

Enhancing Modular Integrated Construction (MiC) Supply Chain in the Greater Bay Area (GBA) for Hong Kong Development

QUESTIONNAIRE SURVEY

Aim of the Survey: This questionnaire survey is part of the research project funded by the Policy Innovation and Co-ordination Office (PICO) of the HKSAR Government under the Strategic Public Policy Research (SPPR) funding scheme (Project Number: S2019.A8.013). The project is entitled “Enhancing Modular Integrated Construction (MiC) Supply Chain in the Greater Bay Area (GBA) for Hong Kong (HK) Development”. The survey aims to identify the regulatory and business drivers, opportunities, constraints and concerns for MiC supply chain identification and enhancement, and to develop relevant measures and strategies.

Confidentiality: All responses will be treated in strict confidentiality with identity protected and used for research purpose only.

Definitions:

- **MiC:** A game-changing disruptively-innovative approach to transforming fragmented site-based construction of buildings and facilities into integrated value-driven production and assembly of prefinished modules with the opportunity to realise enhanced quality, productivity, safety and sustainability. MiC systems can engage modules in steel frame, concrete, timber, and composite materials, and could be applied to the building sectors including private housing, public housing, hostel, hotel and hospital, etc.
- **Drivers:** factors that motivate MiC supply chain identification and enhancement in the GBA for HK development.
- **Opportunities:** occasions or situations that make it possible for MiC supply chain identification and enhancement in the GBA for HK development.
- **Constraints:** factors that hinder MiC supply chain identification and enhancement in the GBA for HK development.
- **Concerns:** problems or issues that should be addressed to support MiC supply chain identification and enhancement in the GBA for HK development.
- **Measures:** methods/actions for amplifying drivers/opportunities and/or mitigating constraints/concerns for MiC supply chain identification and enhancement.
- **Strategies:** short-term or long-term plans to guide or facilitate the implementation of measures.



HOW TO COMPLETE AND RETURN THE QUESTIONNAIRE

This questionnaire is designed to be completed in about 15 minutes. We would be most grateful you could kindly complete and return the questionnaire using any of the following methods

- (1) Complete online by clicking the web link: (English) https://www.surveymonkey.com/r/SPPR_EN; or (Traditional Chinese): https://www.surveymonkey.com/r/SPPR_TCN; or scan the QR code; (2) Complete the PDF which is also downloadable from <https://www.miclab.hk/mic-sppr>, scan and reply to Dr Yi Yang (+852 6417 4342) at yyang@hku.hk; (3) Complete on a printed version of the questionnaire and post it to Professor Wei Pan at the postal address: Room 6-18A, Haking Wong Building, Department of Civil Engineering, The University of Hong Kong, Pokfulam Road, Hong Kong.

If you understand the contents described above and agree to participate in this survey, please fill the circle I agree.

I INFORMATION OF PARTICIPANTS

1. Your primary area of practice (please fill the most relevant one circle only)

Government/developers	<input type="radio"/> Policy bureaus (e.g. DEVB) <input type="radio"/> Regulatory departments (e.g. BD) <input type="radio"/> Public developers (e.g. HA) <input type="radio"/> Private developers
Contractors	<input type="radio"/> Main contractors <input type="radio"/> Specialist contractors
Suppliers	<input type="radio"/> Precast suppliers <input type="radio"/> MiC suppliers <input type="radio"/> Other suppliers
Consultants	<input type="radio"/> Architects <input type="radio"/> Structural engineers <input type="radio"/> Building service engineers <input type="radio"/> Surveyors <input type="radio"/> Smart construction consultants <input type="radio"/> Other consultants
Institutions	<input type="radio"/> Professional institutions (e.g. HKIE, HKIA) <input type="radio"/> Educational institutions (e.g. HKU)
<input type="radio"/> Others (please specify) _____	

2. Number of years working in the building sector 0-5 6-9 10-19 20 and above

3. Main building sectors you have been involved (tick more as appropriate) Private housing Public housing Transitional housing
 Hostel Hospital School Staff quarters Office Quarantine camp Others (please specify) _____

