

# Building Tomorrow: Embracing Innovation and Digitalisation

November 2025



**Development Bureau**

The Government of the  
Hong Kong Special Administrative Region  
of the People's Republic of China











## Foreword

Since the launch of Construction 2.0 in 2018, the Development Bureau of the Government of Hong Kong Special Administrative Region and local construction industry have continuously formulated strategic initiatives aiming at enhancing governance, capability, productivity, safety and sustainability of the project delivery industry.

One of the policy measures to support this ambition is the successful launch of the International Infrastructure and Projects Leaders Summit (IIPLS) from 14 - 16 November 2024, an international landmark summit for infrastructure sector.

IIPLS brought together over 500 esteemed infrastructure and major project leaders and visionary experts in infrastructure from over 20 economies around the globe, for exchanging insights and best practices in project delivery and governance, and equally important fostering collaborations and jointly formulating strategies and initiatives to enhance the performance of mega and complex infrastructure projects.

There were three plenary sessions in IIPLS, namely “The Next Growth Curve: Pivoting Infrastructure for City Development”, “Powerful Partnerships: Collaboration for Project Success” and “Building Tomorrow: Embracing Innovation and Digitalisation”.

This publication is part of a series of three publications aimed at reinforcing Hong Kong’s position as an International Infrastructure Centre. While this publication focuses on the key theme of embracing innovation and digitalisation, the other two delve into pivoting infrastructure for city development and powerful partnerships for project success. Together, they provide a comprehensive overview of Hong Kong’s strategic initiatives in infrastructure development.







# Smart Cities





	Page
Perspectives from international infrastructure project leaders on digitalisation and innovation in Hong Kong	6
Executive Summary	8
Hong Kong's Innovation Engine	10
Core of Innovation	
Government: Architect and Enabler	
Industry Partners: Drivers of Execution	
R&D Institutions: Catalysts for Innovation	
Accelerators of Innovation	
Strategic Transformation	
Skills and Capabilities	
Technology and Standards	
Conclusion	20

# Perspectives from international infrastructure project leaders on digitalisation and innovation in Hong Kong

During the IIPLS, a plenary session focused on innovation and digitalisation featured a panel of prominent infrastructure leaders, industry experts, and innovators who shared their insights on various topics. Key points on Modular Integrated Construction (MiC) were captured below:



Labour shortages in the industry stem from unsafe working conditions, and adopting MiC can create a cleaner, safer environment.



Hong Kong currently has over 120 MiC projects at various stages, with a total contract value exceeding HK\$100 billion.



Since 2014, the Singapore Government has driven MiC demand through regulatory levers and demand generation, with the public sector responsible for 55%-60% of construction works.



The Greater Bay Area (GBA), home to 80% of China's supply chain enterprises, can support MiC development by leveraging its manufacturing capabilities alongside Hong Kong's skilled workforce and international standards.

This publication further explores how Hong Kong is harnessing digital tools and forward-thinking solutions to build a world-class infrastructure ecosystem.





**Carl DEVLIN**  
Capital Works  
Director,  
MTR Corporation  
Limited

"As industry leaders, we must move beyond the debate of maintaining business as usual versus embracing change. Innovation is not an option; it is essential for the sustainable delivery of future projects and addressing the challenges we face."

"Hong Kong's proximity to Shenzhen, the 'Silicon Valley of China', allows local innovators to tap into a network that accelerates the development of new technologies. Initiatives like the San Tin Technopole will become essential environments for collaboration with the GBA."

**Jack CHAN**  
Chairman  
of EY China  
and Regional  
Managing  
Partner of EY  
Greater China



**Ian GALBRAITH**  
Group Executive  
Board Director,  
Mott MacDonald

"Transformational programmes led by clients in transformational market places such as Hong Kong give us the opportunity to make big step changes that introduce new and younger talent from other industries who are used to changing at pace."

"Through the Building Technology and Research Institute (BTRi), we hope to leverage Hong Kong's research and innovation ecosystem to bring valuable solutions that will enhance the capabilities of our industry in Singapore."

**Teck Thai HENG**  
Deputy CEO,  
Building and  
Construction  
Authority,  
Singapore



**Prof. Wei PAN**  
Head of  
Department of  
Civil Engineering,  
The University of  
Hong Kong

"Hong Kong is the only city in the world with 5 universities ranked in the QS World University Rankings top 100. That paves a solid foundation to foster close collaboration with universities who are the powerhouse for continuous scientific breakthroughs and technological solutions."

