

An aerial photograph of a lush green park, likely the Singapore Botanic Gardens, featuring several iconic Supertrees with their distinctive circular canopies. A large, white, stylized 'U' shaped graphic is overlaid on the left side of the image, partially obscuring the park's features. The text is positioned on the right side of the image, set against a dark, semi-transparent background.

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

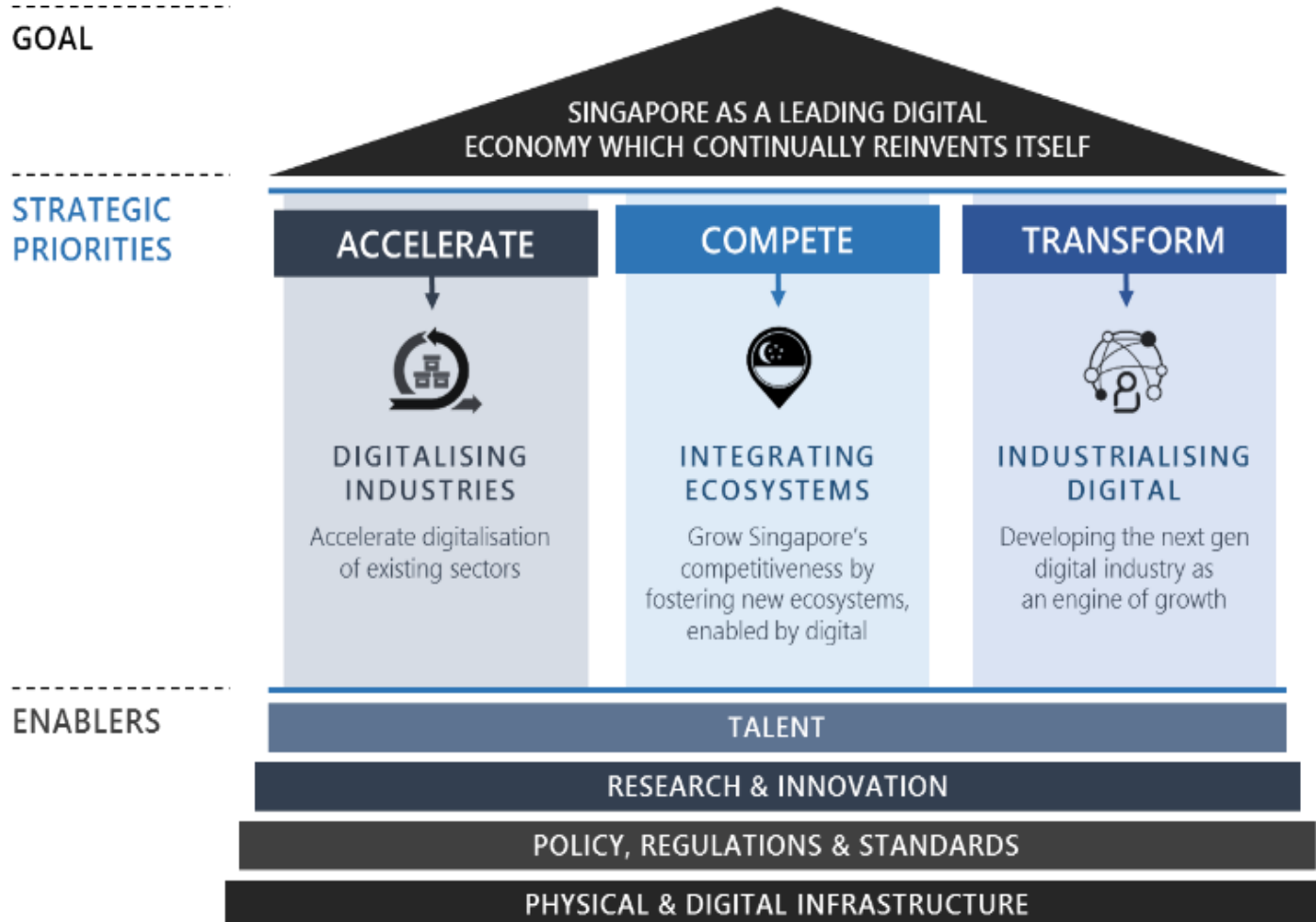
Asst. Director, Built Environment, Sectoral Transformation Group, IMDA

- Q&A

BCA & IMDA Panel



IMDA SUPPORTS THE CONSTRUCTION ITM: TO DIGITALISE, BUILD CAPABILITIES, STAY COMPETITIVE & GROW

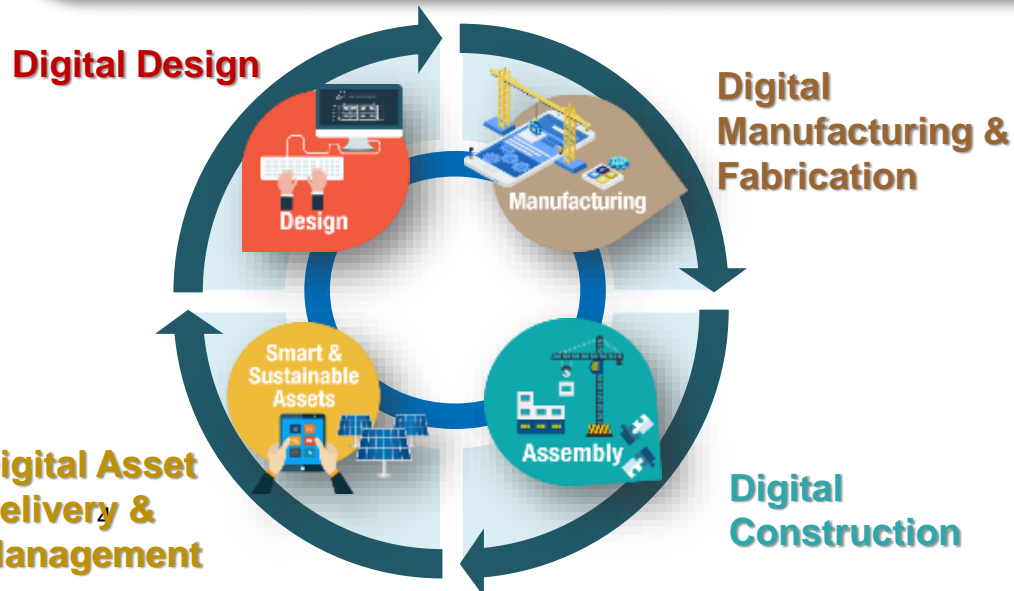
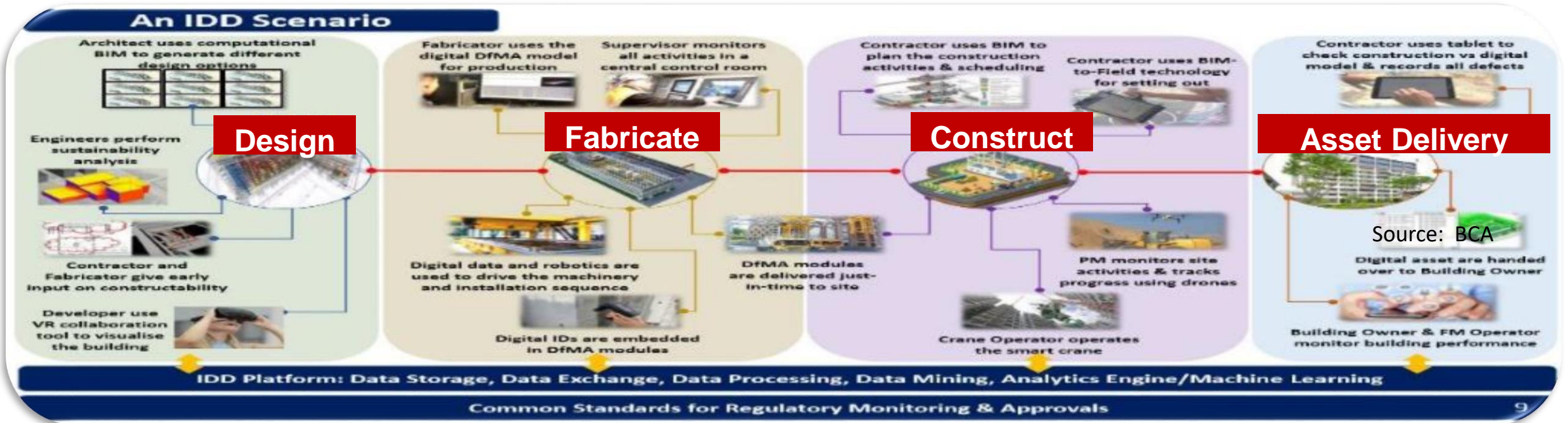


Singapore to be among the top digital economies in the world.

