

# Construction Industry Advance and Change

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# **Construction Industry Advance and Change: Progress in Eight Asian Economies Since 1995**

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United Kingdom – North America – Japan – India – Malaysia – China

Emerald Publishing Limited  
Howard House, Wagon Lane, Bingley BD16 1WA, UK

First edition 2022

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**British Library Cataloguing in Publication Data**

A catalogue record for this book is available from the British Library

ISBN: 978-1-80043-505-6 (Print)

ISBN: 978-1-80043-504-9 (Online)

ISBN: 978-1-80043-506-3 (Epub)



Certificate Number 1985  
ISO 14001

ISOQAR certified  
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ISO 14001:2004.



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**Michael Anson**, Civil Engineer, Professor Emeritus, is a member of the Department of Building and Real Estate in the Faculty of Construction and Environment at the Hong Kong Polytechnic University. He was the first Dean of that Faculty, between 1992 and 2000. An Oxford University graduate in Engineering Science in 1959, he gained his Ph.D. from London University in 1962. Following 6 years with the Division of Building Research, CSIRO, in Australia and 17 years with Lancaster University, UK, in the Department of Engineering, 6 years as Head, he joined the then Hong Kong Polytechnic in 1988 as Head of its Department of Civil and Structural Engineering. His research interests and publications mainly divide between concrete structures design and factors affecting the productivity of concreting on site.

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**Ahmad ‘Asri Abdul Hamid**, the current Chief Executive of Construction Industry Development Authority (CIDB) Malaysia, spent over 36 years in the construction mechanical industry, 13 of them in the post of Engineer in the Public Works Department between 1985 and 1998. He was President of the Professional Services Development Corporation from 2008 to 2011. During his 20 years with the CIDB, he headed various units and divisions as General Manager and Senior General Manager before becoming Chief Executive. He has contributed to the development and implementation of CIDB strategic plans, the Construction Industry Master Plan and the Construction Industry Transformation Programme. He represents Malaysia on many international construction-related platforms and is active on national committees and councils.

**Daisuke Hosoda**, Social Scientist, has been a Researcher at the Research Institute of Construction and Economy, since September 2019. He was awarded his degree in Social Science from Ritsumeikan Asia Pacific University in 2005, before joining Penta-Ocean Construction Co., Ltd. in the same year. After experience in its domestic branch offices for seven years, he was transferred to the Malaysia branch office in May 2012 to work as a Site Administration Manager. He then moved to the Singapore branch office in 2013, also as an Administration Manager, where he was involved in several construction projects including a subway project, a port construction project and others.

**Chandima Swarnamali Karunaratne**, Civil Engineer, is a Deputy Director of Sri Lanka’s Construction Industry Development Authority (CIDA). She joined the Institute of Construction Training and Development in 2005, the forerunner of CIDA, contributing for the last 15 years to training itself and to construction industry development including national awards schemes and disputes mediation and supporting advice. She worked in construction between 1991 and 1994, on roads and water supply and drainage, before spending 11 years in civil engineering teaching at the Katunayaka Technician Training Institute, including seconded experience in Australia and Germany. She took her Bachelor degree in Engineering (Civil) at the Open University of Sri Lanka in 1996. In 2002, she gained a post graduate diploma in Construction Management and is currently studying Geotechnical Engineering at post graduate level.

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**Yukinobu Nagamine**, Civil Engineer, an Executive Fellow at the Research Institute of Construction and Economy (RICE) since July 2019, received his Master degree in Civil Engineering in 1994 from Hokkaido University. He commenced employment with the National Land Agency of the Cabinet Office within the Japanese Government (now, the Ministry of Land, Infrastructure and Transportation) in 1994. He has also worked with UN-HABITAT and the Tokyo Metropolitan Government. Before joining RICE, he was seconded to the Reconstruction Agency of the Japanese Government involved in mitigation and other work following the great East Japan earthquake. He is a member of the City Planning Institute of Japan.

**Krishna S. Pribadi**, certified Project Manager, is currently Professor and Chair of the Construction Engineering and Management Research Group at the Bandung Institute of Technology. He served as Vice Chair of Research and Development, Training and International Collaboration for the National Construction Service Development Board between 2016 and 2020. A graduate from Institut National des Sciences Appliquées, Lyon, France in 1985 his research interests include construction industry development, human resource development and disaster mitigation in the construction sector and business continuity planning. He is a certified mediator in conflict resolution, with more than 20 years of experience in construction project management and in directing research projects and investigations.

