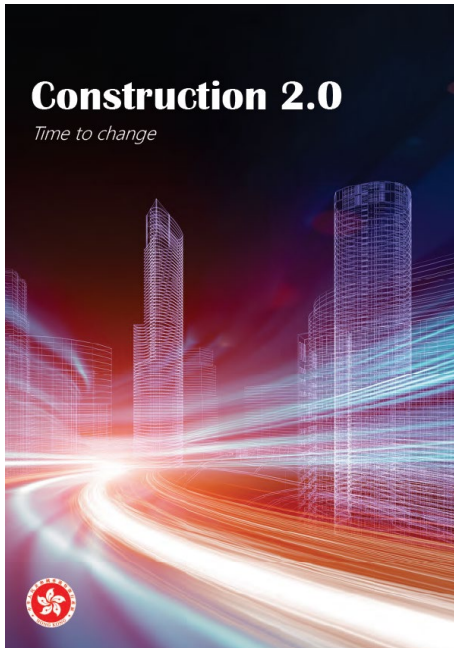


RECO7611: Innovation and Procurement – Gaming and VDC

Lecture 02: Innovation and Procurement Context

September 2019



HK construction rising from HK\$1.9 trillion over past 10 years to HK\$2.5-3.0 trillion over the next 10 years...

but...

- An increasingly ageing construction workforce
- A lag in innovation and adoption of advanced technologies
- One of the most expensive construction markets in the world



Contents	
About this publication	2
Executive summary	3
Construction in Hong Kong	6
Introduction	
Objectives of this publication	
Core challenges facing the industry	
Construction 2.0	23
Pillar 1: Innovation	
Pillar 2: Professionalisation	
Pillar 3: Revitalisation	
The way forward	44
Measuring future performance	
Additional initiatives to explore	
Strategic collaboration opportunities	
Working together	
How to provide feedback	

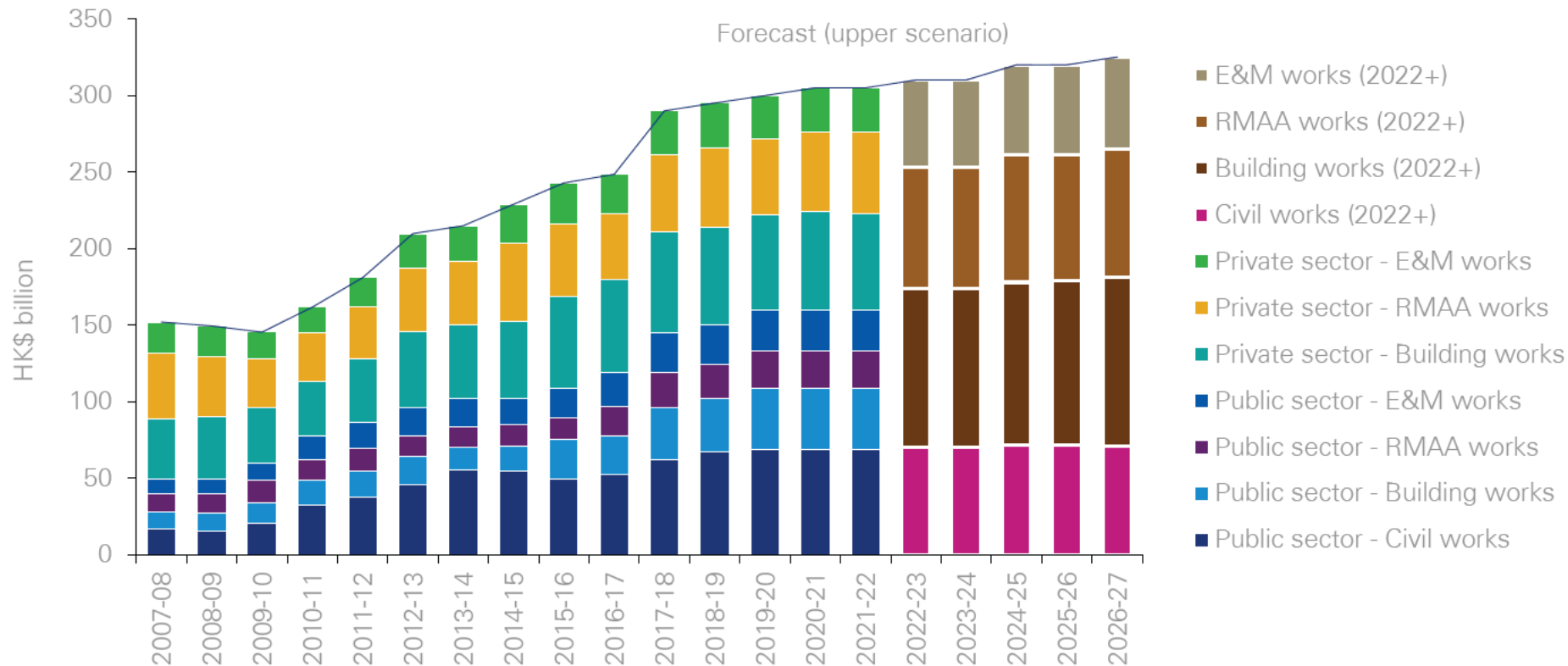
This publication has been produced with the assistance of KPMG and was published in September 2018. 

