

Frequently Asked Questions (FAQS)

1. What are some examples of projects that could be considered under Productivity Innovation Projects?

An example would be the development and adoption of Prefabricated prefinished volumetric construction (PPVC) that reduces the need for on-site construction

2. How do we submit a PIP enquiry?

For enquiries on **Technologies and Innovations, DfMA Manufacturing Facilities and Integrated Digital Delivery (IDD)**, the interested party may provide more information on the technology in an e-form at <https://form.gov.sg/forms/bca/5c73865662e3a600175a0309>.

Our BCA officer will contact the interested party after the form has been completed

3. How much support may we get from PIP?

The following costs are supportable on a co-funding and reimbursement basis:

- a) Manpower
- b) Equipment and Materials
- c) Professional Services
- d) Intellectual Property Rights

The level of support for each area is as below:

Area	Funding Support
Technologies and Innovations	<u>30-40% productivity improvements at trade level</u> Co-funds up to 70% of the qualifying cost, capped at \$1 mil per application <u>> 40% productivity improvements at trade level</u> Co-funds up to 70% of the qualifying cost, capped at \$10 mil per application
	<u>Integrated Construction and Prefabrication Hubs (ICPH)</u> Co-funds up to 70% of the qualifying cost, capped at \$10 mil per application
DfMA Manufacturing Facilities	<u>Other manufacturing facilities</u> Co-funds up to 70% of the qualifying cost, capped at \$3 mil per application.

Integrated Digital Delivery (IDD)	<u>Integrated Digital Delivery (IDD) 3 stage digitalisation</u> Co-funds up to 70% of the qualifying cost, capped at \$600,000 per application.
	<u>Integrated Digital Delivery (IDD) 4 stage digitalisation</u> Co-funds up to 70% of the qualifying cost, capped at \$700,000 per application.
	<u>Local customisation of IDD platforms and solutions</u> Co-funds up to 70% of the qualifying cost, capped at \$500,000 per application.

Applicants are required to partner at least one SME in the construction project to receive a higher support level of up to 70%,

4. What are the IDD deliverables and strategies to be implemented in PIP?

Each project team must implement IDD throughout the whole value chain (from design, fabrication, construction and/or asset delivery and management) with clear outcome KPIs, using a collaboration platform to integrate with different stakeholders.

Examples of IDD strategies include:

- a) The focus on one integrated model where data requirements and milestones are set by consultants upfront, with ICE sessions conducted to resolve key design issues with impact downstream (e.g. M&E spaces and Design for Maintainability)
- b) The streamlining of shop drawing approvals and data extraction, from BIM, for off-site production automation
- c) The use of BIM-to-Field technologies and site management platforms for better field management onsite
- d) The use of smart FM technologies for real-time monitoring operation and maintenance.

Reference documents

[Annex 1: IDD Outcome KPIs](#)

[Annex 2: Industry Leaders' Quick Start Guide to IDD: The "What" and "Why"](#)

5. What are 3 stage and 4 stage digitalisation?

There are four stages in a construction project: (i) design, (ii) pre-fabrication, (iii) construction and (iv) asset delivery and management. PIP helps to build up IDD capabilities through funding support for digital solutions to be applied in at least three out of four stages of a construction project.

6. When should we submit the PIP application?

Applications must be submitted before the commencement of PIP. Any cost incurred before the PIP application date would not be supportable.

7. Is there a timeframe set for the completion of the PIP project?

The applicant should indicate the estimated PIP duration for evaluation. The project duration should be at least six months and be kept within two years.

8. Is GST supported?

As government grants are not meant to offset the tax liabilities of companies, GST will not be supported.

9. Can my firm/group submit multiple applications for the same construction project?

Yes, you may submit multiple applications if the technologies adopted are different and there are no overlapping areas.