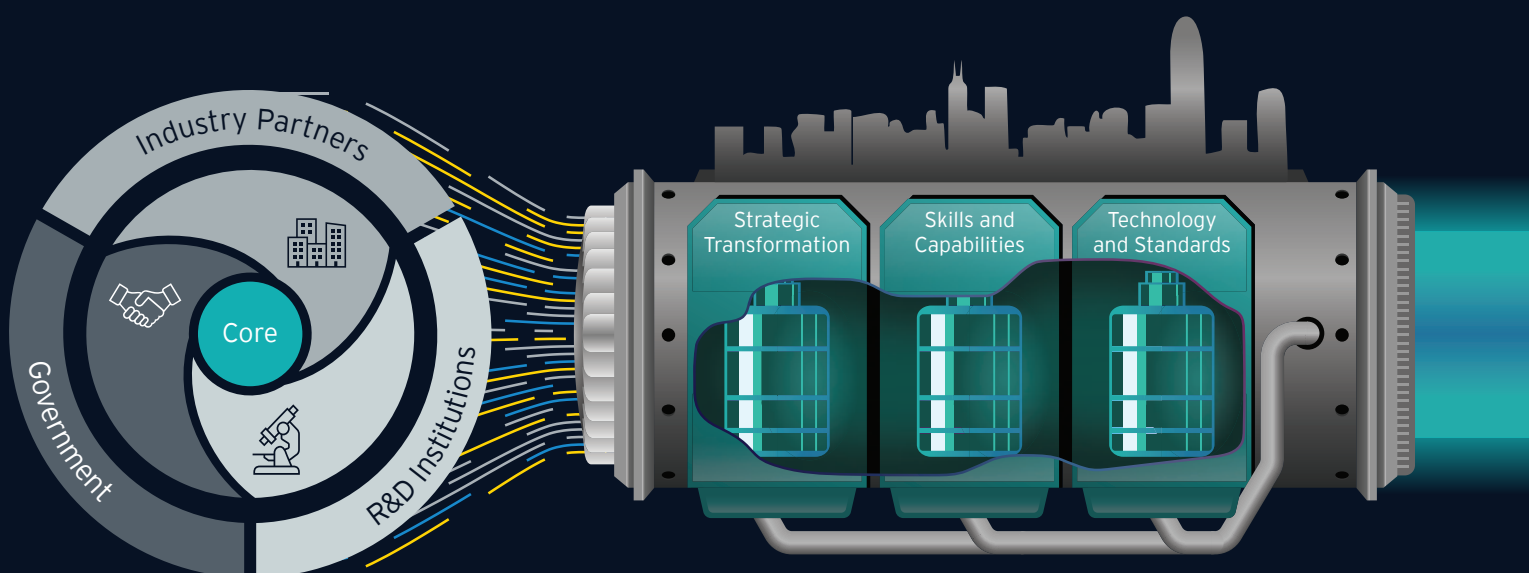
# Executive Summary

## Hong Kong's Innovation Engine

Hong Kong stands at the cusp of a transformative era in infrastructure delivery, expecting unprecedented growth over the next 20 to 30 years. With Capital Works expenditure averaging approximately 3.4% of the GDP, the city is committed to innovating and digitalising capital works delivery across the asset lifecycle to meet this demand.

Embracing innovation and digitalisation is essential for building the city's infrastructure of tomorrow, that adapts to Hong Kong's evolving needs and those of the GBA. With the total construction output at around 9% in 2023-24, integrating advanced technologies and innovative practices will streamline processes, enhance collaboration, and create a more sustainable and responsive infrastructure system. These initiatives set a benchmark for excellence in infrastructure delivery and shapes the city's future.

This publication examines how Hong Kong's core foundational infrastructure ecosystem – comprising the Government, Industry Partners, and Research and Development (R&D) Institutions – is strengthened by three accelerators to form a powerful innovation engine:



**Accelerator 1**  
**Strategic Transformation**

**Accelerator 2**  
**Skills and Capabilities**

**Accelerator 3**  
**Technology and Standards**

Hong Kong is known for its tenacity, ingenuity, entrepreneurialism and innovative nature. These qualities are embodied in the three accelerators that will propel its core ecosystem, the city and the GBA forward at pace to become the international infrastructure centre.





### Accelerator 1

## Strategic Transformation

**Establishing a robust strategy and governance framework was the foundational piece for strengthening Hong Kong's ecosystem.**

The Development Bureau has implemented "Construction 2.0" which advocates "innovation", "professionalisation" and "revitalisation" with initiatives promoting the New Engineering Contract (NEC), Building Information Modelling (BIM) and the Integrated Capital Works Platform (iCWP). Hong Kong is setting global standards for capital works project delivery, cost efficiency, quality, and sustainability.

### Accelerator 2

## Skills and Capabilities

**Empowering decision-makers with the leadership skills and confidence to steer digitalisation and innovation is vital to its successful implementation.**

Initiatives like the Centre of Excellence for Major Project Leaders (CoE) cultivate ownership while enhancing leadership skills and project delivery capabilities. Through specialised programmes with esteemed institutions, the CoE prepares future leaders and aligns educational curricula with industry needs, fostering continuous learning and adaptability in the workforce.