4. Number of years of work experience with modular construction/MiC 0 1-5 6-9 10-19 20 and above

5. Number of MiC projects you have been involved 0 1-2 3-5 6-9 10 and above

6. Main type(s) of MiC systems you have been involved (tick more as appropriate)
 Steel Concrete Hybrid Timber Others

7. Main location(s) of your work? (tick more as appropriate) Hong Kong Macao Shenzhen Guangzhou Zhuhai
 Jiangmen Zhongshan Dongguan Huizhou Foshan Zhaoqing Others (please specify) _____

II ATTITUDE/PERCEPTIONS ON MiC SUPPLY CHAIN FOR HONG KONG

8. How would you evaluate the influence of MiC on the development of Hong Kong?

Very weak Weak Neutral Strong Very strong

9. How would you evaluate the influence of supply chain on the development of MiC in GBA?

Very weak Weak Neutral Strong Very strong

10. How would you evaluate the importance of MiC supply chain identification and enhancement for Hong Kong?

Not important Somewhat important Important Very important Extremely important

11. How would you evaluate the urgency of MiC supply chain identification and enhancement for Hong Kong?

Not urgent Somewhat urgent Urgent Very urgent Extremely urgent

III DRIVERS FOR MiC SUPPLY CHAIN

12. How important do you view the following drivers for MiC supply chain identification & enhancement in the GBA?

Possible drivers (Fill one circle each row)	Not important	Somewhat important	Important	Very important	Extremely important
<i>Technical perspective</i>					
(1) HK market needs to identify eligible MiC suppliers and products efficiently	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(2) Main contractors are highly reliant on MiC suppliers and subcontractors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(3) The need to increase cost and time certainty of module delivery	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(4) The need to improve module installation efficiency and quality on site	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(5) Effective supply chain is critical to MiC project success	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>Political and regulatory perspective</i>					
(6) The need for policy initiatives to promote MiC for HK development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(7) The need for consistent MiC building codes and regulations in the GBA	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(8) The need for MiC transport codes and regulations in the GBA	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(9) The need for consistent MiC quality assurance/control (QA/QC) mechanism in the GBA	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>Socio-economic perspective</i>					
(10) The need for fast housing supply to address HK's housing shortage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(11) The need for speedy delivery of facilities against disruptive events (e.g. Covid-19 epidemic)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(12) The increasing need to procure modules outside Hong Kong	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(13) The need to achieve economies of scale via mass production of modules	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(14) HK contractors & GBA suppliers need long-term relationship	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>Geographical perspective</i>					
(15) HK is an important MiC market in the GBA with geographic advantages	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If any other drivers, please specify: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

IV OPPORTUNITIES FOR MiC SUPPLY CHAIN

13. How important do you view the following opportunities for MiC supply chain identification & enhancement in the GBA?

Possible opportunities (Fill one circle each row)	Not important	Somewhat important	Important	Very important	Extremely important
<i>Technical perspective</i>					
(1) MiC suppliers in GBA experienced in overseas modular high-rise projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(2) Demonstrated benefits of MiC and established guidebooks for MiC performance measurements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(3) Mature practices in HK to import certificated building materials & products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(4) Digital techniques enable remote inspection of module production	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(5) Smart technologies (e.g. IoT, AI) can enhance MiC supply chain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>Political and regulatory perspective</i>					
(6) The 6% exemption from Gross Floor Area (GFA) can drive MiC demand	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(7) MiC pre-approval mechanism can facilitate project planning and design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(8) Relevant guidance has been formulated for MiC design and inspection	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(9) Some inspection and approval requirements for service installation (fire, plumbing and electricity) are the same in MiC and traditional projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(10) GBA cities adopt electronic import/export declaration systems, providing opportunities for setting up one-stop digital declaration system for MiC	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>Socio-economic perspective</i>					
(11) Business opportunities for clients/developers to work with pre-approved MiC suppliers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(12) The low import-export duty rates of HK is financially favourable for procuring modules in the GBA	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(13) HK as a major GBA MiC market due to global geopolitical and epidemic situations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(14) MiC-related training will improve the practitioners' MiC capabilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>Geographical perspective</i>					
(15) Transportation risk is controllable given the geographic closeness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(16) Inspection in factory is realisable given the geographic closeness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If any other opportunities, please specify: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