Construction 2.0: Time to Change

- Pillar 1: Innovation
- Pillar 2: Professionalisation
- Pillar 3: Revitalisation

Challenge 1: Significant future construction volumes

Figure 2 – Hong Kong Construction Activity



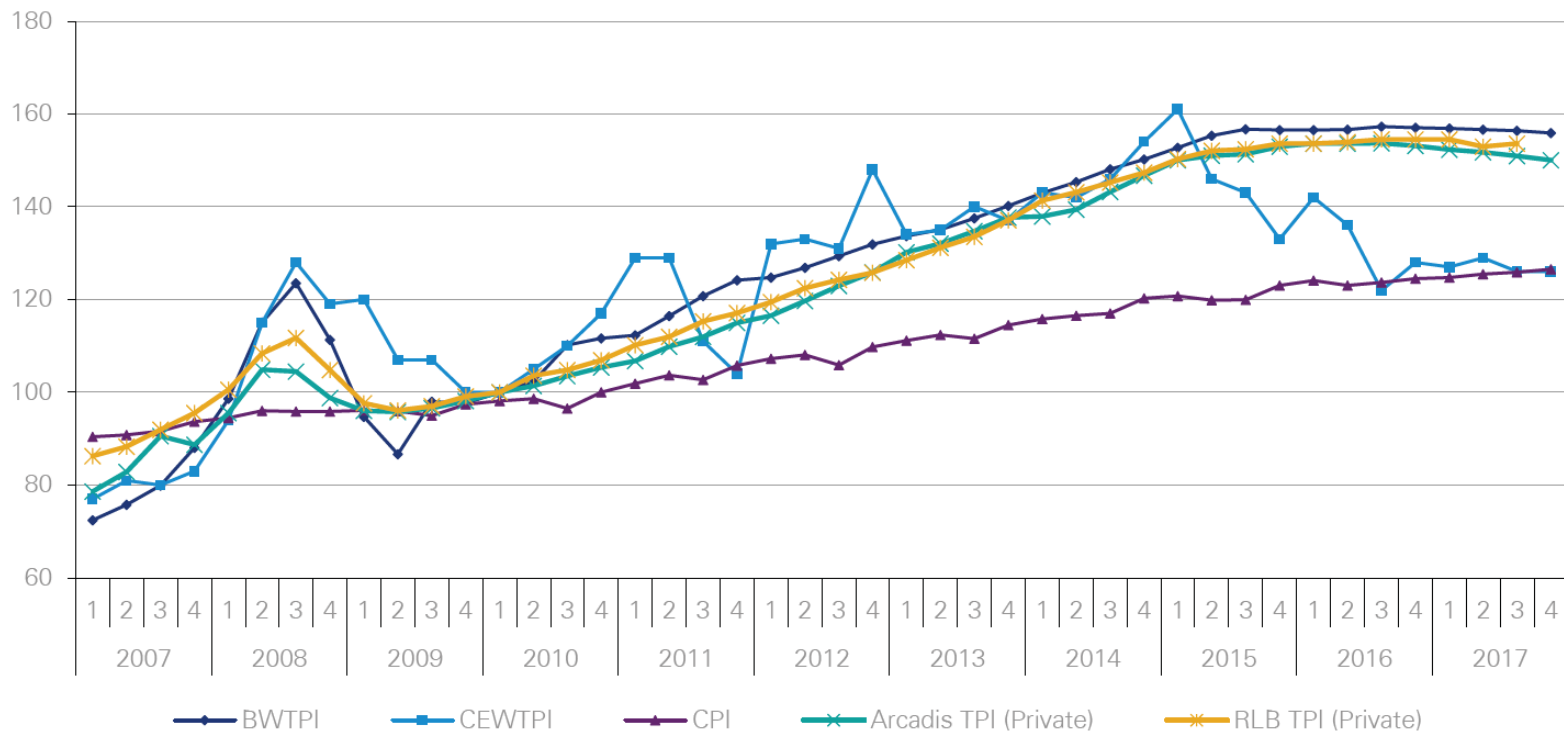
Source: Construction Industry Council

Challenge 2: High costs

Table 1 – Top 5 most expensive cities to build globally

Ranking	Arcadis International Construction Costs 2018 ¹²	Turner & Townsend International Construction market survey 2018 ¹³
1	New York City	San Francisco
2	San Francisco	New York City
3	Hong Kong	Hong Kong
4	Zurich	Toronto
5	London	Boston

Figure 3 – Tender price indices vs. CPI