### Accelerator 3

## Technology and Standards

**Embracing innovation and digitalisation is essential for Hong Kong to remain competitive and sustainable in a rapidly evolving global landscape.**

The BTRi exemplifies Hong Kong's commitment to innovation, focusing on R&D in construction materials and technologies, establishing standards, conducting testing, and providing accreditation. Through collaboration with GBA authorities, the BTRi aims to promote interconnectivity and integrated development.



# Foundational Ecosystem of Hong Kong's Infrastructure: The Core of Innovation



“ The World Bank's Ease of Doing Business Index consistently ranks Hong Kong among the top locations globally, with a current ranking third out of 190 economies. ”

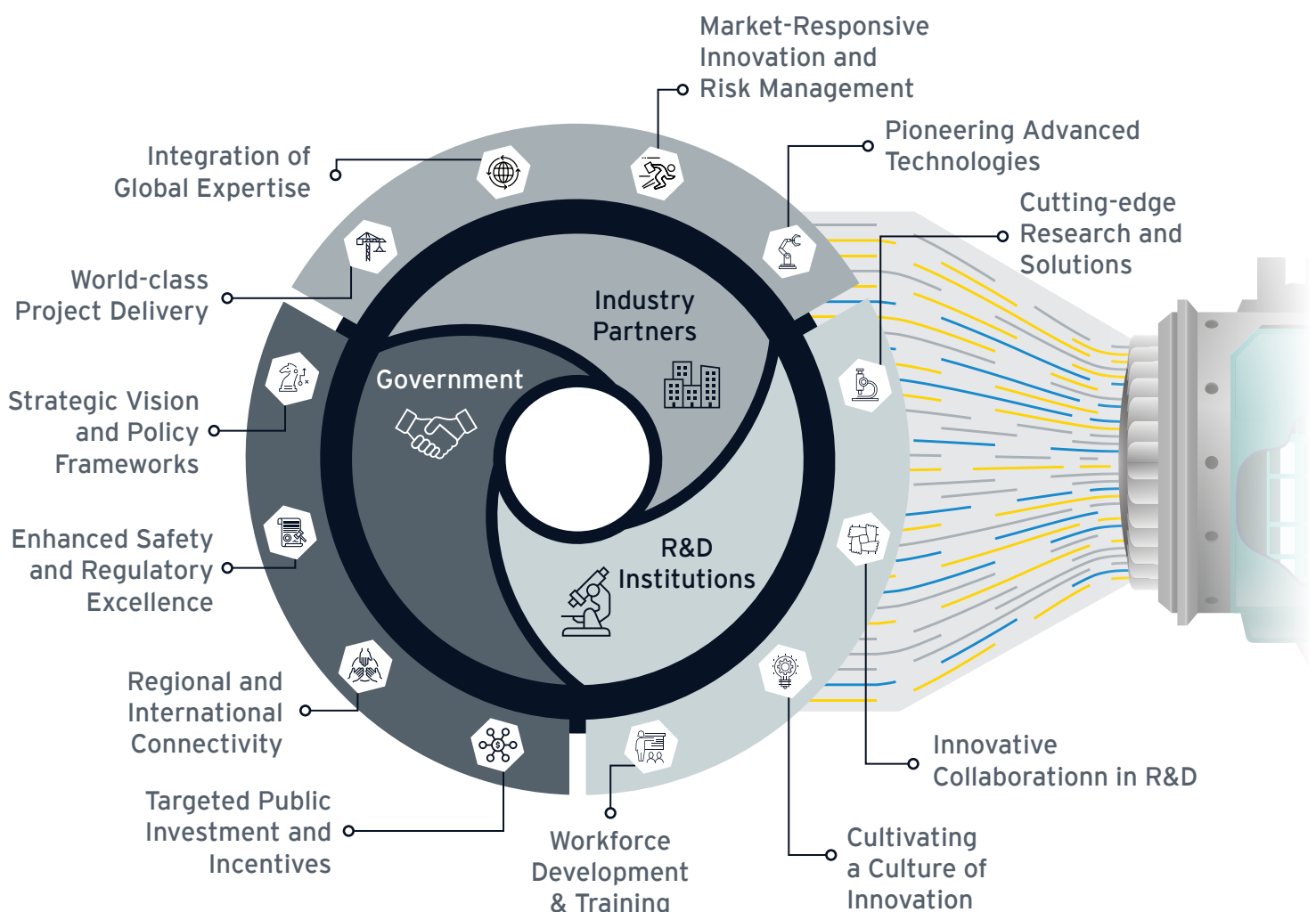
**Jack Chan**

Chairman of EY China and Regional Managing Partner of EY Greater China

At the core of Hong Kong's success lies a foundational ecosystem of three elements: the Government, Industry Partners, and R&D Institutions. This alliance forms the backbone of Hong Kong's infrastructure, fostering innovation, efficiency, and sustainability.