V CONSTRAINTS FOR MiC SUPPLY CHAIN

14. How significant do you view the following constraints for MiC supply chain identification & enhancement in the GBA?

Possible constraints (Fill one circle each row)	Not significant	Somewhat significant	Signifi-cant	Very significant	Extremely significant
<i>Technical perspective</i>					
(1) Challenges to freeze design specification early	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(2) Limited use of new technologies (e.g. IoT) in MiC supply chain	0	0	0	0	0
(3) Challenges in inter-disciplinary collaboration due to industry fragmentation	0	0	0	0	0
(4) Heavy machinery for module erection is not widely used in HK and may not be suitable for congested sites	0	0	0	0	0
(5) Complicated QA/OC liability issues (e.g. responsibility allocation and product warranty) when MiC suppliers are outside of HK	0	0	0	0	0

Political and regulatory perspective

(6) Lack of public policy on MiC supply chain	0	0	0	0	0
(7) Lack of effective governmental incentives, subsidies and promotions	0	0	0	0	0
(8) Incomprehensive building codes and regulations for MiC in Hong Kong	0	0	0	0	0
(9) Some HK building codes are too stringent to facilitate early design freeze	0	0	0	0	0
(10) Current HK transport regulations restrict the delivery of large modules	0	0	0	0	0

Socio-economic perspective

(11) High initial capital cost for developing MiC factories	0	0	0	0	0
(12) The industry is reluctant to use MiC due to the cost-driven culture	0	0	0	0	0
(13) Lack of effective MiC procurement methods	0	0	0	0	0
(14) Market demand for MiC remains low	0	0	0	0	0

Geographical perspective

(15) The hilly landscape of HK constraints module transportation	0	0	0	0	0
(16) The narrow streets of HK constraints module transportation	0	0	0	0	0
If any other constraints, please specify: _____	0	0	0	0	0

VI CONCERNS FOR MiC SUPPLY CHAIN

15. How significant do you view the following concerns for MiC supply chain identification & enhancement in the GBA?

Possible concerns (Fill one circle each row)	Not significant	Somewhat significant	Signifi-cant	Very significant	Extremely significant
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Technical perspective

(1) Lack of collaboration platform for MiC projects	0	0	0	0	0
(2) GBA MiC suppliers no familiar with HK construction practices	0	0	0	0	0
(3) Concerns on module manufacturing performance as no mandatory requirement for factory workers to obtain qualification certificates	0	0	0	0	0
(4) Increased transportation and logistics consideration in MiC	0	0	0	0	0
(5) Lack of module storage areas in HK	0	0	0	0	0

Political and regulatory perspective

(6) Inefficient review and approval if authorities are unfamiliar with MiC	0	0	0	0	0
(7) Inconsistent building codes and regulations for MiC in the GBA	0	0	0	0	0
(8) Inconsistent transport codes and regulations for MiC in the GBA	0	0	0	0	0
(9) No cargo clearance and declaration guidance note specific for MiC	0	0	0	0	0
(10) Existing MiC QA/QC regulations lack practicability	0	0	0	0	0

Socio-economic perspective

(11) Lack of skilled workers for MiC supply and implementation	0	0	0	0	0
(12) Increased equipment costs for powerful lifting	0	0	0	0	0
(13) MiC introduces significant changes to the payment terms and cash flows	0	0	0	0	0
(14) Inefficient communication due to language barrier (e.g. different terms used in practices)	0	0	0	0	0
(15) Uncertainties in the currency exchange rate	0	0	0	0	0

Geographical perspective

(16) Transportation time is impacted by the opening hours of land control points	0	0	0	0	0
If any other concerns, please specify: _____	0	0	0	0	0

16. How would you agree: "The drivers & opportunities for GBA MiC supply chain outperform the constraints & concerns"?

Strongly disagree Disagree Neutral Agree Strongly agree

VII MEASURES FOR MiC SUPPLY CHAIN

17. How important do you view the following measures for MiC supply chain identification & enhancement in the GBA?

Possible measures (Fill one circle each row)	Not important	Somewhat important	Important	Very important	Extremely important
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Technical perspective

(1) GBA suppliers to team up with local designers for pre-approval application	0	0	0	0	0
(2) Mandatory use of BIM for pre-submission	0	0	0	0	0
(3) Use smart technologies to facilitate MiC site inspection processes	0	0	0	0	0
(4) Develop third party agency for overseas offsite manufacturing inspection	0	0	0	0	0
(5) Encourage MiC professional inspectors in the Mainland to register in HK	0	0	0	0	0
(6) Digitalise transport impact assessment to facilitate regulatory approval	0	0	0	0	0
(7) GBA prefab factories transfer to supply volumetric modules for MiC	0	0	0	0	0