Source: Architectural Services Department, Civil Engineering and Development Department, Arcadis, Rider Levett Bucknall, Census and Statistics Department

Challenge 3: Unsatisfactory mega-project performance

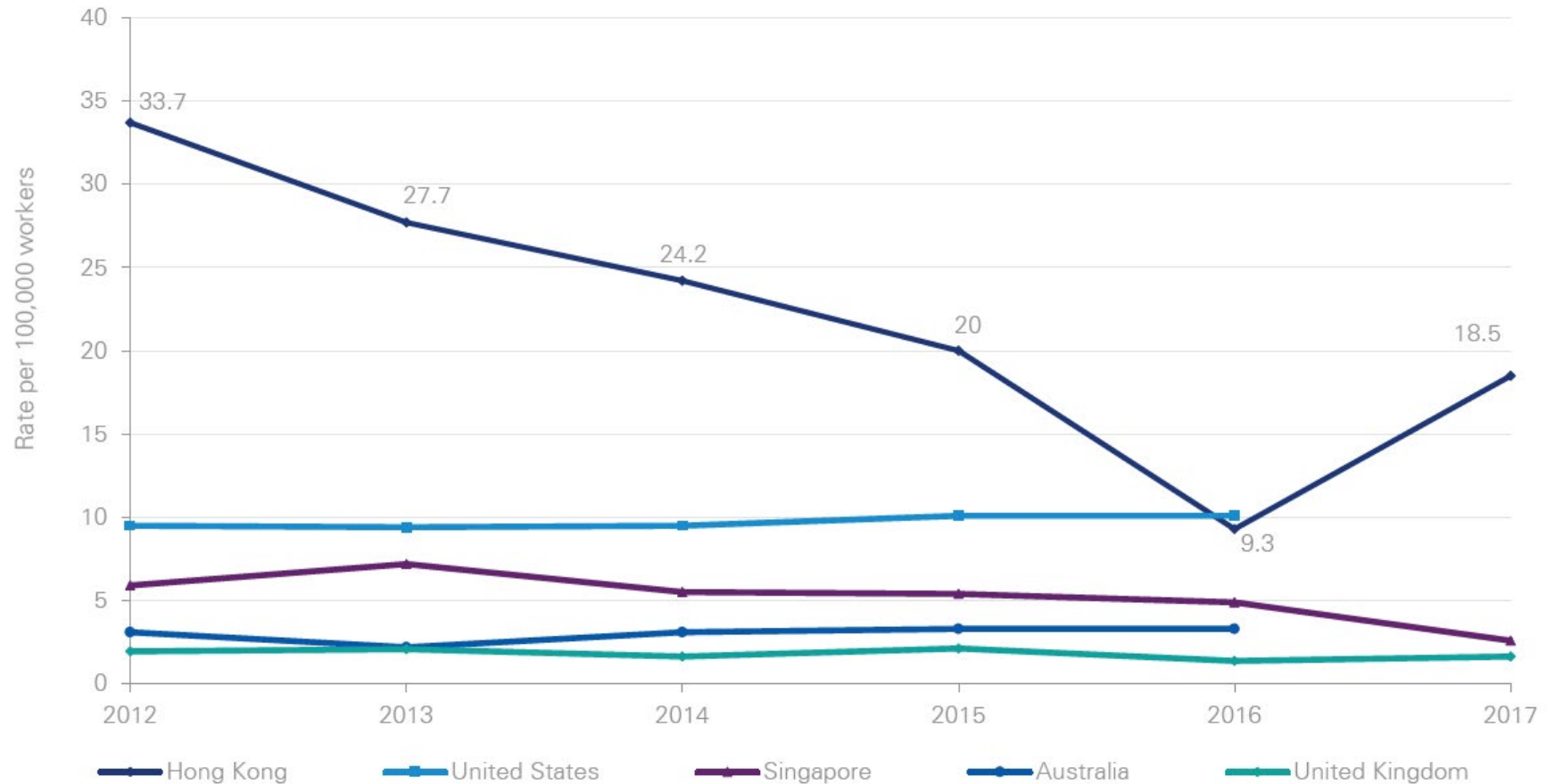
Over the period from 2008 to 2017 approximately 850 Category A projects had their final accounts settled where the original Approved Project Estimates of these projects totalled approximately HK\$240 billion as compared with cumulative final accounts of approximately HK\$210 billion. A 14% saving sufficient to offset the additional funding required in approximately 10% of the projects where the amount represented some 8% of the total provision.