The strength of this ecosystem enhances the city's reputation as a global leader in delivering complex and ambitious infrastructure projects. Its unique geographical position – at the crossroads of global markets and close to Chinese Mainland – provides unparalleled access to resources, talent, and opportunities.

## Hong Kong Foundational Ecosystem







## Government: Architect and Enabler

The Hong Kong Government is pivotal in shaping the city's infrastructure ecosystem, offering strategic leadership regulatory oversight, and financial support to guide development and foster innovation.



### Strategic Vision and Policy Leadership

The Government drives long-term urban development through initiatives such as the Smart City Blueprint 2.0 and the Northern Metropolis Development Strategy. These programmes set an ambitious agenda for sustainability and digitalisation.



### Regional and International Connectivity

The Government facilitates collaboration and resource sharing by leveraging Hong Kong's proximity to Chinese Mainland, integration with the GBA, and as a global super-connector, enhanced by initiatives like the Belt and Road to expand regional influence.



### Enhanced Safety and Regulatory Excellence

The Government ensures global construction standards are upheld by implementing advanced systems like the Smart Site Safety System (4S), delivering consistent safety and quality across all infrastructure projects.



### Targeted Public Investment and Incentives

The Government supports transformative innovation, catalysing progress across the infrastructure sector through dedicated funding mechanisms such as the Construction Innovation and Technology Fund (CITF).

## Hong Kong - Zhuhai - Macao Bridge

Over  
**HK\$146bn**  
(US\$18.8bn)  
collaborative effort  
between Hong  
Kong and Mainland  
Government

**World's  
longest**  
sea-crossing  
bridge-tunnel  
system

Dramatically  
reduced Hong Kong-  
Zhuhai travel time  
from 4 hours to  
**just 45  
minutes**



## Industry Partners: Drivers of Execution

Industry partners - developers, contractors, consultants, and investors - are the operational force delivering Hong Kong's infrastructure. Their expertise and commitment to excellence ensure projects meet the highest global standards.



### World-Class Project Delivery

Industry partners excel in executing complex, large-scale projects that transform Hong Kong's urban landscape while showcasing construction expertise and excellence.



### Integration of Global Expertise

Industry partners enhance local expertise by integrating global capabilities, collaborating with government and R&D institutions to adopt best practices, fostering innovation, and driving sustainable growth in the local ecosystem.



### Market-Responsive Innovation and Risk Management

Industry partners balance innovative construction methods with robust risk management practices, addressing shifting market dynamics and practical challenges.



### Pioneering Advanced Technologies

Industry partners lead in adopting innovative construction methods that improve efficiency, reduce costs, and enhance sustainability, reinforcing Hong Kong's position in modern construction practices.

## Innovation Executed: Use of High-Strength Steel



The Tseung Kwan O Cross-bay Link utilised S690 high-strength steel, delivering nearly double the strength of traditional S355 steel.

The project exemplifies effective collaboration among government, research centres, designers, and contractors which resulted in a reduction of material costs by approximately 30%.

Estimated **HK\$100M**  
**savings** in overall construction  
cost from use of **S690** steel



## R&D Institutions: Catalysts for Innovation

Hong Kong's world-leading R&D institutions provide the scientific, technical, and educational foundation for the city's infrastructure ecosystem through research, knowledge transfer, and workforce development, enabling continuous innovation.



### World-class talent

5 Universities in Hong Kong in the Top 100 in the World\*

The University of Hong Kong

The Chinese University of Hong Kong

The Hong Kong University of  
Science and Technology

The Hong Kong Polytechnic University

City University of Hong Kong



The Government establishes  
**R&D and technology centres**  
to promote innovation and  
technological development

Hong Kong Applied Science and Technology  
Research Institute

Building Technology Research Institute

Hong Kong Cyberport

Hong Kong Science and  
Technology Parks Corporation

Hong Kong-Shenzhen Innovation  
and Technology Park



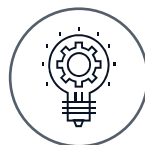
### Cutting-Edge Research and Solutions

R&D institutions ensure Hong Kong is equipped to meet emerging challenges. Organisations such as the Centre for Innovation in Construction & Infrastructure Development (CICID), focus low-carbon smart infrastructure, and data-driven project management



### Innovative Collaboration in R&D

R&D institutions promote problem-solving and teamwork among students, researchers, and industry professionals through hackathons, design competitions, and pilot projects, generating innovative solutions.



### Cultivating a Culture of Innovation

R&D institutions bridge the gap between research and implementation by partnering with the Government and industry to develop and test new technologies. Organisations such as HKSTP and the BTRi drive innovation and standardise best practices.