10. When will I know the outcome of my PIP application?

You will be notified on the outcome of your PIP application within two months if all supporting documents are in order

11. May I request for seed money at the beginning of my Productivity Innovation Project?

No seed money will be provided at the start of your Productivity Innovation project. Payment of expenses incurred is on a reimbursement basis.

12. When can I submit my claims?

You may submit your claim every six months. All claims must be accompanied by a progress report, an Auditor's Statement and other supporting documents as requested by BCA. The final claim must be submitted within 6 months from the end of development period and accompanied by a final report and necessary documents stated in the Letter of Offer.

For more information, please click on the link below:

[https://www.bca.gov.sg/feedbackform/?Category=BuildSG%20Transformation%20Fund%20\(BTF\)](https://www.bca.gov.sg/feedbackform/?Category=BuildSG%20Transformation%20Fund%20(BTF))

IDD OUTCOME KPIS

SINGAPORE LEADERS' QUICK START GUIDE TO IDD

SAFETY

- Improve site safety
- Reduce number of incidents
- Zero fatal accidents



TIME

- Meet or shorten target construction period
- Reduce floor cycle time
- Reduce Extension of Time



QUALITY

- Better turnaround of quality inspections



COST

- Reduce waste and rework
- Maximise target cost
- Reduce construction cost
- Reduce contingency



PROFIT

- Maximise saleable area or floor efficiency



LITERATURE RESEARCH

Performance

Safety



Time



Quality



Cost



Profit







Manpower







Safety +

1. Improve site safety process
2. Zero accident, regardless minor or fatal

 Digital Design	 Digital Fabrication	 Digital Construction	 Digital Asset Delivery And Management
<ul style="list-style-type: none"> • Design for safety • Reduction in no. of waivers related to safety 	<ul style="list-style-type: none"> • <u>Reduction of safety incidents</u> <ul style="list-style-type: none"> -by using BIM and digital technology to simulate and check product dimensions (W x D x L) and weight (tonnage) for lifting/handling and transportation 	<ul style="list-style-type: none"> • Reduce errors in crane hoisting <ul style="list-style-type: none"> -By simulating hoisting path through BIM • 20% improvement in Permit-To-Work submission (0.19hr vs 0.15hr) <ul style="list-style-type: none"> -By implementing safety management system • 40% improvement in lodgement of non-conformances during safety inspection (3.4hrs vs 2.0hrs) <ul style="list-style-type: none"> -By implementing safety management system • 50% improvement in producing safety audit report (17hrs vs 8.0hrs) <ul style="list-style-type: none"> -By implementing safety management system 	

Time





1. On-time completion percentage
2. Shorten target construction period
3. Reduction of request for EOT

 Digital Design	 Digital Fabrication	 Digital Construction	 Digital Asset Delivery And Management
<ul style="list-style-type: none"> • <u>Design sign-off within 4 month of appointment</u> • Improvement in time spent for design confirmation (i.e. room layout confirmation) 	<ul style="list-style-type: none"> • 22% time savings in inventory tracking during production stage <ul style="list-style-type: none"> - using BIM-based digital logistic management system • <u>70% time saving for receiving orders digitally</u> <ul style="list-style-type: none"> - using digital ordering system • Logistic – zero delivery delay <ul style="list-style-type: none"> - delivery 100% real-time updates of PPVC delivery status by BIM-based QR code system integration with mobile app 	<ul style="list-style-type: none"> • Reduce onsite fit out by 15 working days per typical module • <u>Achieve 25% of time saving on payment claim</u> <ul style="list-style-type: none"> - using digital payment claim to reduce in time spent on verification and assessment of payment claim on structural elements • On-time completion percentage/ahead of schedule <ul style="list-style-type: none"> – using 4D BIM to simulate virtual construction schedule to achieve 20% reduction of floor cycle time, allowing accurate tracking of plan vs actual 	<ul style="list-style-type: none"> • Not more than 1 re-inspection for TOP • <u>Achieve 90% turnover of defects within 14 days</u> <ul style="list-style-type: none"> - using defect management mobile solution