Table 2 – Performance of selected mega-projects

Project	Cost ²⁶		Timeline	
	Original APE	Revised APE	Original scheduled completion date ²⁷	Latest scheduled completion date
Hong Kong-Zhuhai-Macao Bridge	HK\$56.5bn	HK\$70.8bn	End of 2016	To be announced
Guangzhou-Shenzhen-Hong Kong Express Rail Link	HK\$69.6bn	HK\$89.2bn	2015	Sep 2018
Shatin to Central Link	HK\$79.8bn	HK\$80.7bn	2018-2020	2019-2021 ²⁸
Liantang/Heung Yuen Wai Boundary Control Point	HK\$26.7bn	HK\$35.4bn	End of 2018	End of 2018 ²⁹

Challenge 4: Unsatisfactory site safety performance

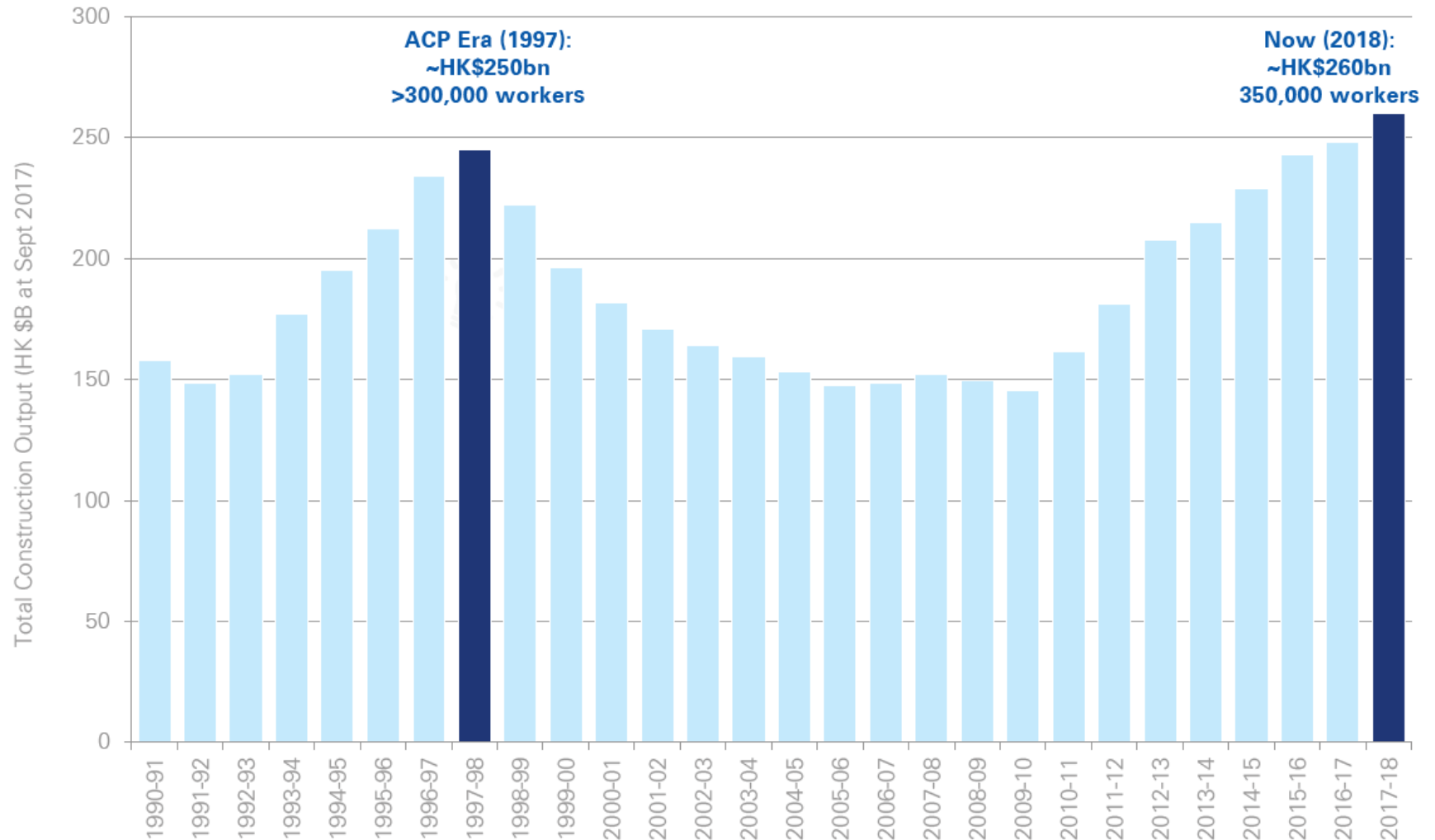
Figure 6 – Fatality rate of the global construction industry



Source: Labour Department (Hong Kong); Bureau of Labour Statistics, (US); Ministry of Manpower (Singapore); Safe Work Australia, (Australia); Department of Work and Pensions (UK), KPMG Analysis

Challenge 5: Declining productivity

Figure 7 – Hong Kong Construction Industry total construction output



Challenge 6: A lack of creativity and innovation



Approval process and construction regulation

A common theme discussed in the Industry relates to the scope for reduction in the number of technical circulars impacting public projects, as well as the volume of regulation and processes related to construction approvals from statutory bodies. This is backed by a general sentiment within the Industry that whilst these processes are designed to reduce the risk of engineering and construction failure, there is a high level of regulatory overlap and duplication, adding extra costs associated with compliance and risk management.



Tender specification and procurement

Traditional approaches towards the tendering of public projects have involved high levels of design and construction specification with a view to reducing the risks associated with delays, uncertainty and contract variations. However, in many cases this approach leads to reduced design and delivery freedom for the private sector, inhibiting innovation and the adoption of new approaches. Also, the traditional approach in Hong Kong often involves referring to precedent approaches of comparable (and in some cases incomparable) projects in determining procurement and contracting methodologies rather than adopting bespoke, purpose built contract structures based on market appetite and project suitability.