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



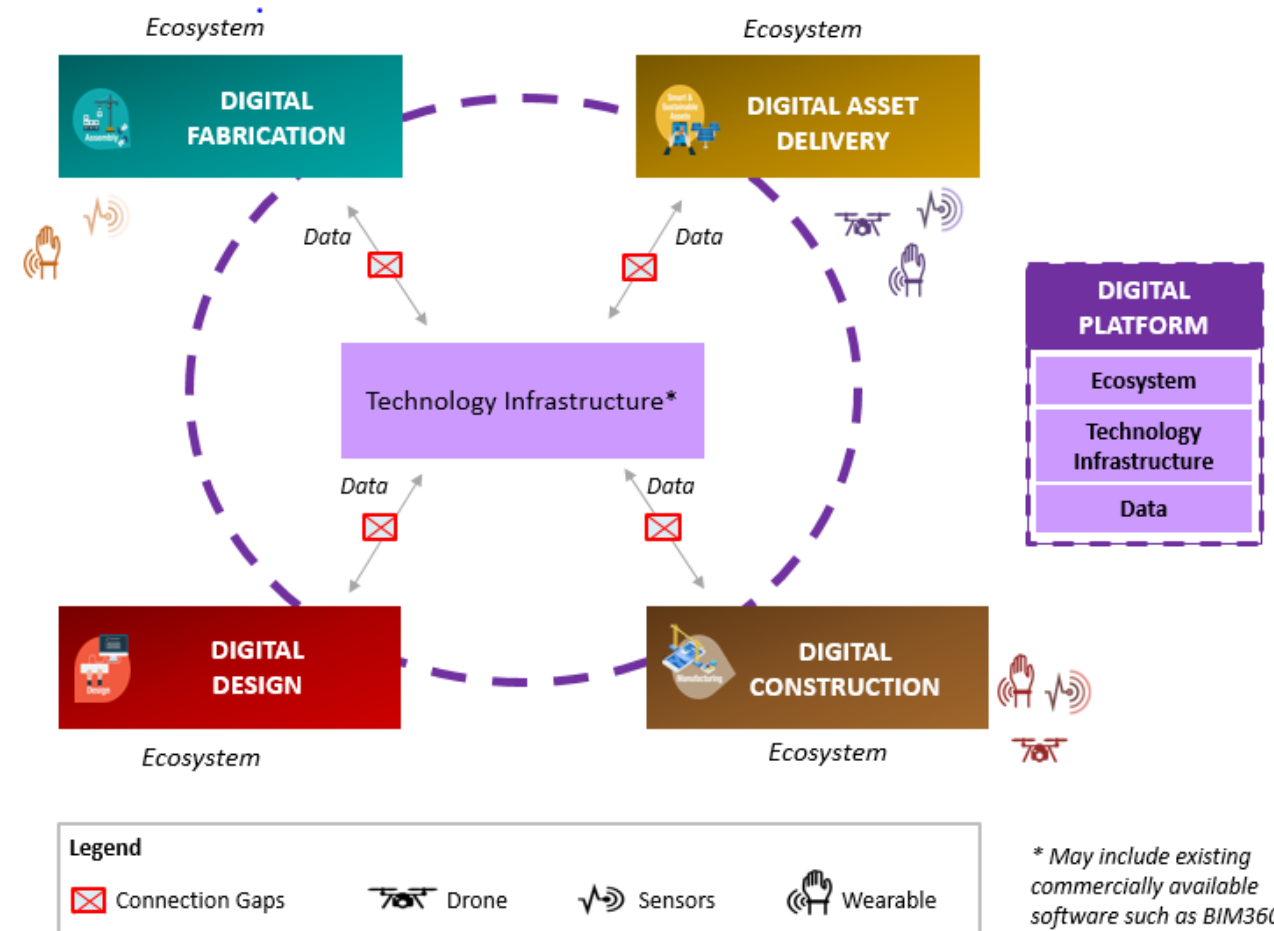
Deliverables

- Better gathering & use of data to support integration of at least one aspect of the IDD
- Enable interoperability of data through established open data formats commonly adopted in the construction industry
- 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

- Integration of Ecosystem
- Technology Infrastructure including software
- Use of Data



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CONSTRUCTION ITM

One of 23 ITMs to chart Singapore's future economy

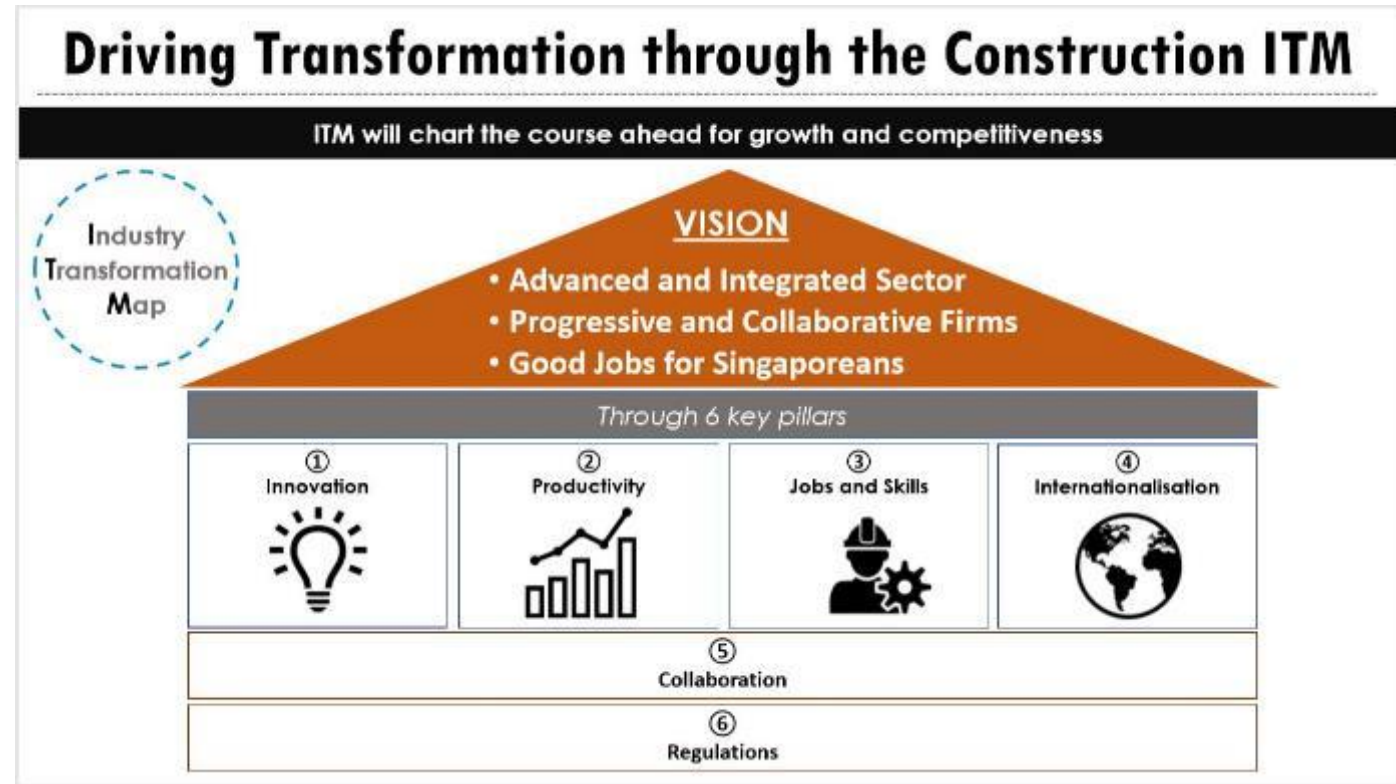
Part of Built Environment Cluster

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



Construction ITM

3 Key Areas under the Construction ITM

1

Green
Buildings



2

Design for
Manufacturing
and Assembly
(DfMA)