**Madhuri Jyothi Rani**, a Social Development Professional with over three decades of experience in Capacity and Institutional Building in the Construction Sector, holds a Master's degree in Business Administration from the University of

Delhi. She is a certified Life Coach, Alternate Medicine and Pranic Healer. As Deputy General Manager (Projects) at the Indian Construction Industry Development Council (CIDC) she has initiated pan-Indian skill development training programmes, and organised more than 50 national and international conferences. During those years, she has collaborated with the Governments of Bhutan, Indonesia and Sri Lanka and many organisations and universities around the world and participated in many conferences and workshops to promote the Indian Construction Industry and new technologies. She has wide cultural interests and is a supporter of holistic living, value-based education and sustainable development.

**Jianfu F. Shen**, Economist, completed his Ph.D. degree in Real Estate Finance at The University of Hong Kong. He obtained his Bachelor degree in Land Management and his Master degree in Finance from Renmin University of China in Beijing. He is a certificated Financial Risk Manager and Chartered Financial Analyst. He joined the Department of Building and Real Estate, The Hong Kong Polytechnic University in June 2019. He teaches Construction Economics, Construction Finance, Housing Studies, Development Finance, Business Valuation and Project Appraisal. His major research interests lie in real estate finance/economics, urban studies and capital markets.

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**Pham Van Bo**, Economist, is Vice President of the Academy of Construction Managers for Construction and Cities. He took his B.A. in Economics at the Hanoi Commercial University in 1988, an M.B.A. in Economics at the National Economics University in the year 2000 and in 2005 in India, his Ph.D. in Economics at the Jamia Millia Islamia, New Delhi. He has published many scientific articles and conference reports, two books and at Ministerial Level has directed four scientific topics. He is currently Project Director of the international project, 'Institutional Strengthening and Capacity Building for Sustainable Urban Development'.

# Foreword

This book has been written to mark the first 25 years of existence of the AsiaConstruct Conference.

The AsiaConstruct Conference, an annual meeting of Asian Construction Industry representatives, exists to promote mutual knowledge, to recognise and discuss factors affecting industry performance and share information on recent trends and progress. The book participants are organisations representing the Hong Kong Special Administrative Region of China and the seven countries of India, Indonesia, Japan, Malaysia, South Korea, Sri Lanka and Vietnam. The first conference was held in November 1995. Each chapter in the book relates to each of these eight construction economies for the period 1995–2019.

The Research Institute of Construction and Economy, Japan had the privilege of hosting the first 1995 AsiaConstruct Conference in Japan and is pleased, therefore, to be accorded the honour of writing the Foreword to this book. The project was conceived in Kuching, Malaysia, in November 2018. A publisher was then found, followed by project confirmation in Madurai, India, in November 2019. Professor Mike Anson, representing the Hong Kong Polytechnic University Team was appointed Coordinator by the AsiaConstruct leadership. His continuing dedicated efforts in that role, with his team, are warmly acknowledged.

All eight contributors are regular attenders at the annual AsiaConstruct Conference hosted in rotation by network members. AsiaConstruct exists, ‘within a spirit of friendship and cooperation’, to share knowledge among its members, of construction industry practice, progress, difficulties and standards, including the construction market, methods of procurement, resources provision, standards of constructed quality, site safety, productivity and others, as they apply in the different countries. At the annual conference, alongside a paper on a topic chosen by the host country (e.g. financing construction, resources supply and disaster management), each country also submits a construction economics report for the year, providing up to date statistics on the construction market, construction investment, labour and materials costs and trends, the proportions of private and public investment and contributions to gross domestic product (GDP).

In the same spirit of sharing knowledge, the eight main chapters outline 25 years of recent construction industry progress in Hong Kong, India, Indonesia, Japan, Malaysia, South Korea, Sri Lanka and Vietnam. Chapter 1, an overview chapter, identifies concerns common to all eight industries on the one hand and the more unique concerns which exist, on the other. For example, land shortage stands out as a serious constraint in Hong Kong.