### Workforce Development and Training

R&D institutions ensure that Hong Kong's workforce is equipped with the right skills for emerging technologies. Organisations like the Construction Industry Council (CIC) provide hands-on training, creating a steady pipeline

It is clear that Hong Kong's core, its foundational ecosystem of these three central elements - the Government, Industry Partners, and R&D Institutions - is robust and world leading.

The foundational ecosystem forms the basis from which we can amplify using the three accelerators that are unique to Hong Kong as detailed over the following pages.



## Accelerator 1:

# Strategic Transformation

Establishing a robust strategy and governance framework is the foundational piece for strengthening Hong Kong's ecosystem.

Strategic transformation is essential for fostering innovation and accelerating digitalisation in the sector. The Project Strategy and Governance Office (PSGO) under the Development Bureau leads this effort to ensure effective public works delivery.



## Execution of "Construction 2.0"

The PSGO is charged with implementing "Construction 2.0", centered around three key pillars:

- **Innovation:** Cultivate a culture of innovation and technology adoption to boost productivity, efficiency, and project delivery.
- **Professionalisation:** Raise industry standards with improved leadership, skills, and safety practices for better outcomes.
- **Revitalisation:** Attract and nurture new talent to energise the workforce and increase industry agility.



## New Engineering Contract (NEC)



The NEC engineering and construction contract (ECC) Hong Kong Edition, launched in 2023, is the only location-specific edition outside of the United Kingdom (UK). It introduces the Secondary Option Clause X30 for innovation and technology, encouraging contractors and project managers to propose solutions that enhance project performance and sustainability.

This edition incorporates legal frameworks that ensure compliance with local laws and promotes smoother project execution, collaboration and improvement in construction practices.

## BIM Adoption & Harmonisation

Since 2013, BIM has underpinned the Government's digitalisation strategy. In 2023, the Development Bureau released the Roadmap on Adoption of BIM for Building Plan Preparation and Submission as well as the updated BIM Harmonisation Guidelines for Works Departments.

These initiatives aim to align the implementation, delivery and management of capital works projects to ultimately support Smart City planning.





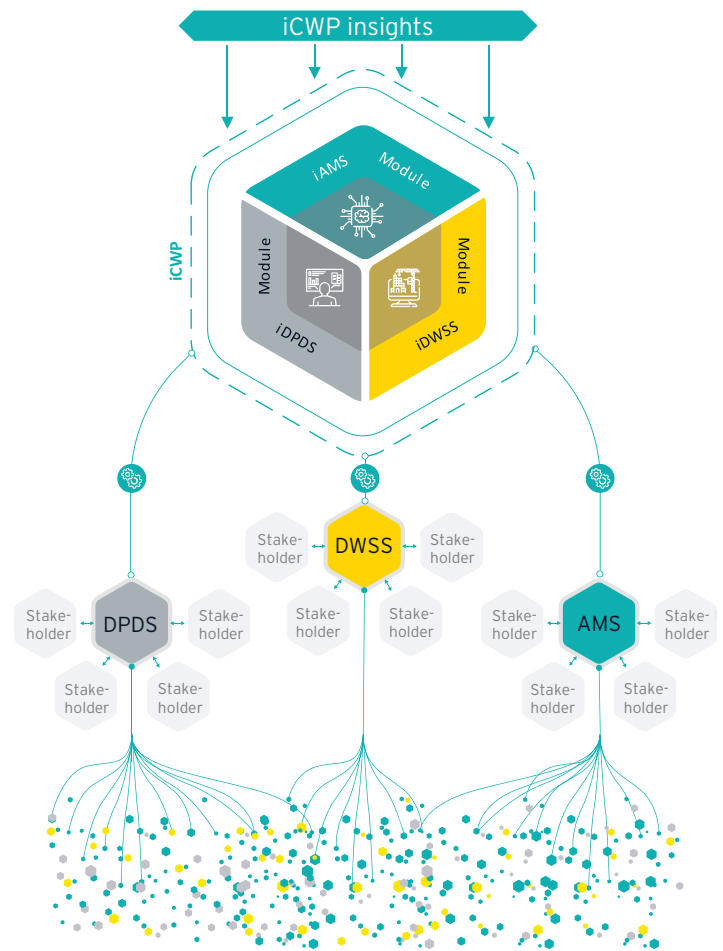
## A Digital Strategy for Public Works

A key element of this transformation is the Government's Public Works Digital Strategy, led by the Development Bureau to make digital the default.

The strategy aims to transition from a "data-rich" to an "information-rich" environment, enabling stakeholders to effectively capture and exploit data on a common platform. This structured approach focuses on:

- **Better Information:** Enhancing data quality and accessibility.
- **Better Efficiency:** Streamlining processes through digitalisation.
- **Better Outcomes:** Improving project delivery and operations and maintenance (O&M).