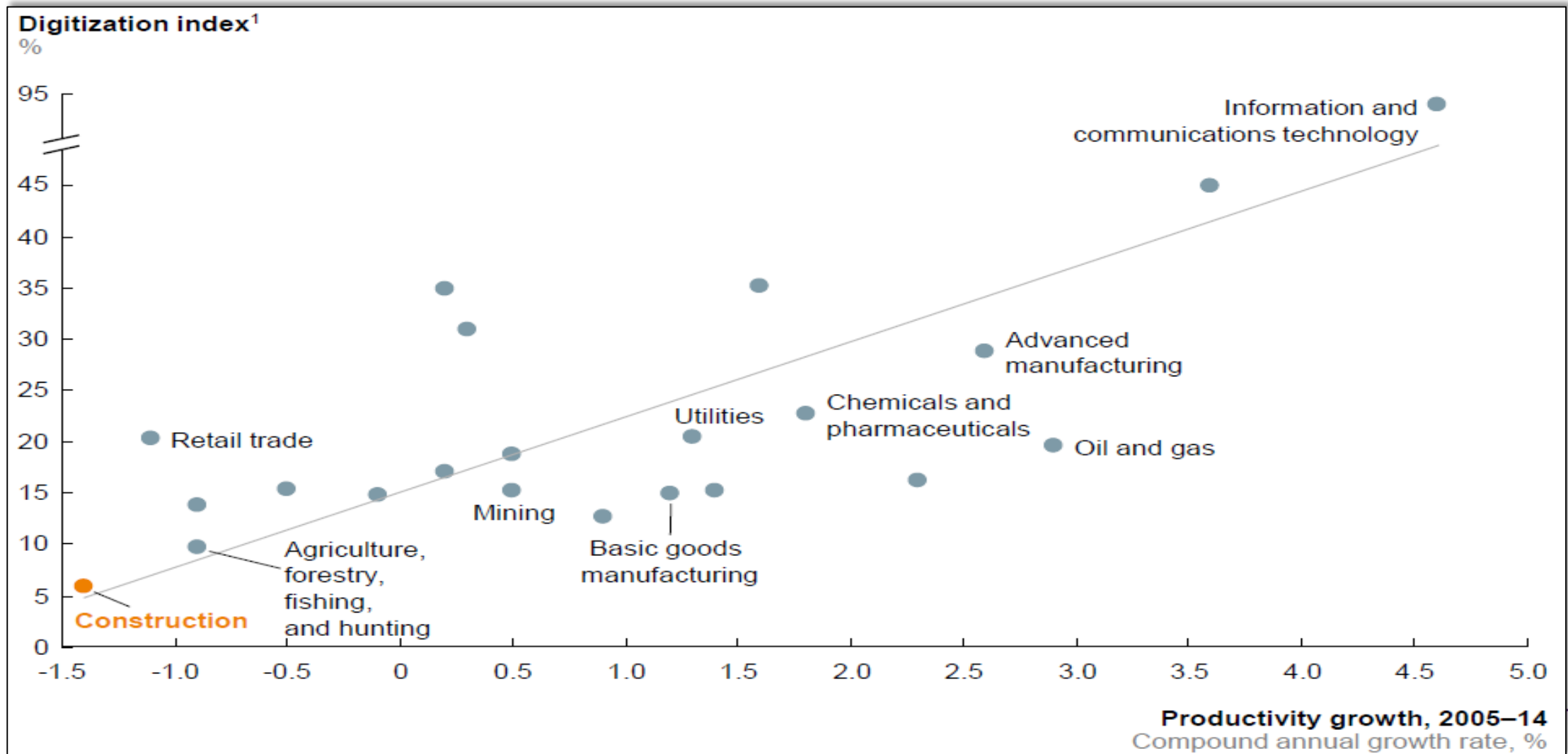
3

Integrated
Digital
Delivery (IDD)

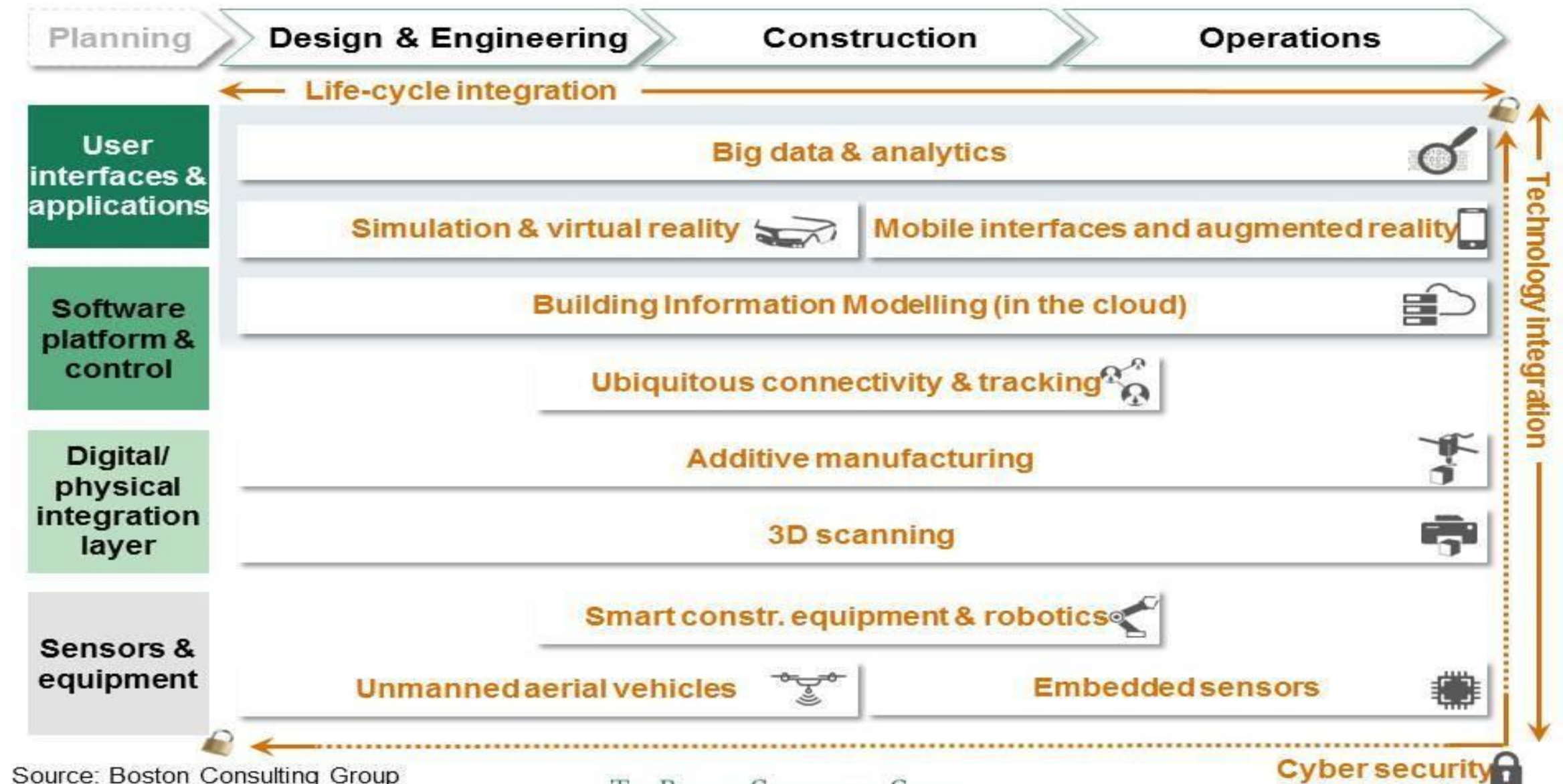


OPPORTUNITIES FOR GROWTH IN CONSTRUCTION

The McKinsey report indicated that the Construction industry has huge potential for digitalization, productivity and growth

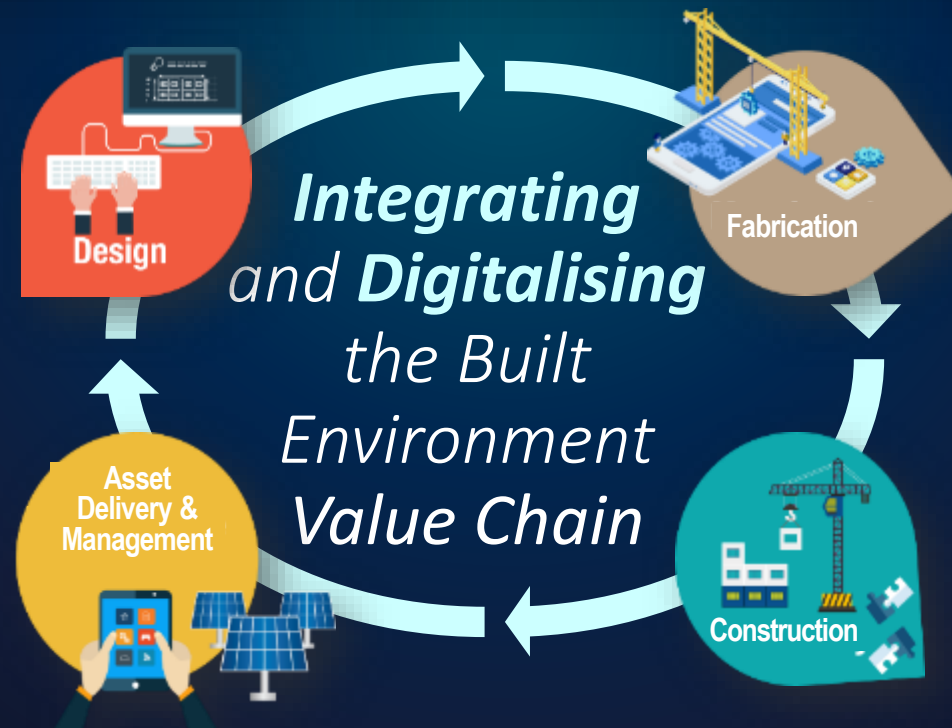


Many digital technologies can be applied along the E&C value chain





INTEGRATED DIGITAL DELIVERY



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:
Perform
sustainability
analysis



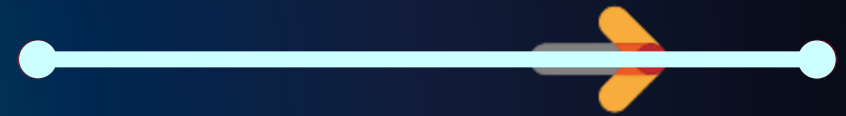
Engineers: Links BIM to
structural analysis and
design, MEP and
sustainability design