Quality







1. Improve turnaround of quality inspection
2. Reduce defects
3. Client satisfaction

 Digital Design	 Digital Fabrication	 Digital Construction	 Digital Asset Delivery And Management
<ul style="list-style-type: none"> • Reduction in revision and design changes <ul style="list-style-type: none"> -by leveraging technology i.e. VR/AR/MR • <u>Good quality of “frozen design model” handover to contractor</u> <ul style="list-style-type: none"> -by using of BIM for design coordination and client engagement before construction begins 	<ul style="list-style-type: none"> • Reduce no. of defects arising from no. of fabrication errors <ul style="list-style-type: none"> -by virtually picking up errors before fabrication of material and product 	<ul style="list-style-type: none"> • <u>Reduction of time spent for inspection approval</u> <ul style="list-style-type: none"> - By implementing BIM-To-Field mobile solution • Reduction in rework due to workmanship and wrong installation 	<ul style="list-style-type: none"> • <u>40% improvement in QA/QC process (2.5hrs vs1.5hrs)</u> <ul style="list-style-type: none"> - By implementing defect management system • 27% improvement in defect rectification process (1.1hrs vs 0.8hr) <ul style="list-style-type: none"> - By implementing defect management system • Feedback from end-users on severity of defects





Cost \$\$

1. Reduce rework
2. Reduce material wastage

 Digital Design	 Digital Fabrication	 Digital Construction	 Digital Asset Delivery And Management
<ul style="list-style-type: none"> • Improve client decision making <ul style="list-style-type: none"> - Using BIM QTO to estimate cost accurately • <u>Reduce man-hours spent by 50%</u> of optimizing lighting provision <ul style="list-style-type: none"> - Using computational design 	<ul style="list-style-type: none"> • <u>Cost saving from DfMA production</u> <ul style="list-style-type: none"> - By reducing DfMA module types • Improvement in QTO • Reduction in change orders issued to off-site factories 	<ul style="list-style-type: none"> • <u>90% reduction in abortive works for precast façade (no. of reworks 20 vs 2)</u> • Improvement in QTO • <u>10% reduction in material wastage (i.e. concrete/rebar wastage)</u> <ul style="list-style-type: none"> - By using digital ordering system and material tracking system 	<ul style="list-style-type: none"> • <u>20% cost saving</u> in commissioning handover <ul style="list-style-type: none"> - By implementing C2O process system • Smart FM reduces <u>30% cost saving</u> <ul style="list-style-type: none"> - through use of model-based predictive operation and maintenance

Manpower

1. Manpower saving
2. Increase employee satisfaction
3. Reduce turnover rate

 Digital Design	 Digital Fabrication	 Digital Construction	
<ul style="list-style-type: none"> • Reduce man-hours spent by 50% of optimizing lighting provision <ul style="list-style-type: none"> - Using computational design 	<ul style="list-style-type: none"> • 20% manpower saving in <u>inventory tracking during production stage and delivery</u> <ul style="list-style-type: none"> - Using BIM-based digital logistics management and RFID • Manpower saving for DfMA fabrication automation <ul style="list-style-type: none"> - Using automation & robotics for PPVC steel carcass production 	<ul style="list-style-type: none"> • 15% manpower saving from <u>optimized onsite planning and resource management</u> <ul style="list-style-type: none"> - By adoption of lean principle and using BIM-to-Field • Increase workers satisfaction <ul style="list-style-type: none"> -Over time tracking 	<ul style="list-style-type: none"> • Improvement of FM/AM staff competent in using BIM for improved maintainability of assets & physical spaces



“Integrating and Digitalising the Built Environment Value Chain”

Streamlining work processes and
connecting stakeholders...

...through digital data, innovation
and technology...

...across the whole project life cycle from design,
construction, fabrication, to facilities management...