The eight chapters differ considerably in the emphasis placed on the different factors affecting industry progress and performance, although all are unified in their ambition to employ the new Information and Communication Technologies (ICT) to the maximum useful extent in the coming years. Japan, for example, says much about the consequences of the massive earthquake of 1995 and the 2011 major earthquake and tsunami event. India, very large scale, is notable for its programme to develop 100 smart cities with differing focusses. The chapter by Hong Kong, a single city, is at a totally different level of detail. Indonesia is a big population country, and one widely dispersed geographically with many islands. The eight chapters also divide between economies with high levels of GDP per capita and those with lower levels.

This book is intended as an interesting ‘good read’ for the construction professional or student of construction, interested in a broad appreciation of the contribution made by construction industries to the economic progress of the nations they serve, the issues of quality, productivity, safety and resourcing which affect that progress and the differences which exist between the industries of different countries. All construction industries have the same general objectives, but unlike the car industry, for example, all are ‘home grown’ long-term derivatives of the local culture, history and geography, economic circumstances and economic and political ideologies.

Indeed, this book is not without interest to *any citizen*, immersed in the outputs of his/her construction industry and concerned for the surrounding built environment, but is most likely to engage construction industry professionals with wide interests and construction industry development policy makers within governments. The book is not a scholarly reference work of the type sought by academic researchers containing large amounts of comparative statistical data, but remains not irrelevant to such persons.

I hope all readers will enjoy this book and widen their understanding of construction industry progression and achievement, and of the attendant constraints affecting them.

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February, 2021

## Acknowledgements



This book is an Initiative of AsiaConstruct, first mooted 2018 in Kuching, Malaysia, and confirmed in Madurai, India, in 2019.

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# **The Eight Chapter Contributing Organisations**

## **The Building and Real Estate Department of the Hong Kong Polytechnic University**

The Department of Building and Real Estate (BRE) has the longest history, and is the largest of its kind in Hong Kong, in terms of the student body and numbers of academic staff. It was a founding constituent of the 1937 Government Trade School, a precursor of the Hong Kong Polytechnic University and has evolved into the major tertiary institution it is today. BRE provides a comprehensive range of courses up to doctorate level, including building engineering, construction law and disputes resolution, facility and project management, international real estate and surveying. Most undergraduate students are local. Of those taking the post-graduate taught and research courses, however, an increasing and significant proportion are students from Mainland China and other parts of Asia. BRE has organised itself around, and undertaken research and consultancy work in, economics, management, technology and urban sustainability policy, the four broad disciplines of the building and real estate sectors. In the 2021 QS World University Ranking by Subject, the University ranked 18th in the world in the field of Architecture/Built Environment. The BRE strives to continue providing competitive courses and game-changing research outputs, particularly for the building and real estate industries.

## **Construction Industry Development Council, India**

In 1996, the Planning Commission, Government of India, jointly with the Construction Industry, set up the Construction Industry Development Council (CIDC) to advance the Indian construction industry. CIDC, the first organisation of its type in India, has branches across the whole country, in providing the impetus to raise quality levels across the industry and helping to secure a wider awareness of the importance of construction businesses and their concerns, by government and society. CIDC is an agent of change towards a more competitive, quality conscious and equal opportunity industry, ready for the future, contributing to societal goals and nation building. Since 1996, Council initiatives include the following:

Advising Government on industry and financing policies, standardising construction contracts and procedures, training skilled worker and management

manpower, grading construction businesses, devising worker welfare mechanisms, establishing a pool of construction equipment and a contract disputes resolution service, promoting emerging technologies and best practices, assisted by the CIDC Viswakarma awards for achievement and creating a database of consultants, manufacturers, suppliers and service providers for robust procurement purposes.

### **The Construction Services Development Board, Indonesia**

The economic crisis that hit Indonesia in 1998 resulted in an economic slump, including a slump within the construction industry. Following this downturn, reforms were carried out on various aspects of governance; Law No. 18 of 1999, being the one concerning construction services. Under this law, the Construction Services Development Board – CSDB (LPJK) became an entity to promote the development of the national construction industry. As an independent institution, CSDB had representative members from the professional associations, construction company associations, government and universities. After more than 20 years of working in this very dynamic industry, under Law No. 2 of 2017, the pendulum swung back to closer government control of the development of the national construction industry. In its new form today, CSDB is part of the government bureaucracy under the Ministry of Public Works and Housing, and its function is limited to the registration of construction workers and business entities. Its other functions, such as research and development, training and education and professional and business certification have been transferred to other institutions.