(8) Establish GBA MiC supply chain database	0	0	0	0	0
(9) Develop collaboration platform for MiC supply chain management	0	0	0	0	0
Political and regulatory perspective					
(10) Develop a one-stop platform that includes all relevant regulatory bodies, to facilitate expedited evaluation and enhance the regulatory approval process	0	0	0	0	0
(11) Streamline design approval process for improved efficiency	0	0	0	0	0
(12) Increase the comprehensiveness of MiC related codes and regulations	0	0	0	0	0
(13) Develop seismic design code for MiC in Hong Kong	0	0	0	0	0
(14) Develop guidance on import/export declaration specific for MiC	0	0	0	0	0
(15) Improve the practicability of current MiC QA/QC system	0	0	0	0	0
(16) Refine transport regulation to facilitate the adoption of MiC	0	0	0	0	0
(17) Develop GBA one-stop approval system for MiC transport permission	0	0	0	0	0
(18) Develop GBA one-stop customs clearance system specific for MiC	0	0	0	0	0
Socio-economic perspective					
(19) Government take the lead to promote and adopt MiC	0	0	0	0	0
(20) Develop MiC cost codes for cost evaluation and benchmarking	0	0	0	0	0
(21) Identify innovative MiC procurement methods	0	0	0	0	0
(22) Increase industry knowledge sharing	0	0	0	0	0
(23) Increase professional training for MiC inspectors	0	0	0	0	0
(24) Increase training to enhance MiC practitioners' knowledge and skills	0	0	0	0	0
Geographical perspective					
(25) Consider MiC adoption from urban planning stage	0	0	0	0	0
(26) Adopt MiC in new development areas in HK	0	0	0	0	0
(27) Develop MiC factories in HK	0	0	0	0	0
If any other measures, please specify: _____	0	0	0	0	0

VIII STRATEGIES FOR MiC SUPPLY CHAIN

18. How important do you view the following strategies to guide/facilitate the recommended measures for MiC supply chain identification & enhancement in the GBA?

Possible strategies (Fill one circle each row)	Not important	Somewhat important	Important	Very important	Extremely important
(1) Enhance HK regulatory bodies' understanding of MiC	0	0	0	0	0
(2) Provide GBA-wide MiC training courses for practitioners	0	0	0	0	0
(3) Provide policy support to attract more GBA MiC suppliers to HK market	0	0	0	0	0
(4) Establish innovative funding schemes to attract more MiC suppliers to HK	0	0	0	0	0
(5) Provide technical support to attract more GBA MiC suppliers to HK market	0	0	0	0	0
(6) Promote MiC digital design to enhance multi-disciplinary collaboration	0	0	0	0	0
(7) Build up BIM model repository specific for MiC	0	0	0	0	0
(8) Provide policy support to streamline relevant regulatory approval process	0	0	0	0	0
(9) Public consultation and discussions on MiC related codes and regulations	0	0	0	0	0
(10) Encourage intra-government department collaboration for MiC	0	0	0	0	0
(11) Provide incentives for MiC suppliers to digitalise the manufacturing process	0	0	0	0	0
(12) Provide policy support to attract experts & young talents into MiC industry	0	0	0	0	0
(13) Enhance research and development on smart MiC	0	0	0	0	0
(14) Provide logistics-supporting facilities (e.g. factory, warehouse) in HK	0	0	0	0	0
(15) Streamline the procedures of customs declaration and clearance for MiC	0	0	0	0	0
If any other strategies, please specify: _____	0	0	0	0	0

19. If you have any other comment on MiC supply chain identification and enhancement in general, please specify:

20. Please provide your email if you would like to receive a summary report of the research findings.

21. Would you wish to attend a follow-up interview (over the telephone or in person)?

Yes (please provide your contact information) _____ No

-END OF THE QUESTIONNAIRE-

Thank you for your participation!

If you have any question about this survey, please feel free to contact the Principal Investigator Professor Wei Pan (2859 2671; wpan@hku.hk). If you want to know more about the rights as a research participant, please contact the Human Research Ethics Committee for Non-Clinical Faculties, The University of Hong Kong (2241 5267).