A cornerstone of the digital transformation is the development of the iCWP launched in 2022. This platform unifies data collection and analysis across platforms like Digital Project Delivery System (DPDS), Digital Works Site Supervision System (DWSS), and Asset Management System (AMS).



## Modern and Enhanced Project Governance

The Development Bureau has established robust frameworks for effective project governance, ensuring high-quality outcomes. Key initiatives include:



### Design Optimisation

Implementing the "Fitness-for-Purpose" and "No Frills" principles to improve efficiency.



### Expanded Cost Control

Extending cost surveillance from project initiation to completion.



### Project Surveillance System (PSS)

Developing the AI-enabled PSS for monitoring progress and predictive analyses.



### Cost Benchmarking

Publishing reports to refine project estimations, improve transparency, and bolster cost management.

## Future Outlook

The Development Bureau is transforming the infrastructure sector by prioritizing better information for efficiency and outcomes. Its focus on process and data innovation drive high-quality, sustainable projects, establishing Hong Kong's leadership in infrastructure innovation and digitalisation.



## Accelerator 2:

# Skills and Capabilities

**Empowering decision-makers with the leadership skills and confidence to steer digitalisation and innovation is vital to its successful implementation.**

As the city confronts critical infrastructure challenges like an ageing workforce and stagnant productivity, effective leadership is essential for driving strategic responses. Leaders must cultivate a vision embracing innovation, encouraging teams to explore new technologies. Investing in leadership development enhances organisational effectiveness and fosters a resilient framework prioritizing adaptability and creativity for implementing new technologies and solutions.

## The Centre of Excellence for Major Project Leaders

A first of its kind in Asia, the CoE is dedicated to uplifting the leadership skills and project governance capabilities of Hong Kong's senior public officers under the Major Projects Leadership Programme (MPLP), and mid-tier professionals under the Project Delivery Capability Programme (PDCP).

The specialised programmes focus on critical areas such as leadership development, public engagement, communication, innovation, and the effective application of technology. By developing critical competencies, it cultivates major project leaders ready to navigate the complexities of modern infrastructure challenges. On 16 December 2024, the 7<sup>th</sup> MPLP cohort was launched.

In early 2023, the CoE with full support of the Financial Secretary expanded training opportunities to stakeholders beyond the government, including major public clients, international engineering consultants, and contractors. This strategic move broadens expertise and fosters collaboration across sectors, ensuring a shared vision and best practices in project delivery.

In December 2024, the 7<sup>th</sup> MPLP cohort invited Mainland officials to participate for the first time to promote meaningful exchanges with the Mainland on policies and strategies for future infrastructure projects, with a view to vigorously promote innovation and accelerate the development of new productive forces in the GBA region.





“

We need to ensure our resources are used as smartly, effectively and efficiently as possible. The Government and the public will settle for nothing less.

”

**Paul Chan**

The Honourable Paul Chan Mo-po, GBM, GBS, MH, JP

Financial Secretary

The Government of the Hong Kong Special Administrative Region

### Similar leadership programmes abroad

**Major Project Leadership Academy (MPLA) at Saïd Business School in the University of Oxford, UK**

- ▶ Commissioned by the UK Infrastructure and Projects Authority, MPLA was the first government major project leadership programme in the world.
- ▶ Designed to equip major project leaders with the skills to tackle modern challenges and embrace leading practices for the future of the UK government.



**Bespoke Executive Leadership Programmes offered at the BCA Academy, Singapore**

- ▶ BCA Academy offers two bespoke executive leadership programmes for the Built Environment sector, developed in partnership with leading Institutes of Higher Learning:
  - ▶ iBuildSG LEAD Horizon Programme
  - ▶ iBuildSG LEAD Milestone Programme
- ▶ BCA Academy is the education and training arm of the Building and Construction Authority.



## Future Outlook

In November 2024, Hong Kong hosted the inaugural IIPLS, facilitating the sharing of insights and best practices, enhancing the governance of large-scale infrastructure initiatives and reinforcing Hong Kong's reputation in the global infrastructure arena.

Building on this momentum, the CoE will continue to support the promotion of the Hong Kong brand, with a vision to become an international expert knowledge hub on project delivery and world-class infrastructure expertise. When industry leaders seek information on innovative solutions and expert advice on project delivery, the CoE will be poised to provide guidance, fostering collaboration and driving excellence across the region.



### Accelerator 3:

## Technology and Standards

**Embracing innovation and digitalisation is essential for Hong Kong's to remain competitive and sustainable in a rapidly evolving global landscape.**

Adopting advanced technologies such as smart sensors, data analytics, and automated systems can revolutionise project efficiency and responsiveness to urban challenges. Implementing robust standards is vital for the safe and consistent technology use, fostering a culture of quality and excellence across the industry. By prioritising innovative solutions and high standards, Hong Kong can reshape its infrastructure landscape to meet a changing society's needs while championing sustainability and resilience, solidifying its status as a beacon of infrastructure excellence.