Developer:
Experiences
Virtual Reality



Contractor & Fabricator:
Provide constructability
inputs



Digital Fabrication

Translating design to standardised components for automating off-site production

Drives machinery and factory installation



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



Digital Construction

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

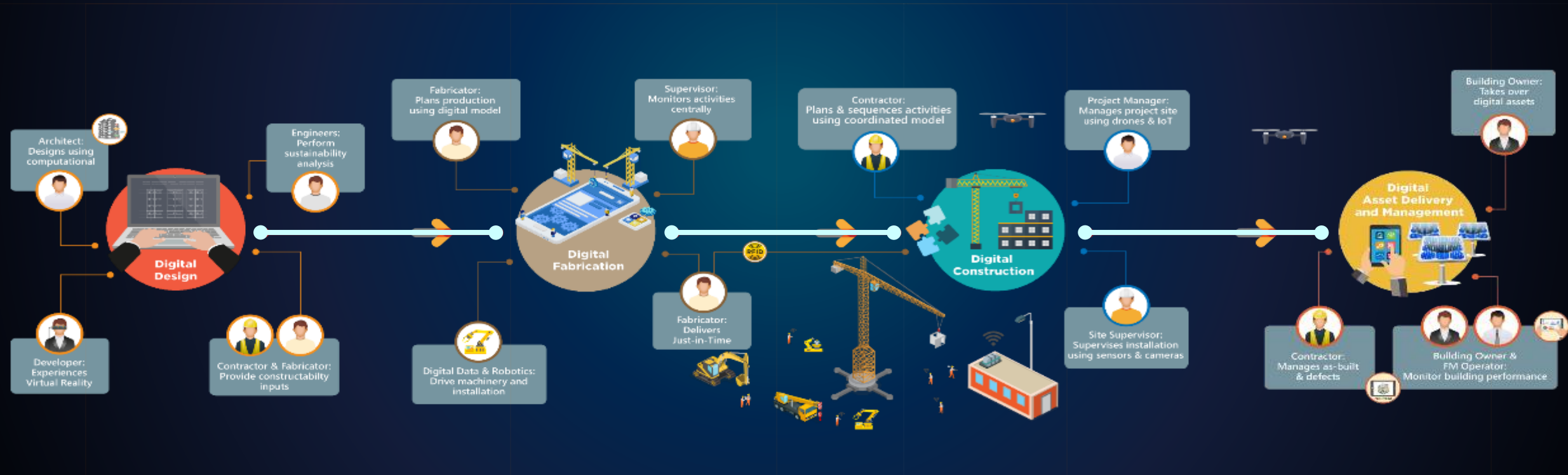


Digital Asset Delivery & Management

Real time monitoring for operations and maintenance to enhance asset values



IDD focuses on the integration of all processes and stakeholders throughout the entire project lifecycle, enabled by digital technologies



Common Platform & Standards, Computational Design, Internet of Things, Data Analytics, Robotics, Mobile, Cloud

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

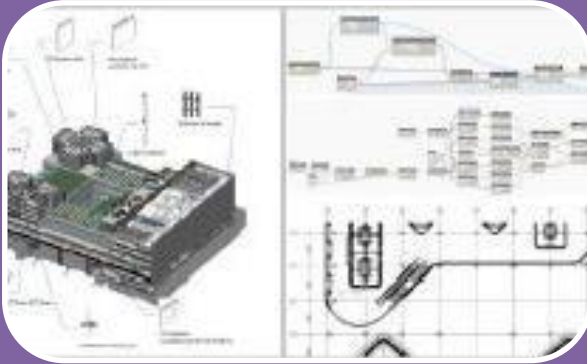


DIGITAL ASSET DELIVERY AND MANAGEMENT

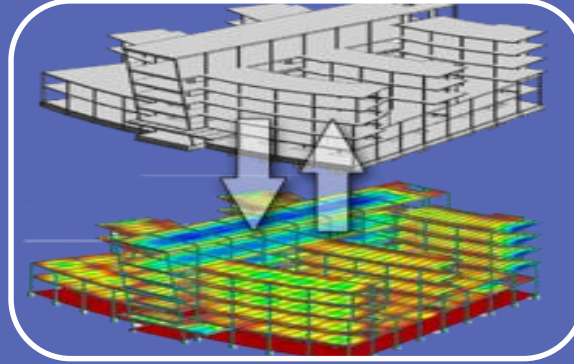
- Building owners still learning how to link BIM to FM
- Lack of capability and infrastructure to support FM operations digitally.

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

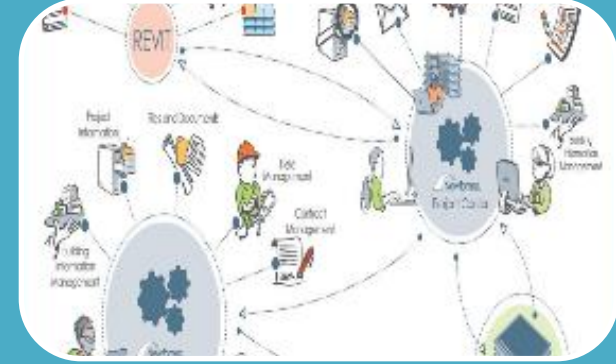
GAPS IN CONSTRUCTION INDUSTRY



Incomplete
information
shared



Inaccurate
information
exchanged



Poor timeliness in
receiving
information

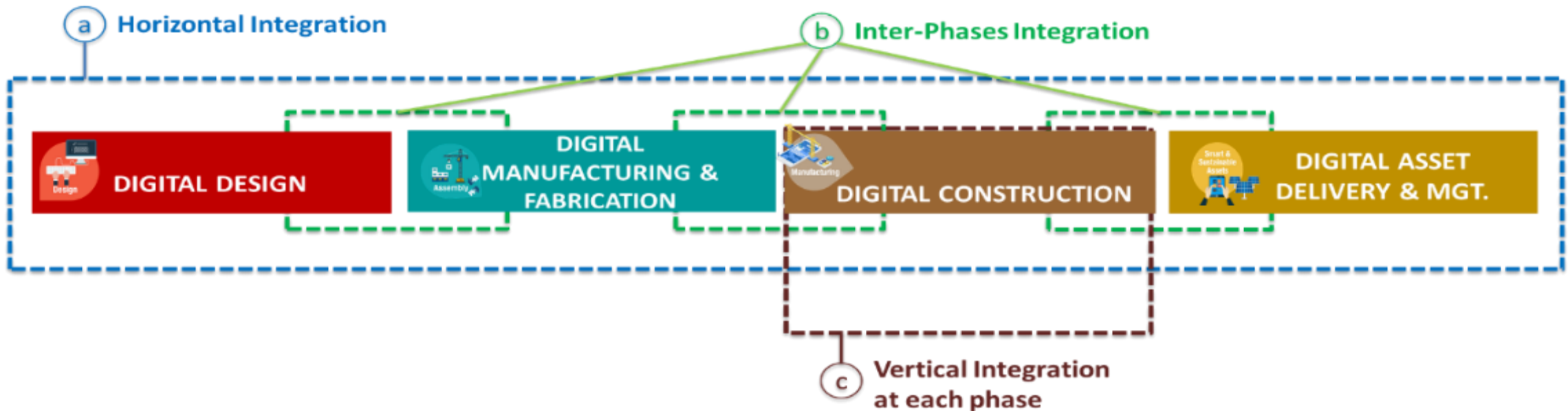
Inefficient Processes & Poor Resource Optimisation

BCA and IMDA jointly to support development of digital platforms to move industry towards IDD

DESIRED OUTCOME

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



- a. **Horizontal Integration**: aims at providing a digital platform that enable effective integration, collaboration and management of information across the value chain.
- b. **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).
- c. **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.

