Contractor & Fabricator: Provide constructability inputs

Digital Design
Digital Fabrication

Translating design to standardised components for automating off-site production

Fabricator: Plans production using digital model

Supervisor: Monitors activities centrally

Fabricator: Delivers Just-in-Time

Fabricator: Coordinates with site and delivers just-in-time

Digital Data & Robotics: Drive machinery and installation

Drives machinery and factory installation
Digital Construction

Just-in-time delivery, installation and monitoring of on-site activities to maximise productivity and minimise rework

Contractor: Plans & sequences activities using coordinated model

Project Manager: Manages project site using drones & IoT

Site Supervisor: Supervises installation using sensors & cameras

Progress monitoring and progress claims
Digital Asset Delivery & Management

Real time monitoring for operations and maintenance to enhance asset values

Contractor: Manages as-built & defects

Building Owner & FM Operator: Monitor building performance

Building Owner: Takes over digital assets
IDD focuses on the integration of all processes and stakeholders throughout the entire project lifecycle, enabled by digital technologies.
**Key Challenges for Construction SMES Towards IDD**

**Challenges**

**Digital Design**
- Design BIM model is often not developed to tender stage
- Regulatory agencies are still building BIM processing capabilities

**Digital Manufacturing & Fabrication**
- Design and construction BIM not directly linked to manufacturing, fabrication and logistics planning and execution
- Opportunities for further automation, use of robotics and 3D printing

**Digital Construction**
- BIM is not fully utilized during construction beyond 3D
- Documentation still very paper-based
- Real-time information not captured and used effectively to guide coordination, execution, and validation

**Digital Asset Delivery and Management**
- Building owners still learning how to link BIM to FM
- Lack of capability and infrastructure to support FM operations digitally

- Digital information are mostly segregated, great need to integrate across the value chain for greater effectiveness
GAPS IN CONSTRUCTION INDUSTRY

Incomplete information shared
Inaccurate information exchanged
Poor timeliness in receiving information

Inefficient Processes & Poor Resource Optimisation

BCA and IMDA jointly to support development of digital platforms to move industry towards IDD
BCA and IMDA aim to provide opportunities for technology providers to collaborate with construction industry practitioners to **develop technology-enabled business model and co-innovate Construction Digital Technologies** that will support a timely, cost effective, productive and high quality project delivery through collaborative working approaches & integrated platforms.

### Scope

- **Horizontal Integration**: aims at providing a digital platform that enable effective integration, collaboration and management of information across the value chain.
- **Inter-Phases Integration**: aims at providing digital platforms that significantly improves the interaction of processes between any 2 or more phases (i.e. between Design and Digital Manufacturing & Fabrication phase).
- **Vertical Integration at each phase**: aims at providing a digital platform that significantly improves the productivity and efficiency of tasks related to that phase (i.e. within the construction phase).

For the various integration, the proposed digital platform must enable interoperability of data across different platforms via established open data formats commonly adopted in the construction industry.
What we are looking for: Innovative and viable solution that would allow seamless information mobility throughout the project life-cycle.

Gaps today:

Information required for manufacturing and fabrication of building components is not adequately addressed by designer/main contractor

Excessive amount of time and manpower to re-model and/or re-input the information when moving from one phase to another

Interconnectivity across different solutions/platforms throughout the project life-cycle

Excessive time and effort to address interoperability issues due to isolated platforms and proprietary file formats and software
Call Challenge Statement for Inter-Phases Integration

What we are looking for: Innovative and viable solution that would enable an effective and efficient information flow between any 2 phases.