### The Building Technology Research Institute (BTRi)

The BTRi, a limited company wholly owned by the Financial Secretary Incorporated, will conduct R&D in innovative construction materials, methods and technologies, as well as devise standards, conduct testing and provide accreditation. Leveraging Hong Kong expertise in international construction standards, the BTRi will collaborate with GBA authorities to promote interconnectivity and integrated development. This effort aims to establish the brand of "GBA Standards" by developing standards across various construction domains, ultimately transforming the region into a leader in advanced construction technologies and enhancing the industry's productivity.

#### Smart Site Safety System (4S)



The 4S employs advanced technologies for real-time monitoring and hazard detection.

Launched in May 2024, the 4S Labelling Scheme issues labels to construction sites verified in adopting 4S, promoting wider industry adoption. The 4S includes:

- ▶ **Smart Safety Devices:**  
Monitor high-risk activities and identify hazards.
- ▶ **Communication Network:**  
Transmits data from devices for timely alerts.
- ▶ **Centralised Management Platform:**  
Analyses data and generates alerts.

**Bernadette Linn**  
Secretary for  
Development

The Government of  
the Hong Kong Special  
Administrative Region

“

Established with two strategic missions, the BTRi will enhance professional skills, product quality and cost effectiveness on one hand, while on the other hand facilitating our country to align its standards for construction technologies and products with those in the international market, thereby enabling relevant construction technologies and products to go global, as well as attracting R&D talent to Hong Kong.

”



The BTRi focuses on applied R&D, innovative construction materials, advanced construction methods, and cutting-edge technologies, to enhance the efficiency and sustainability of the industry.

### MiC & Multi-trade Integrated Mechanical, Electrical and Plumbing (MiMEP)

MiC and MiMEP revolutionised Hong Kong's construction sector through offsite prefabrication for on-site assembly. A notable example, InnoCell, achieved a 30-50% reduction in construction time and 7-10% cost savings while maintaining quality and safety.

In November 2024, the BTRi launched the MiC Manufacturer Accreditation Scheme to ensure compliance with quality standards.



### Advanced Construction Materials

The Fanling North New Development Area project used S960 ultra-high strength steel for a footbridge, reducing weight and enhancing sustainability.

The BTRi collaborates with works departments to address technical challenges and providing expert advice to promote innovation in construction.



### Uplifting Building Standards

Hong Kong's strong track record in international building standards positions it to collaborate on developing GBA standards.

The BTRi will partner with local and international entities to review and optimise existing standards, including design loading and foundation bearing capacity.



## Future Outlook

AI is at the core of developing new quality productive forces. Through frontier research and real-world application, Hong Kong will endeavour to develop AI as a core industry and empower traditional industries in their upgrading and transformation. The Development Bureau is actively driving favourable policies that will further support Hong Kong's initiatives and enhance the overall advancement of innovation and digitalisation in the city.