... to deliver a better outcome for end users.

INTEGRATED

DIGITAL

DELIVERY

INDUSTRY LEADERS' QUICK START GUIDE TO IDD: THE “WHAT” & “WHY”



Digital Design

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



Design



Digital Fabrication

Translating design to standardised components for automating off-site production.



Fabrication

Digital Asset Delivery & Management

Real time monitoring for operations and maintenance to enhance asset values.



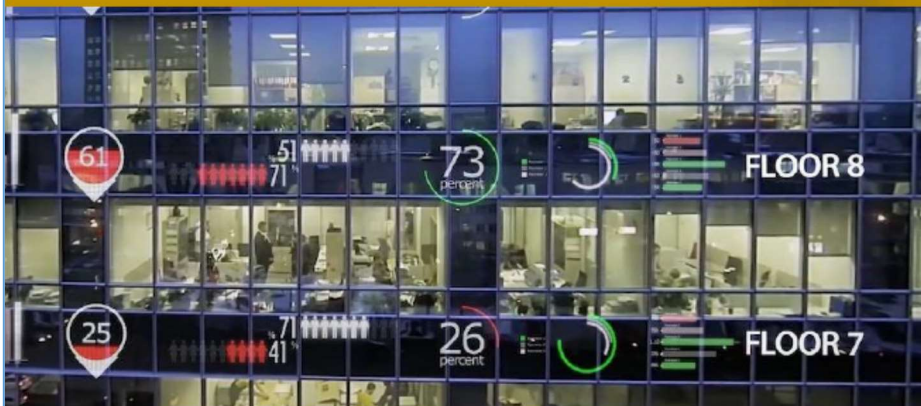
Asset
Delivery &
Management



Construction

Digital Construction

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



IDD builds on BIM & VDC



beyond BIM:
real-time digital data



whole value chain



outcome-based



Mobile & cloud
platform



Artificial intelligence,
machine learning

Transformation



beyond 3D BIM



design + construction
collaboration



reduce issues
& resolution latency



BIM to field

Collaboration



3D BIM
BIM e-submission



core information



design analyses

Information

BIM

Building Information Modelling

“Single Source of Truth”

VDC

Virtual Design and Construction

“Build Twice:
First Virtual, then Real”

IDD

“Integrating and
Digitalising the Built
Environment Value
Chain”

Benefits to PROJECT

Project teams realise outcome-based benefits from IDD such as the following:

TIME



- Meet or shorten target construction period
- Reduce floor cycle time
- Reduce Extension of Time

COST



- Reduce waste and rework
- Maximise target cost
- Reduce construction cost
- Reduce contingency

PROFIT



- Maximise saleable area or floor efficiency

SAFETY



- Improve site safety
- Reduce number of incidents
- Zero fatal accidents

QUALITY



- Better turnaround of quality inspections

Value to STAKEHOLDERS

At the same time, project stakeholders achieve value to meet their individual objectives, which in turn benefits the project as a whole.

OWNER / DEVELOPER



- Best design outcome for project
- Improved cost, time, and quality project goals
- More accurate & reliable digital asset information
- Enhanced value of assets

DESIGNER



- Faster and better design options
- Better design coordination and reduced RFIs
- Improved competitiveness

CONTRACTOR



- Reduced risk
- Reduced reworks
- Higher accuracy in bidding
- More time for value engineering
- Improved safety

FABRICATOR



- Faster shop drawing approval
- Automated translation of design to production/fabrication
- Improved production management

ASSET / FM OPERATOR



- Cost effective operations
- Enhanced lifecycle management
- Real time access to O&M manuals
- Streamlined maintenance regime

Applying IDD to PPVC



PPVC (Prefabricated Prefinished Volumetric Construction) is one of the most productive DfMA (Design for Manufacturing and Assembly) technologies. IDD helps to push the boundaries of productivity even further through digitalisation and streamlining of the entire PPVC workflow.