Challenge 6: A lack of creativity and innovation



**New design and
construction
methods**

Unlike many other developed market jurisdictions, adoption levels of new approaches to design and construction such as Building Information Modelling (BIM) and Modular Integrated Construction (MiC) continue to be limited. Singapore, for example, has established a pipeline of MiC projects,⁴⁴ with six projects completed and 25 still in-progress as at April 2018.⁴⁵ The UK, on the other hand, aims to deliver one million homes through MiC methods by the end of 2020.⁴⁶



**Incentives for the
private sector to
invest in new
technology**

In KPMG's 2017 Global Construction Survey, 55% of all respondents indicated the global industry is ripe for disruption, however, approximately 52% of respondents have not yet developed a technology strategy. This indicates that at a global level, the industry recognises that change is coming, but many have not yet done anything to plan for it.

Looking closer to home, it is also arguable that the local Industry is in need of change. For this to occur, an important element relates to private sector investment in new and innovative technologies, systems and ways of doing business. To drive this, private sector groups need to be encouraged, incentivised or possibly even mandated to invest in these areas.

Broad industry challenges

- Challenge 1: Significant future construction volumes
- Challenge 2: High costs
- Challenge 3: Unsatisfactory mega-project performance
- Challenge 4: Unsatisfactory site safety performance
- Challenge 5: Declining productivity
- Challenge 6: A lack of creativity and innovation

Other IPD Initiatives

- Segregation of project phasing
- Risk allocation and partnering with the private sector
- Project funding approvals
- Fragmentation of the industry
- Public image

“Unless the Industry acts now to address these challenges, the future prospects of groups in the Industry ecosystem and the Industry’s contribution to Hong Kong will likely be compromised.”

Pillar 1: Innovation

The discovery and application of new approaches and tools that support the planning, design, construction, funding and operation of built assets to achieve enhanced outcomes over the norm.

- Off-site construction
- Design for buildability
- Smart infrastructure



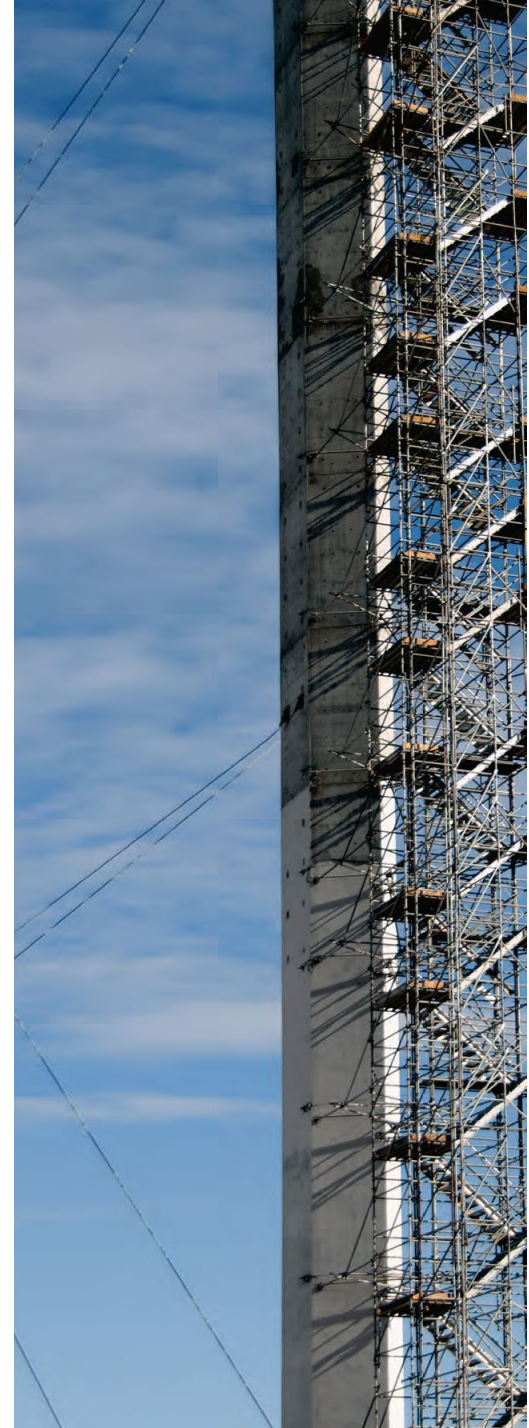
Pillar 1: Innovation

- Off-site construction
- Design for buildability
- Smart infrastructure

Pillar 2: Professionalisation

Through step change increases in project leadership, project management, procurement capabilities and professional skills and practices within Government and the private sector, to deliver higher quality construction and built assets, combined with a first priority focus on safety, construction supervision and quality in the workplace.