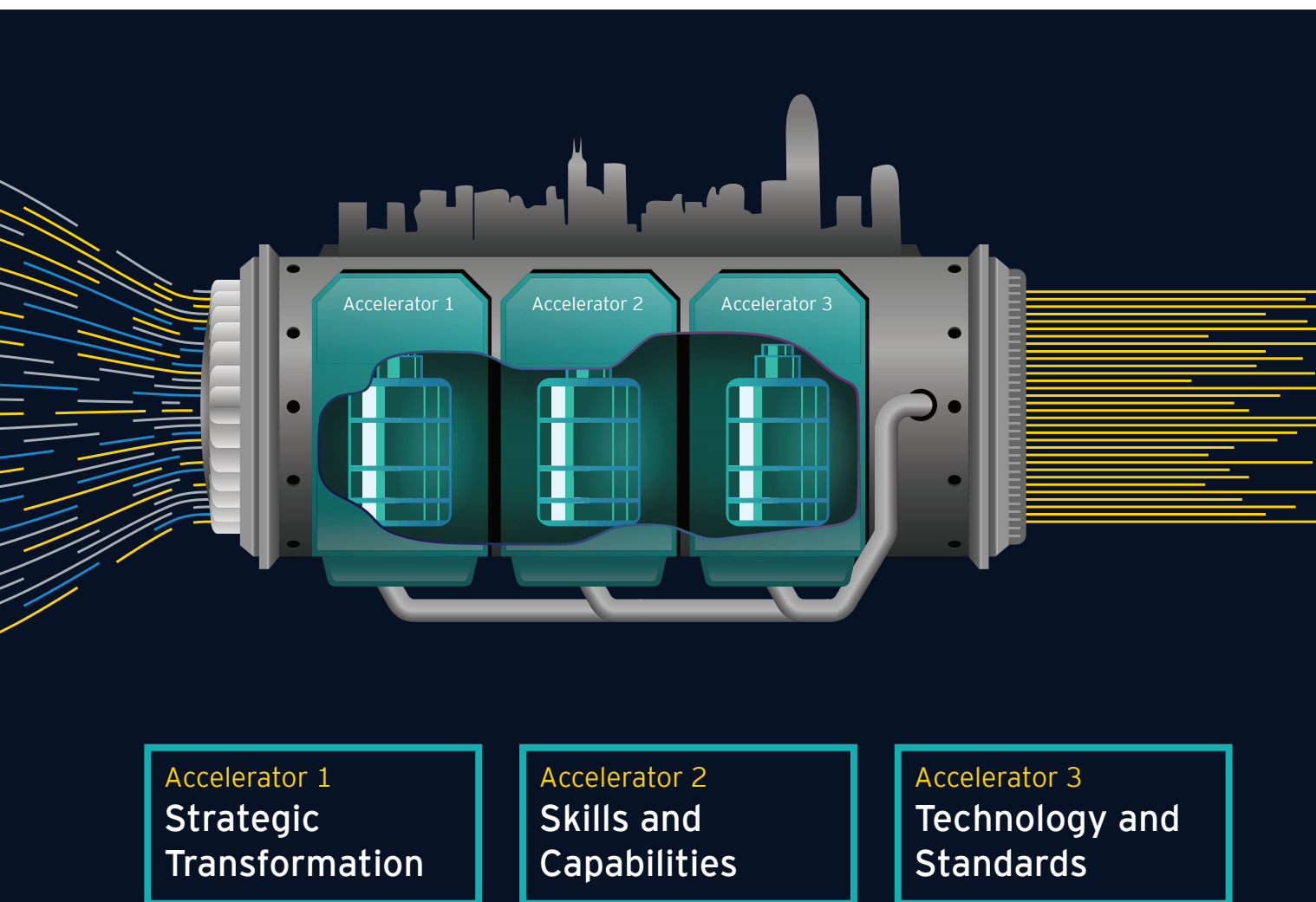
## Conclusion

This publication highlights Hong Kong's capabilities as a pivotal hub for global connectivity and infrastructure innovation. Its strategic location, world-class facilities, and commitment to innovation position the city as a leader in the infrastructure landscape.

### Hong Kong's Infrastructure Innovation Engine

Hong Kong's infrastructure success stems from a dynamic ecosystem of collaboration amongst the Government, Industry Partners, and R&D Institutions. This tripartite alliance aggregates innovative solutions and ideas, channeling them through a powerful innovation engine fueled by the three key accelerators - Strategy and Governance, Skills and Capabilities, Technology and Standards. This synergy fosters an environment ripe for targeted digitalisation and operational efficiency, transforming innovative concepts into practical applications.

By leveraging these key components, Hong Kong cultivates a vibrant environment that promotes effective implementation of innovative practices to meet the needs of the rapidly evolving infrastructure landscape.



Hong Kong's infrastructure innovation engine takes a multitude of ideas, refining and streamlining them to produce targeted solutions that facilitate industry adoption and implementation.



Hong Kong's commitment to innovation and digitalisation is crucial for a resilient infrastructure future. By adopting advanced technologies across all project phases, the city boosts efficiency while addressing rapid urbanisation challenges, all while emphasising sustainability, collaboration, and strategic governance.

### Strategic Location

Hong Kong serves as a key gateway to Asia, making it an attractive hub for infrastructure innovation.



### Digitalisation

Advanced technologies such as 4S and PSS revolutionise construction practices and enhances efficiency.



### Committed to Advancing Research

The establishment of the BTRi underscores the city's dedication to advancing research in innovative materials and methods.



### Efficiency-driven Methods

Innovative techniques like MiC and MiMEP greatly reduce construction time and costs while improving safety and quality.



### A Culture of Collaboration

Emphasising collaboration and continuous learning prepares a skilled workforce to adapt to tech-driven roles.



### Professional Development

Programmes like the CoE equip project leaders with innovative mindsets and world-class leadership skills.



### Strong Governance Framework

The Development Bureau ensures strategic alignment and integrates innovative solutions for sustainable growth.



### Streamlined Project Oversight

Initiatives like the iCWP enhance project accountability and ensure timely delivery of capital works.





## Building tomorrow, building better, building together

Looking ahead, the alliance among government, industry and academia will be the cornerstone of Hong Kong's infrastructure renaissance.

By embracing a culture of continuous learning, Hong Kong is setting the stage for groundbreaking advancements that will redefine urban living. As the city embarks on this journey of transformation, Hong Kong invites stakeholders from around the world to join in shaping a future where infrastructure innovation thrives, creating lasting benefits for generations to come.

Together, we are not just building infrastructure; we are building a better tomorrow – an innovative, resilient, and sustainable future.