Call Challenge Statement for Horizontal Integration



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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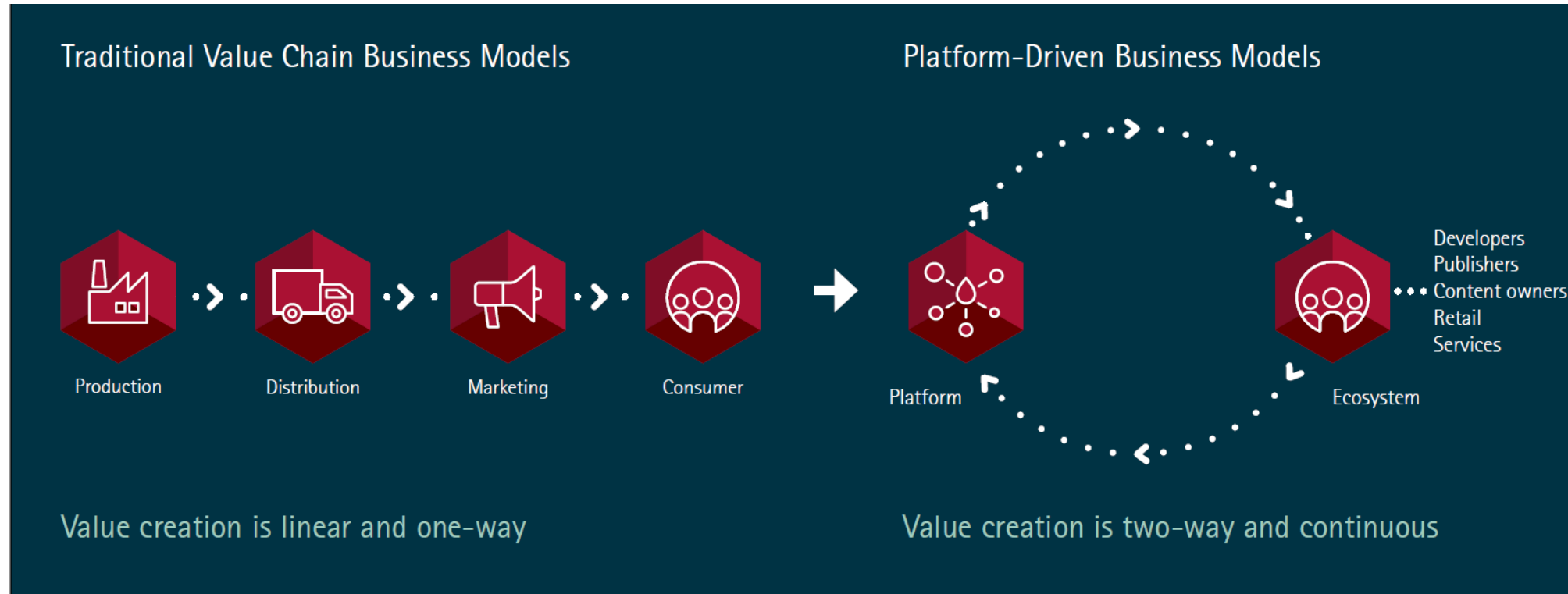
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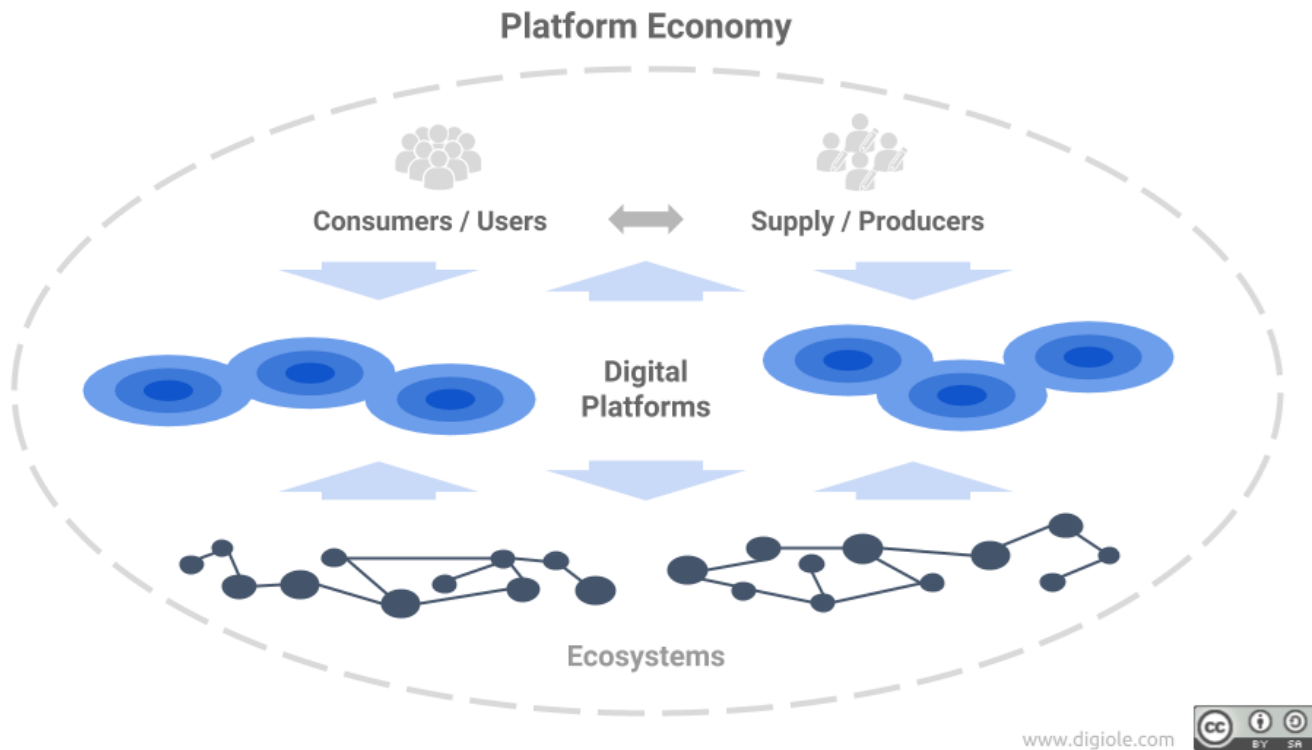
PLATFORM ECONOMY IS EMERGING AS ONE OF THE MOST POWERFUL MANIFESTATIONS OF THE DIGITAL REVOLUTION



Sources –
Technology Vision 2016, Accenture
Digital America: A Tale of the Haves and Have-Mores, McKinsey Global Institute

WHAT ARE DIGITAL PLATFORMS?

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



The world's largest taxi company owns no vehicles



The largest accommodation provider owns no real estate



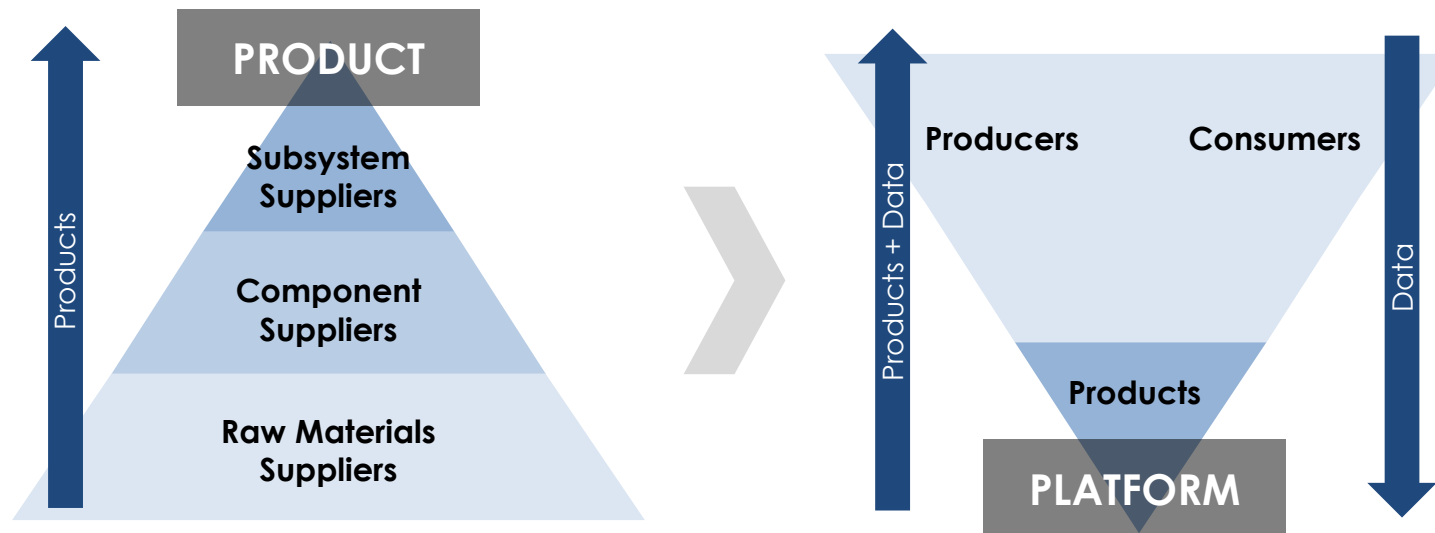
The most valuable retailer has no inventory

...