- Enhancing prof skills of workforce
- Improving site safety
- Professionalism of subcontractors



Pillar 1: Innovation

- Off-site construction
- Design for buildability
- Smart infrastructure

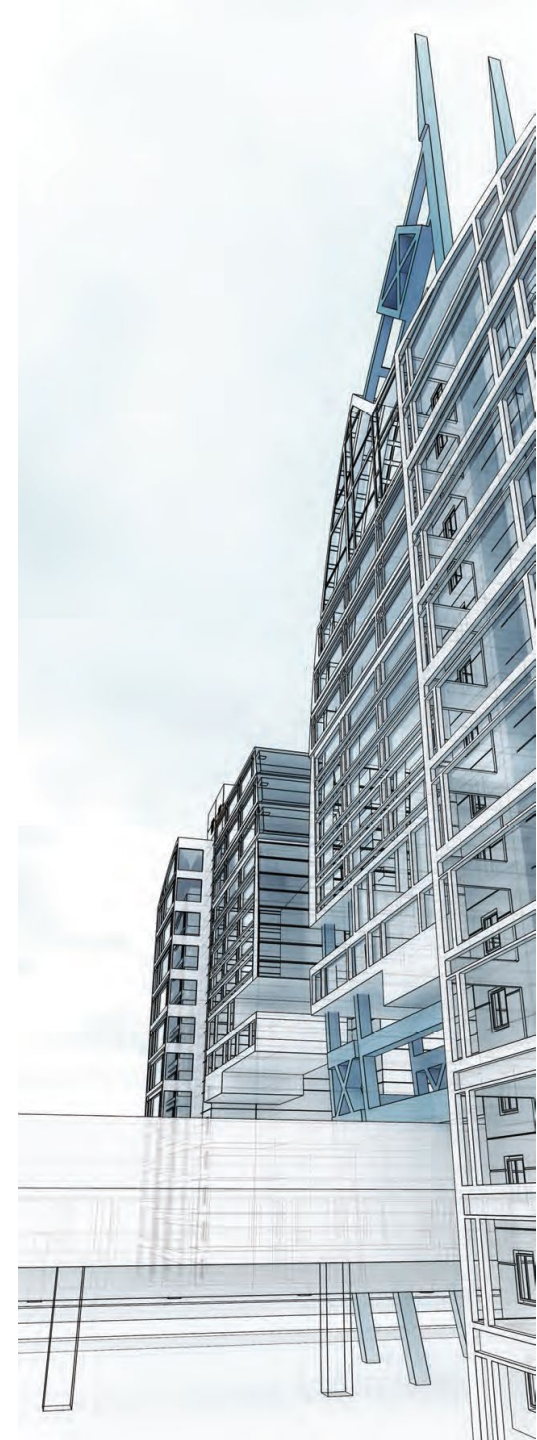
Pillar 2: Professionalisation

- Enhancing prof skills of workforce
- Improving site safety
- Professionalism of subcontractors

Pillar 3: Revitalisation

Transforming external perceptions of the Industry as being a “3D” industry, which stands for dirty, dangerous and dull.

- Promotion & awareness of the industry
- Recruitment & nurturing of young talent
- Strategic procurement



Pillar 1: Innovation

- Off-site construction
- Design for buildability
- Smart infrastructure

Pillar 2: Professionalisation

- Enhancing prof skills of workforce
- Improving site safety
- Professionalism of subcontractors

Pillar 3: Revitalisation

- Promotion & awareness of the industry
- Recruitment & nurturing of young talent
- Strategic procurement
- Project Management Information Systems
- Digitalisation of site management
- Robotics and Exoskeleton and AR and...