### **The Research Institute of Construction and Economy, Japan**

The Research Institute of Construction and Economy (RICE), was established in September 1982 as a non-profit and independent research organisation to conduct theoretical and empirical studies, chiefly on the subjects of construction investment (including public and private investment), construction industries, housing and urban issues, national land policy and others. Besides that, RICE studies trends in overseas construction markets and has conducted case studies research by exchanging information with foreign organisations and by study of the literature. Reports of its activities are periodically released in such publications as Construction Economy Report (Japanese Economy and Public Investment), Construction Investment Forecasts, Analysis of the Settlement of Accounts of the main Japanese construction corporations and the RICE monthly magazine.

As a major collector, verifier and analyst of information on the performance of the Japanese domestic and overseas construction industries, RICE will continue to fulfil its ‘think tank’ role and contribute to the development of new policies and ideas which advance the industry.

### **The Construction Industry Development Board, Malaysia**

The Construction Industry Development Board (CIDB) Malaysia is a Federal Statutory Body under the Ministry of Works, established under the Construction

Industry Development Board Act 1994 (Act 520) to develop, regulate, enforce and execute tasks and functions related to the Malaysia construction industry. With the primary vision of becoming the leading authority on solutions for developing a socially and environmentally responsible industry, CIDB has taken initiatives and implemented wide ranging programmes of activities to enable the industry and enhance its capacities and capabilities, including those of the workforce. This includes emphasis on such key aspects as built quality, safety and a culture of professionalism as well as the continuous adoption of modern practices and technologies. CIDB serves as a construction data depository agency nationwide, in relation to contractor registration, construction personnel registration and declarations of construction work.

### **The Korea Research Institute for Human Settlements, South Korea**

Korea Research Institute for Human Settlements (KRIHS) was established in 1978 to contribute to the balanced development of the national territory and to improve the quality of life of the people through policy-oriented research in the efficient use, development and conservation of territorial resources. KRIHS conducts practical research exploring mid- to long-term national agendas to both lead and support government policies including territory-related social issues. The institute studies land use and its conservation, urban and regional planning, housing and land policies, transportation, construction economics, the environment, water resources and geographic information systems in the relation to issues affecting the Northeast Asian region and Korean territorial policies.

*The Construction Economy and Industry Research Division* of KRIHS undertakes studies aiming to advance the construction industry and its international competitiveness. It focusses on capacity building for domestic construction, public-private partnership projects and on overseas construction. The Division comprises the Fair and Innovative Construction Research Center and the Public-Private Partnership Research Center covering (a) construction economic trends, production systems, contract management, warranties and smart technologies; (b) public-private partnership project success factors such as the appropriate qualifications, feasibility studies, proposal evaluation, negotiation processes and project operational management; and (c) planning for such as small-scale infrastructure modularisation and overseas expansion support for small and medium sized enterprise.

### **Construction Industry Development Authority, Sri Lanka**

The Construction Industry Training Project (CITP), funded by the World Bank was established in 1981 for the purpose of developing the human resources needed by the construction industry. The CITP was succeeded by the Institute for Construction Training and Development (ICTAD) in 1986, and re-established in 1992 as a State Corporation under the provisions of the State Industrial Corporations Act No. 49 of 1957, by the Gazette notification number 718/15 dated 10.06.1992.

The Construction Industry Development Act No. 33 came into operation in December 2014, providing the legal basis underpinning the development of the construction industry in Sri Lanka. More specifically, the Act provides the means to regulate, register, formalise and standardise procedures and activities in the construction industry. It established a National Advisory Council to guide the process, the Construction Industry Development Authority (CIDA) and the Construction Industry Development Fund for the CIDA, and among other matters, is intended to ensure the well-being of all stakeholders, professional persons and craftsmen. The Act also provides for the settlement of disputes among stakeholders and introduces measures relating to safety and others.

### **Academy of Managers for Construction and Cities, Vietnam**

The Academy of Managers for Construction and Cities (AMC), established in July 1975, is a public service institution under the Ministry of Construction, operating on a national scale in the fields of short-term training courses for cadres; research and consultancy relating to urban development and construction management.