Source – “The Battle is for the Customer Interface”, TechCrunch, 2015

ESTABLISHED COMPANIES

PRODUCT TO PLATFORM



Examples



Connected Fitness Platform



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)***



* Alphabet (Google), Amazon, Apple, Facebook, Tencent

** DAX-listed companies: BASF, Bayer, Daimler, Henkel, Siemens

*** The average annual change in the 2012-2016 period is measured in per cent (CAGR)

Source: Roland Berger, in-house calculation based on Bloomberg, 2017

Observations

Digital businesses have grown faster within 5 years than the analogue businesses established at the same time

Trends and Outcomes that Emerged from Consultations

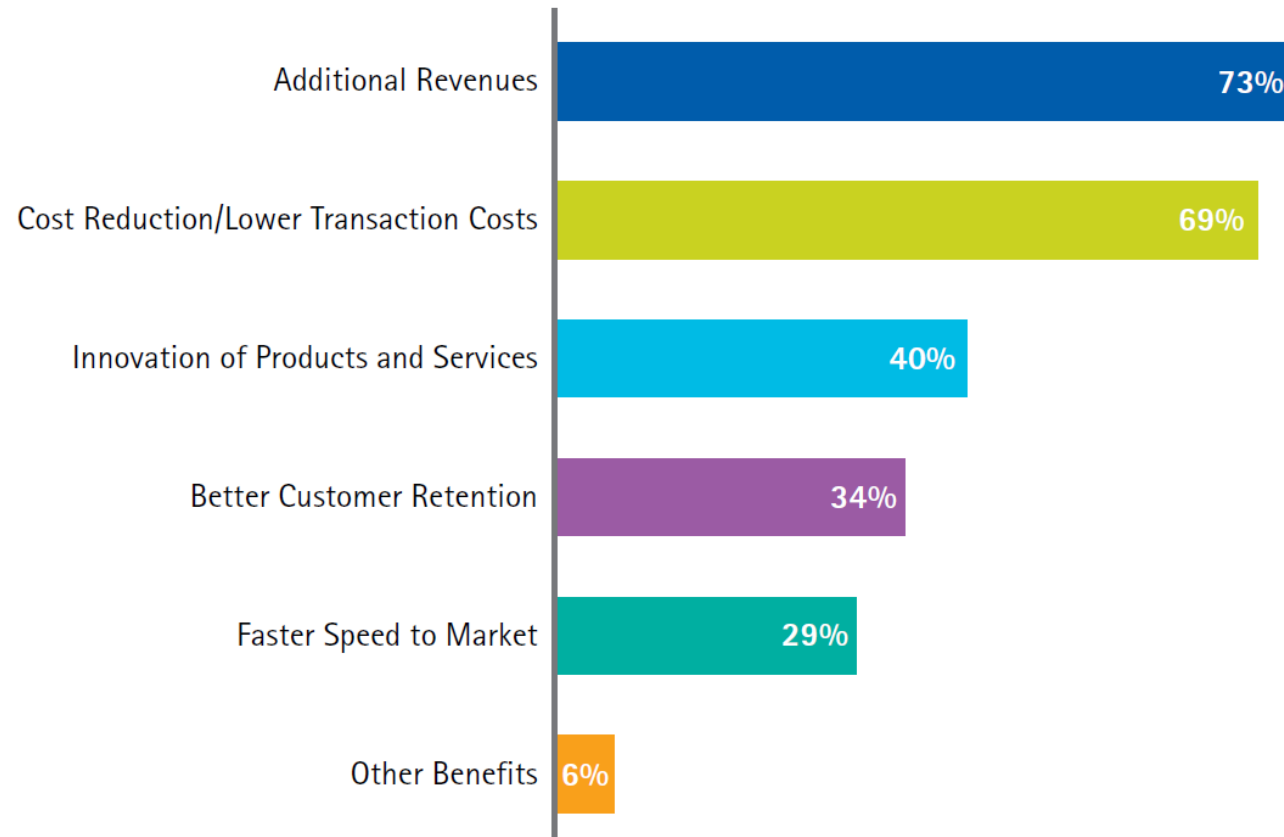
Operators of platforms seen as **most powerful players in digital economy**:

- Open up new markets
- Facilitate market entry for SMEs
- Tailor-made products
- Better use of resources