Gaps today:

*Digital Design <> Digital Manufacturing & Fabrication*

Inadequate input (or no input at all) from fabricator to designer on the optimal way to fabricate design components which resulted in a less fabrication-friendly design

Slow/delayed in response to Request for Information (RFI) and Request for Approval (RFA) from fabricator to designer
Call Challenge Statement for Inter-Phases Integration

**Digital Manufacturing & Fabrication <> Digital Construction**

Inefficient supply chain process and management due to lack of integration between factory and construction site

Frequent changes on the design requirements from the supply chain participants that often ends up in the disruption on the production line and build-up of unnecessary buffers to deal with uncertain situations

Lack of real time visibility into what resources are needed (at both factory and construction site), the availability of the resources, the location of their resources, and the ability to reschedule those resources accordingly

**Digital Construction <> Digital Asset Delivery & Management**

Excessive amount of time and manpower for as-built verification

Inefficient building commissioning process

Costly, time-consuming, and inefficient project hand-over due to excessive delays and defects
Call Challenge Statement for Vertical Integration

What we are looking for: Innovative solutions to improve processes and facilitating seamless information flow between project parties and platforms.

Gaps today:

*Digital Design*
Excessive amount of time and resources to produce feasibility studies with design options, design development, submission drawings, tender and construction documentations

M&E designer could not catch up with the changes in the architectural/structural design
Call Challenge Statement for Vertical Integration

**Digital Manufacturing & Fabrication**

- Excessive amount of time to produce fabrication shop-drawings
- Excessive amount of time and resources to track and monitor fabrication process and progress at the shop floor
- Manual QA/QC of fabricated components

**Digital Construction**

- Excessive material wastage and improper inventory control caused by inaccuracy to track materials usage (e.g. tiles, concrete, rebar)
- Inaccuracy to track workers’ productivity
- Tracking and monitoring of resources against site progress is not link to progress claim
Call Challenge Statement for Vertical Integration

**Digital Asset Delivery & Management**

Inaccuracy in finding the root cause of asset breakdown or a specified asset condition from the operation, installation and design stage

Lack of media/platform to share selected operation & asset performance data for research or certification purposes

Lack of solution to feedback selected average asset performance to suppliers, consultants, architects, developers, FM operators, etc.

Lack of specialised FM workforce; hence there is a need to capture maintenance knowledge into computerised models
Call Challenge Statement – Specific Problem Statement (Example)

LTA

*Different BIM software products adopted by various project stakeholders cause the following issues:*

- **Interoperability** (i.e. information is lost) between Civil and E&M contractors during BIM model exchange, project collaboration and federation of AIMS from multiple disciplines.

- **Incompatibility** among different deliverables generated from various BIM software products used by the same contractor

- **Low productivity** for client/project team/operator during BIM review as they are forced to learn multiple BIM software to interpret BIM formats submitted by various contractors.

*Other implementation issues:*

- **Inaccessibility** for LTA staff to review BIM submissions from their WOG machine as BIM submissions have high hardware requirements to process.

- **Absence of digital signature function** in current BIM software products to indicate mutual agreement among various contractors/consultants during BIM collaboration.

- **Lack of resources** for LTA project team to refer to BIM model during site supervision and inspection.
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PLATFORM ECONOMY IS EMERGING AS ONE OF THE MOST POWERFUL MANIFESTATIONS OF THE DIGITAL REVOLUTION

Traditional Value Chain Business Models

| Production | Distribution | Marketing | Consumer |

Value creation is linear and one-way

Platform-Driven Business Models

| Developers | Publishers | Content owners | Retail Services |

Ecosystem

Value creation is two-way and continuous

Sources –
Technology Vision 2016, Accenture
Digital America: A Tale of the Haves and Have-Mores, McKinsey Global Institute
A digital platform is a technology-enabled business model that creates value by facilitating exchanges between two or more interdependent groups.

- Platforms bring together end users and producers to transact with each other.
- Platforms enable companies to share information to enhance collaboration or the innovation of new products and services.
- The platform’s ecosystem connects two or more sides, creating powerful network effects whereby the value increases as more members participate.