Its main functions are to (a) organise training courses for officials and employees of the construction industry, urban managers at all levels and for those involved in construction activities themselves; (b) disseminate construction-related legal regulations; (c) conduct research into applications of advanced technologies and managerial science; and (d) participate in the compilation of legal regulations and conduct other public services related to the functions of the Ministry.

The Academy's Headquarters is located in Hanoi in the north of the country. The two main supporting centres are located in Ho Chi Minh City in the south and Danang in the centre of Vietnam.

Examples of influential projects undertaken by the Academy include 'Building better cities through better urban managers' funded by the World Bank (2011–2014), 'Training of capacity building in construction management and urban development for leaders and, urban managers at all levels in the period 2010–2020' (Decision No. 1961/QĐ-TTg by the Prime Minister) and 'Institutional Strengthening and Capacity Building for Urban Development in Vietnam' sponsored by SECO, Switzerland, through UNHABITAT (2020–2025).

## Chapter 1

# Country Chapters Overview

*Michael Anson, Y. H. Chiang, Daisuke Hosoda,  
Chandima Swarnamali Karunaratne, Patrick T. I. Lam,  
Yukinobu Nagamine, Pham Van Bo, Krishna S. Pribadi,  
Madhuri Jyothi Rani, Jianfu F. Shen, Biemo W. Soemardi  
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The following eight chapters in this book provide 25 year snapshots (1995–2019) of construction industry progress in the Asian economies of Hong Kong, India, Indonesia, Japan, Malaysia, South Korea, Sri Lanka and Vietnam. Each chapter also includes a brief look into the prospects and aspirations applying to the immediate future. The eight construction industry participants are linked through their regular representation at the annual AsiaConstruct Conference, inaugurated in 1995 by the Research Institute of Construction and Economy, Tokyo.

A nation's construction industry is somewhat rooted within its 'soul'. Construction activity has always been needed, even if rudimentary in man's early days. The characteristics of the industry, in any location, are shaped by history, geography, the social culture, local systems of organisation, means of funding and transport, locally available materials and the levels of trust and standards expected by society. The durability and effectiveness of an industry's outputs depend on the skills and levels of professionalism and commitment displayed by those who carry out the planning, design and construction work and the amount of money available. Every citizen is a stakeholder in the industry to some extent, inevitably immersed in and affected by the built environment surrounding. Even today, very large numbers act as part time micro-project managers and construction workers on an occasional amateur basis, but this must have been the norm for most in earlier centuries and for all in very early times. In modern times, full time skilled construction workers are employed by a small number of very large firms at one end of the spectrum through to a large number of very small firms at the other, a distribution pattern common in construction everywhere as pointed out in some of the chapters in this book.

Every nation's construction industry is fundamental in providing shelter for its people and the built facilities by which a country can function, be they power,

water, drainage and transport networks, schools, factories, business premises, hospitals and leisure facilities. It may not be fully appreciated by the general public just how important a nation's construction industry is to its well-being and how important it should be, therefore, that persons of high calibre seek to serve it at all levels, ones who work creatively to the highest standards of design, quality and efficiency and are rewarded appropriately. Governments, nowadays at least, do seem to understand this and several countries in the chapters of this book report attempts to improve career conditions. Governments are concerned to achieve 'value for money', or good quality construction at the appropriate cost, and with minimising wastes of all kinds, be it time, money, manpower and materials during construction and, nowadays, with minimising the energy used by completed buildings in service. The last 25 years have also seen ramped up concerns to reduce accidents and deaths on construction sites. It would be good if, one day, construction was no longer seen as risky work, ranked alongside fishing and mining in that regard and was seen as providing a range of important and attractive jobs and career options.

Rather, today, construction is often regarded as dirty and dangerous and not as prestigious as it might be. Recruitment concerns are particularly stressed by Japan and Hong Kong which have rapidly ageing workforces, by Malaysia which depends upon immigrant labour and by South Korea, Indonesia and Sri Lanka, worried about workforce quality. A widely held further negative image, not without cause it must be said, is that the construction industry cannot be fully trusted. Completed work might be below the specified quality, costs charged might be excessive and incidences of fraud do occur occasionally. At the same time, it is well understood by those who actually work in construction that large numbers of creative and committed industry and project level leaders are to be found everywhere, who incrementally advance the industry as best they can, working alongside very large numbers of honest, conscientious, reliable and proud skilled craftsmen and supporting labourers.