PLATFORM OPPORTUNITIES EXIST FOR SMALL ENTERPRISES

Main Benefits to SMEs from Platform Businesses

Survey of Chinese SMEs



Source: Accenture Platform Survey, 2016

Source – Five Ways to Win with Digital Platforms, Accenture, 2016

Potential Roles in Platform Economy

Platform Owners

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

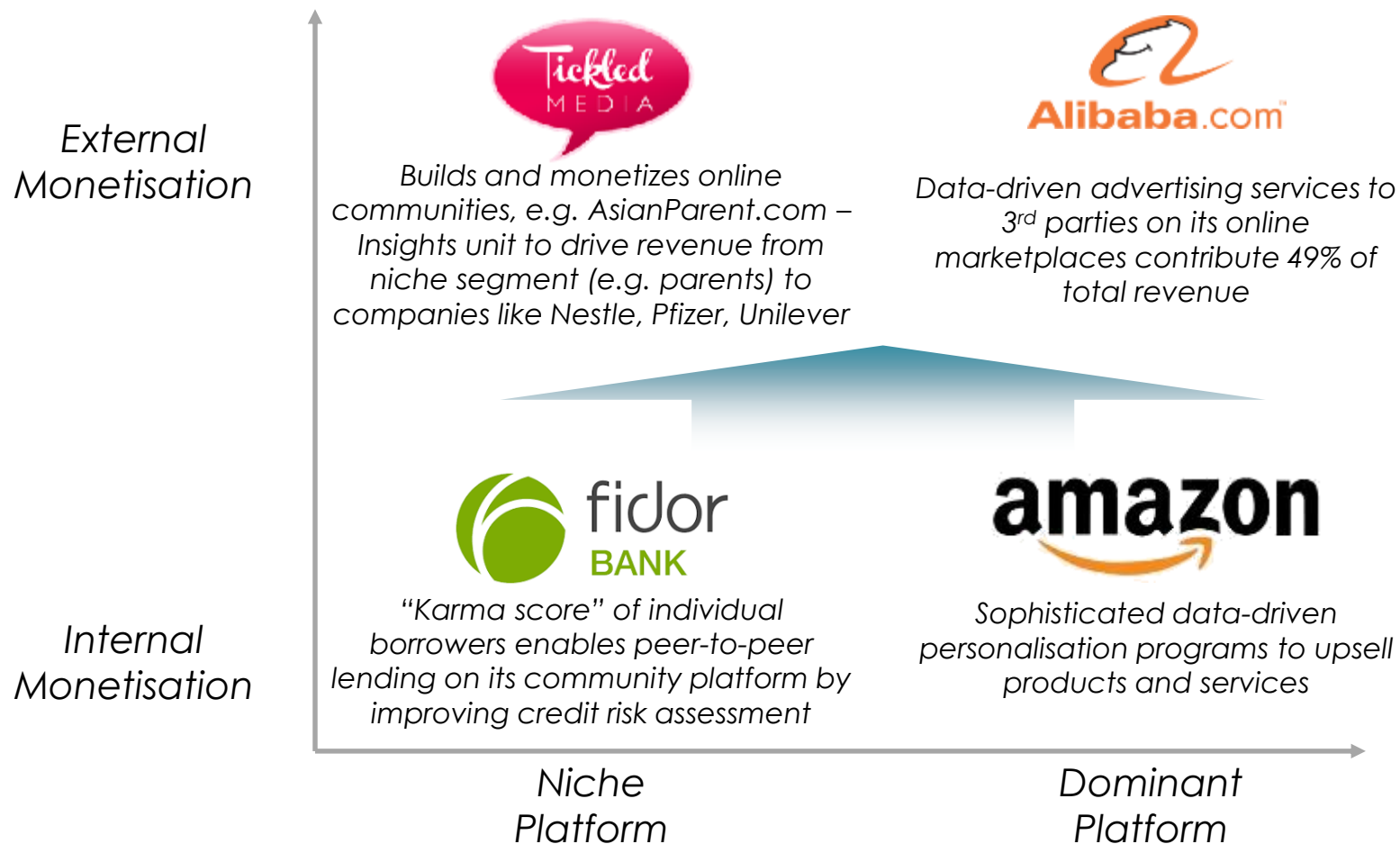
Digital Partners

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

Producers or Suppliers

Merchants selling goods directly to consumer in the marketplace

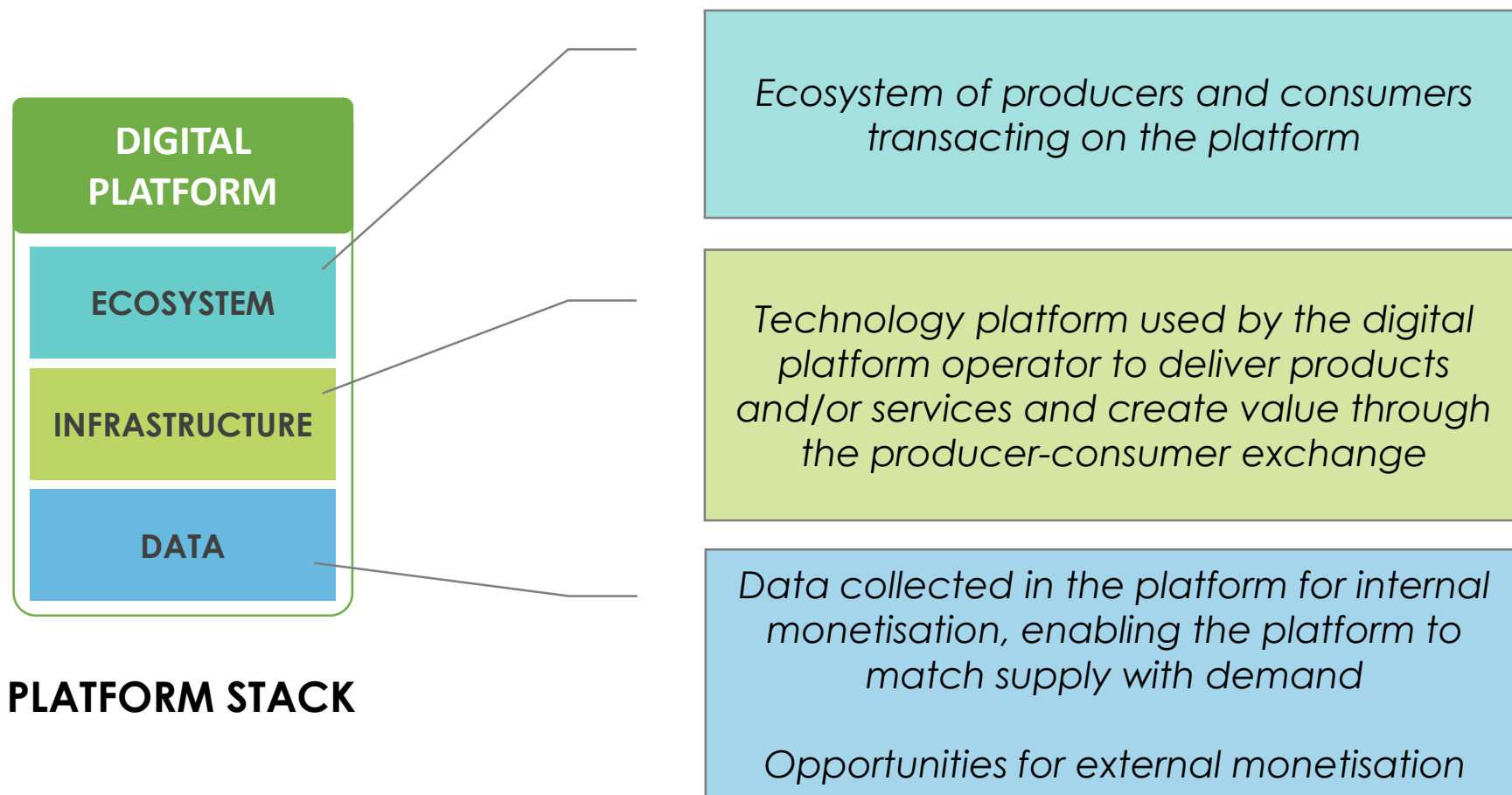
DATA MONETISATION AS THE QUINTESSENTIAL COMPETENCY FOR DIGITAL PLATFORMS



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





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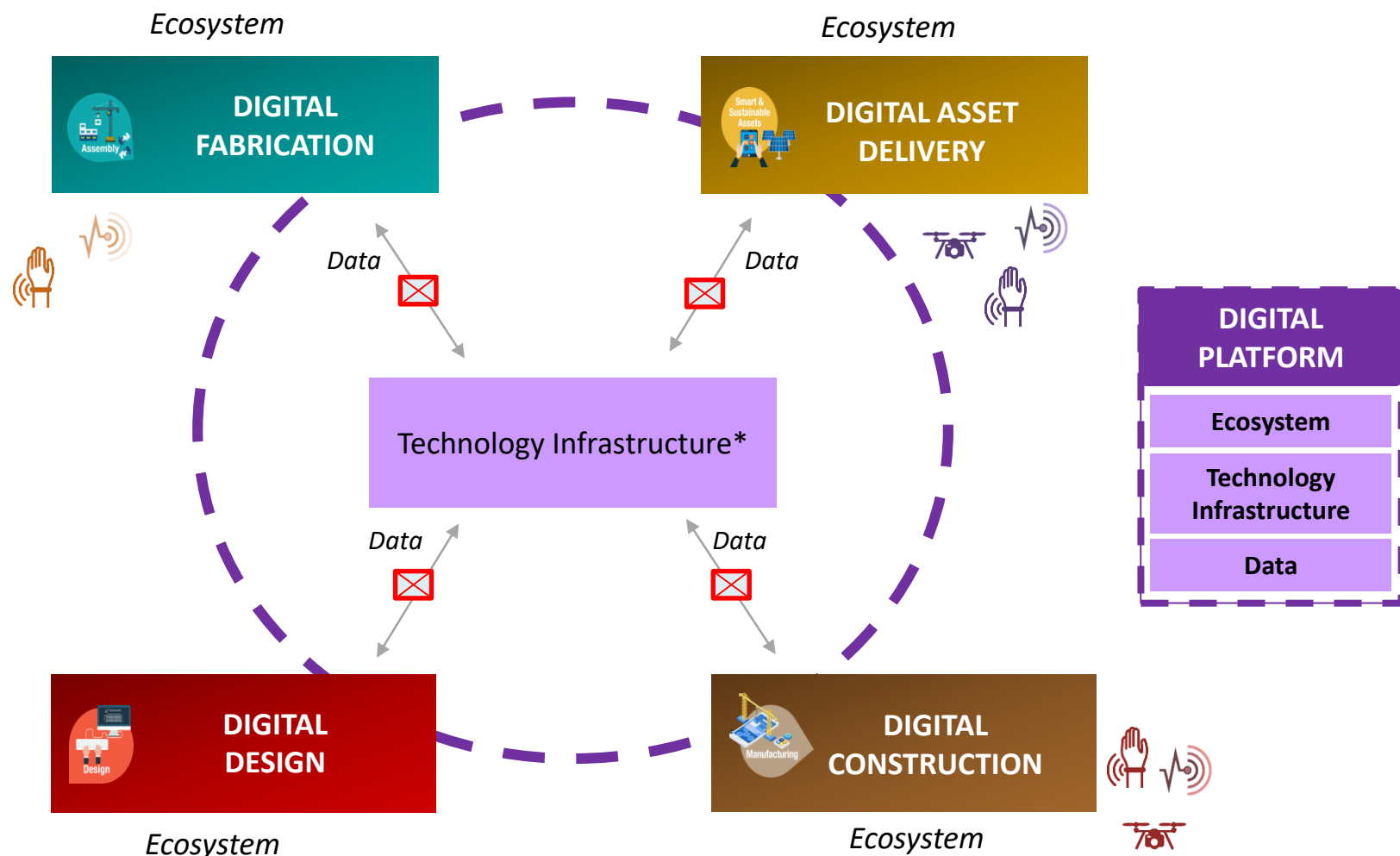
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CALL FOR SUBMISSION - CONSTRUCTION DIGITAL PLATFORM (CDP)



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

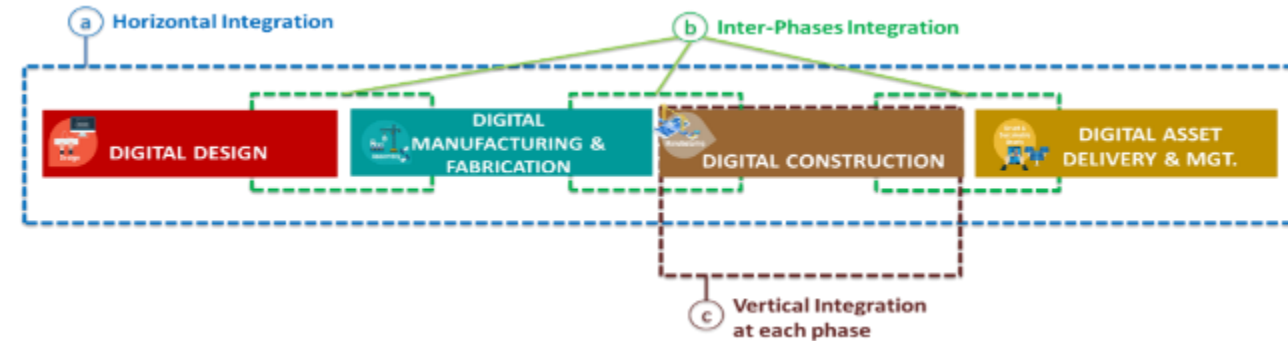
* May include existing commercially available software such as BIM360