Innovation

- **MiC/DfMA** – set targets and measure t
- **Innovative procurement and contract** projects/contracts adopted.
- **Adoption of BIM technology** – uplift t
- **Productivity** – establish indices to mea
- **Buildability** – uplift the utilisation rate o



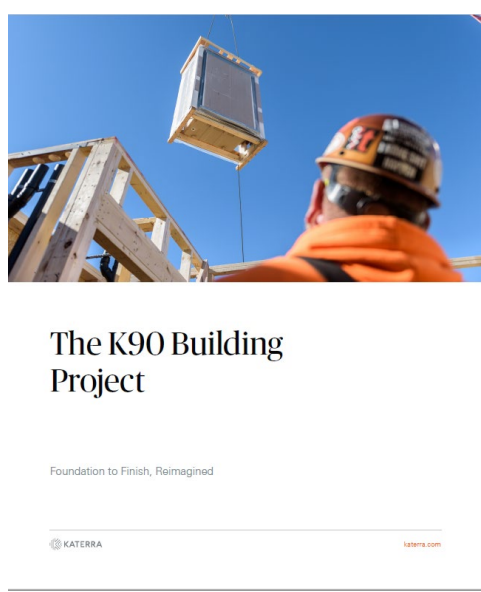
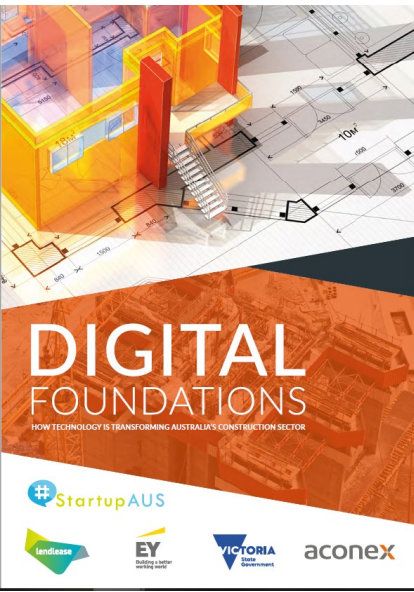
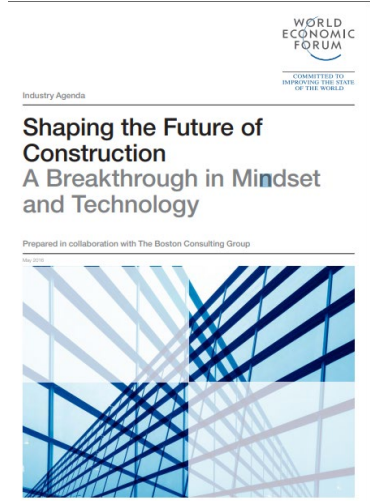
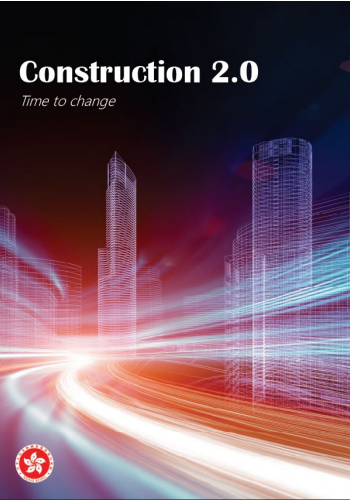
Professionalisation

- **Professional development** – targets b agreed leadership, project management
- **Worker training output** – objectives b experienced workers in certain priority adequacy of those programmes.
- **Safety performance** – setting more str
- **Subcontractor management** – targets
- **Monthly wages** – targets focused on i



Revitalisation

- **Attracting young talent** – targets base by the workforce.
- **Nurturing young talent** – targets base programmes offered to young talent.
- **Industry perceptions** – regular surveys
- **Skilled workers** – targets focused on k period of time.
- **Community and recreational activities** community and recreational activities h
- **Industry agility** – targets based on red with international best practice.



Recommended Readings - moodle