Source – Wikipedia
COMPANIES ADOPTING PLATFORM-DRIVEN BUSINESS MODELS

NATIVE DIGITAL COMPANIES

- Uber
  - The world's largest taxi company owns no vehicles
- Airbnb
  - The largest accommodation provider owns no real estate
- Alibaba
  - The most valuable retailer has no inventory


ESTABLISHED COMPANIES

Product to Platform

Examples

- Under Armour
  - Connected Fitness Platform
- Volkswagen
  - One Digital Platform

Source – Adapted from Apigee presentation “Platform Strategy & Ecosystems”, 2014
COUNTRIES ARE RECOGNISING THE DIGITAL ADVANTAGE OF DIGITAL PLATFORM PLAYERS

Digital platforms* and German industrial companies** in a five-year comparison (2012 – 2016 in per cent)***

Observations
Digital businesses have grown faster within 5 years that the analogue businesses established at the same time.

Trends and Outcomes that Emerged from Consultations
Operators of platforms seen as most powerful players in digital economy:
- Open up new markets
- Facilitate market entry for SMEs
- Tailor-made products
- Better use of resources

PLATFOR M OPPORTUNITIES EXIST FOR SMALL ENTREPRI S

Main Benefits to SMEs from Platform Businesses
Survey of Chinese SMEs

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Additional Revenues</td>
<td>73%</td>
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<tr>
<td>Cost Reduction/Lower Transaction Costs</td>
<td>69%</td>
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<tr>
<td>Innovation of Products and Services</td>
<td>40%</td>
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<tr>
<td>Better Customer Retention</td>
<td>34%</td>
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<tr>
<td>Faster Speed to Market</td>
<td>29%</td>
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<tr>
<td>Other Benefits</td>
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</tbody>
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Potential Roles in Platform Economy

**Platform Owners**
Design and develop the platform, control IP and decide how it will be run

**Digital Partners**
Team with platform owners to offer complementary products and services using APIs

**Producers or Suppliers**
Merchants selling goods directly to consumer in the marketplace
DATA MONETISATION AS THE QUINTESSENTIAL COMPETENCY FOR DIGITAL PLATFORMS

External Monetisation

- **Tickled Media**: Builds and monetises online communities, e.g., AsianParent.com – Insights unit to drive revenue from niche segment (e.g., parents) to companies like Nestle, Pfizer, Unilever.

- **Alibaba.com**: Data-driven advertising services to 3rd parties on its online marketplaces contribute 49% of total revenue.

Internal Monetisation

- **Fidor Bank**: “Karma score” of individual borrowers enables peer-to-peer lending on its community platform by improving credit risk assessment.

- **Amazon**: Sophisticated data-driven personalisation programs to upsell products and services.

Potential for external monetisation is high if the platform holds unique data and has the capacity to package innovative services around the data for 3rd parties.

Source – Five Ways to Win with Digital Platforms, Accenture, 2016
FORMULATING DIGITAL PLATFORM STRATEGY – GETTING STARTED

**PLATFORM STACK**

- **DIGITAL PLATFORM**
- **ECOSYSTEM**
- **INFRASTRUCTURE**
- **DATA**

**Ecosystem**

Ecosystem of producers and consumers transacting on the platform.

**Infrastructure**

Technology platform used by the digital platform operator to deliver products and/or services and create value through the producer-consumer exchange.

**Data**

Data collected in the platform for internal monetisation, enabling the platform to match supply with demand.

Opportunities for external monetisation.
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CALL FOR SUBMISSION - CONSTRUCTION DIGITAL PLATFORM (CDP)

Objectives

- Encourage technology firms to work with Built Environment firms to develop construction digital platforms
- Enable construction firms to digitalise and address industry needs and gaps for construction life-cycle projects
- Enable firms across the construction ecosystem to innovate and generate new growth models

Legend

- Connection Gaps
- Drone
- Sensors
- Wearable

* May include existing commercially available software such as BIM360
REQUIREMENTS OF A CONSTRUCTION DIGITAL PLATFORM (CDP)

Support integration of at least one aspect of the IDD that addresses the gap in the construction industry

Enable interoperability of data across different platforms through established open data formats commonly adopted in the construction industry

Enable firms to collaborate and allow innovative solutions and other third party solution providers to plug in through open APIs
The Digital Platform proposal should have:

- Viable Business Model
- Strength of complementary programs and initiatives to grow its ecosystem of users transacting on the Digital Platform(s)
- Strategy to apply relevant analytics and other intelligence to enhance user experience on the Digital Platform
- Elect AI or data services available as a service on their own Digital Platform or other platforms
1. Government to fund **up to 50%** of qualified costs
2. Proposed costs involved in developing the Digital Platform including manpower, hardware, software, license, and any 3rd party professional services
3. We do not fund operating and generic costs for marketing unless is specific to the project
4. All eligible fundings must be within project qualifying period
5. **The technology company is the only/lead applicant, and must be a Singapore-based company**
6. Consortium comprises a technology company, construction-related companies and/or technology solution vendors
Selected Digital Platform operator(s) would be required to meet delivery milestones and targets as follows:

1. **Built a Digital Platform for Construction**

2. **Outcomes & Deliverables** - The Digital Platform operator(s) shall propose:
   - The number of producers providing digital services and/or the richness of digital services on the Digital Platform(s); or
   - The volume of digital services being transacted on the Digital Platform(s).
   - The project development period must not be more than 18 months.
   - Other quantifiable outcomes (e.g. projected VA, productivity enhancements, etc.)
   - The Participant shall include these milestones in its Proposal.

3. **AI and Data Services.** The Digital Platform operator(s) shall propose targets for the availability of relevant and impactful AI and/or data services, either to be delivered through its own Digital Platform, or through other digital platforms (such as those selected by IMDA in a previous run of the Digital Platforms programme).

For more information, please refer to the submission requirements in the Public Document.
EVALUATION CRITERIA FOR CDP

Award to Applicant

Co-funding based on project scope and subject to funding scheme criteria
Only short-listed participants will be notified
TIMELINE FOR CDP

Closing Date for Proposal Submissions: 15 Mar 2019 at 1200HRS

Clarification for Submission (3 mths)

Evaluation + Shortlist

Announce Short-listed Applicants on IMDA website:
- Co-Development funding details
- Only short-listed Participants will be notified

No retrospective co-funding for Projects that start before award and acceptance of IMDA Letter of Offer (LOA).

Applicants start Development Project

16 Nov  Dec  Jan 2019  Feb  Mar  May  Jun/Jul 2019
Please go to the following website to request for submission documents:


The proposal template and submission details are as following:

1. Call Document
2. Grant Application
   - Schedule A  –  Cover Letter
   - Schedule B  –  Participant’s Contact Information
   - Schedule C  –  Application Form
   - Schedule D  –  IMDA’s Standard Terms and Conditions for Grants
   - Schedule E  –  Additional Information by the Participant (Optional)

You are advised to contact us should you have any difficulties in completing the form or if you need any further information.

Participants shall submit their Proposal, including the list of Schedules, in softcopy. The submission should include one (1) copy in MS Office Word format and one (1) in PDF format. Participants shall submit their Proposals via electronic mail to DEPlatform@imda.gov.sg, copying caro@imda.gov.sg.
In the event that IMDA seeks clarification on any aspect of the prospective Participants’ and/or Participant’s submission, the prospective Participant and/or Participant shall provide full and comprehensive responses within seven (7) days of IMDA’s request.

Prospective Participants and/or Participants who wish to seek clarifications on the CFS shall submit their requests by electronic-mail at DEPlatform@imda.gov.sg by 8 Mar 2019.

Closing Date for Proposal Submission: 15 Mar 2019 at 1200 hrs
Nothing in this CFS CDP shall constitute a contract between IMDA and any Participant. Any Participant selected pursuant to this CFS CDP for participation in the project shall be required to enter into a legally binding agreement with IMDA (“Agreement”), the terms and conditions of which shall be agreed between the parties at a later date.

The receipt by IMDA of any Proposal pursuant to this CFS CDP shall under no circumstances impose any form of obligation or amount to an acceptance of or an agreement to abide by any terms or conditions stated therein or elsewhere on the part of IMDA. This includes facilitation of partnerships organized by IMDA.

IMDA shall have the absolute discretion to accept or reject any Proposal, whether in whole or in part, without giving any reason whatsoever.
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Please raise your hand if you wish to speak

Please provide your name and company before you raise your questions