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



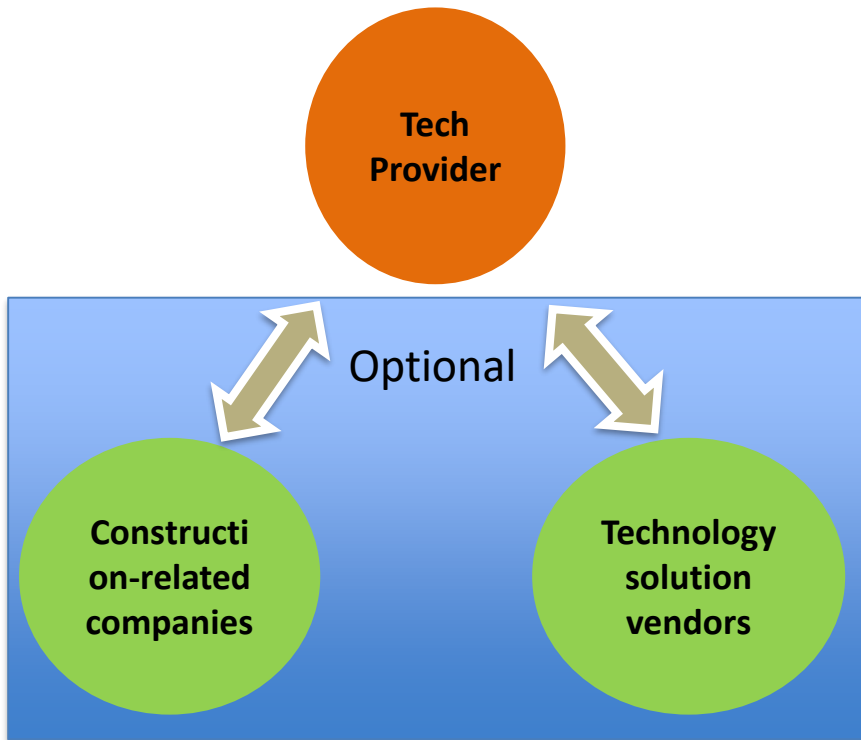
PREREQUISITES FOR CDP

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

FUNDING DETAILS FOR CDP

Development



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

DESIRED OUTCOMES/KPI OF SELECTED DIGITAL PLATFORM OPERATORS FOR CDP

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

Eligibility and
Competency
of Applicant

Quality of
Proposal

Business
Viability

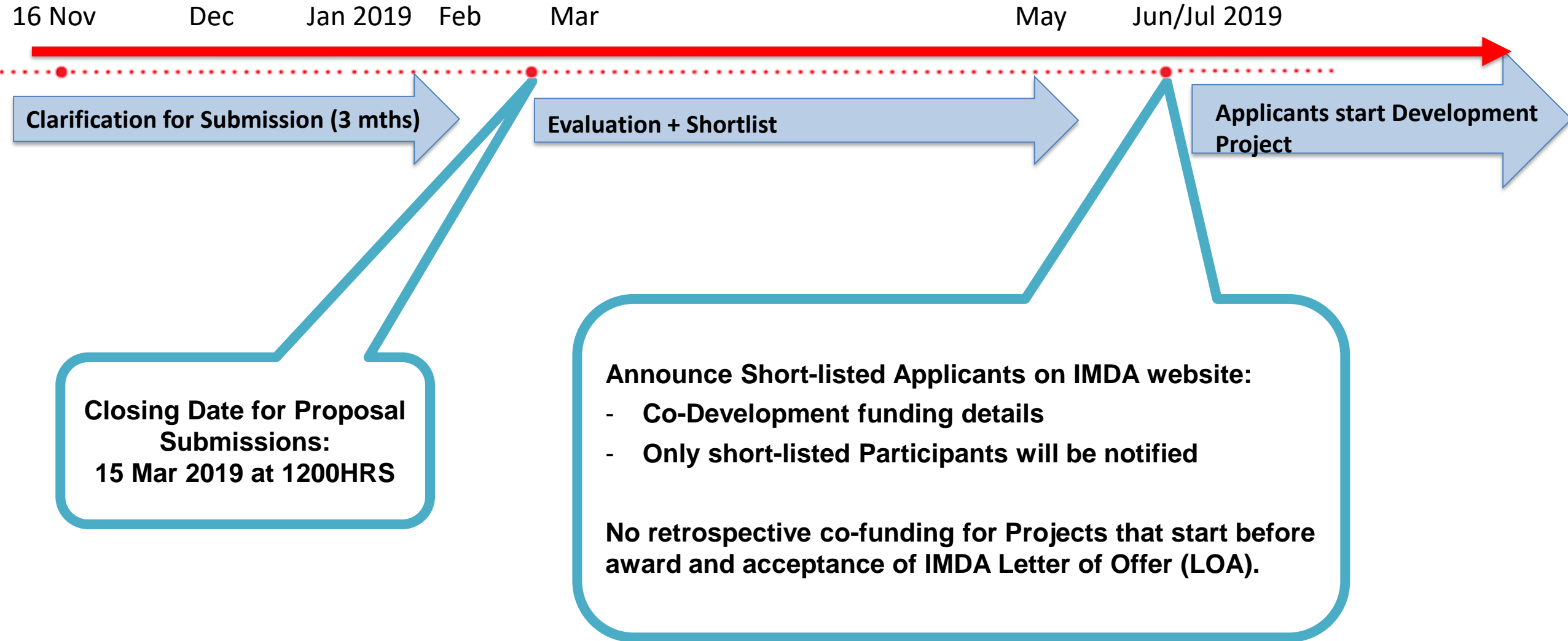
Technical
Viability

Regulatory
Viability

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



PROPOSAL TEMPLATE AND SUBMISSION DETAILS

Please go to the following website to request for submission documents:

<https://www.imda.gov.sg/digital-platforms/>

The proposal template and submission details are as following:

1. Call Document

2. Grant Application

<i>Schedule A</i>	–	<i>Cover Letter</i>
<i>Schedule B</i>	–	<i>Participant's Contact Information</i>
<i>Schedule C</i>	–	<i>Application Form</i>
<i>Schedule D</i>	–	<i>IMDA's Standard Terms and Conditions for Grants</i>
<i>Schedule E</i>	–	<i>Additional Information by the Participant (Optional)</i>

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.

FOR CLARIFICATIONS SOUGHT BY IMDA & PARTICIPANTS

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

IMPORTANT NOTICES TO PARTICIPANTS – DO REFER TO IMDA WEBSITE FOR ANNEX A AND SCHEDULE 1 TO ANNEX A

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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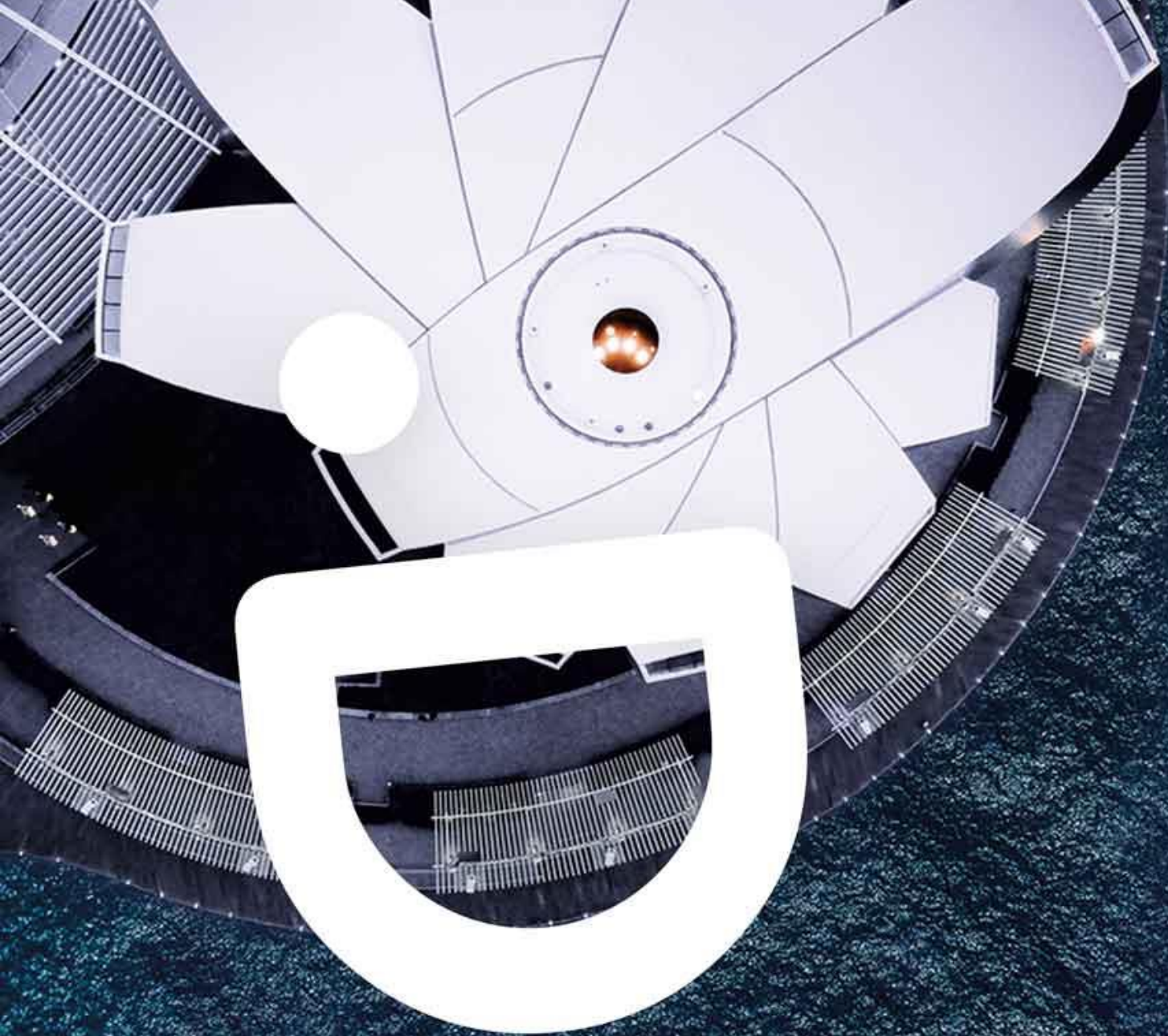




Q&A

Please raise your hand if you wish to speak

Please provide your name and company before you raise your questions



THANK YOU