A key factor affecting construction output performance is the fact that every project is in some sense unique, *essentially a prototype in its own unique location*, inevitably generating, be it lesser or greater, some 'friction' in the form of design inadequacies and logistics inefficiencies. The coordinated timing of plant, labour and materials' supplies to site and of the formal procedures of work quality supervision are not always easy to implement. Factory products, in comparison, such as the motor car and the washing machine are *developments of prototypes*, all identical for a time and produced within an environment designed expressly for the purposes of efficient production, with supervision of quality and functional testing immediately to hand. In fact, as only construction professionals and site workers can properly appreciate, one attractive feature of a career in construction is the very fact that unexpected problems do crop up, providing scope for individual resourcefulness and creative solutions from time to time with the sense of responsibility and the sense of satisfaction that that can bring. This applies at all levels from the design professional, to the site project manager, to the individual craft worker on site and the individual plant (e.g. excavator) operator. Most individuals, every day, have real, often routine, but significant responsibilities devolved upon them, almost always conscientiously and honestly carried out

and often, perforce, without close supervision. This too, in most cases, is a source of personal pride. A vivid example of just how proud of his job a construction worker can be, is the common sight, in Japan, of a concrete delivery truckmixer vehicle and its rotating drum, highly polished all over, as if it were a Rolls Royce car.

The following eight chapters, though all written to the same broad template, vary considerably in content and the degrees of emphasis given to various industry issues. The chapter authors naturally reflect the achievements, aims and specific concerns of their own construction industries in their 1995–2019 snapshots. Thus, Vietnam says much about the growth of a strong construction economy from a low base and little about construction safety, whereas Hong Kong, an advanced economy in terms of gross domestic product (GDP) per capita, can afford the costs of ‘paying for safety’ one of the strategies used there to reduce accidents on site. Hong Kong is the only chapter emphasising the provision of land as a serious constraint on actual production. Only Sri Lanka and Indonesia mention the need to address serious problems of economic imbalance between different regions within their countries and South Korea to some extent. Japan devotes a considerable amount of space to its 1995 great earthquake and the 2011 tsunami disaster and the huge consequences for its construction industry. Some countries export construction services as a deliberate component of the national economy but others do not. The degree to which foreign contractors are welcome in each country varies from the total openness of Hong Kong to different access policies and practices between countries, which can vary over time within a specific country. Generally, in recent years, there does seem to be more opening up to foreign competition in countries’ internal markets, perhaps because of new free trade relationships being negotiated internationally in Asia. This is best exemplified by the Sri Lanka chapter, but is mentioned as a way of attracting inward investment to the economy in several chapters. The degree of access granted to foreign owned firms is always affected by the tensions between the need for capital and access to superior construction technology, the protection of local industry and local jobs and the transfer of technology and skills to local industry.

The motivation underlying the production of this book of 1995–2019 industry snapshots is to celebrate the 25 years of existence of the AsiaConstruct Conference.<sup>1</sup> The chapters, viewed collectively, give the reader a broad picture of the nature of a construction industry, the variety and scope of its concerns in general, an appreciation of its importance to society and the general economy of any country and the contribution made to that society by those who work in it. Because chapters are not quite like each other, not ‘clones’, as if written to a tight template, a wider perspective on the range of construction industry concerns is

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<sup>1</sup>The papers presented at the annual AsiaConstruct Conferences can be accessed via the website [www.asiaconst.com](http://www.asiaconst.com) maintained by RICE, the Research Institute of Construction and Economy, Tokyo. Each year, each country submits a paper summarising its construction industry statistics for that year, with commentary, plus, since 2004, a second paper on a topic of interest to all, chosen by the host country for that year. In 2004, for example, the chosen topic was ‘Financing Construction’.

provided, of interest to the experienced construction professional anywhere and to construction industry policy makers. For students and young professionals a full introduction is provided to the factors affecting the nature of construction industries and those quality and resources issues affecting their performance. Particularly useful in this respect is that our eight construction economies are at different stages of economic development and relate to different types of geographic and population environments.

The real estate industry, not mentioned above, is intimately bound up with the construction industry. It mainly responds to the private sector demand for housing, office space and other types of space and manages many of the larger properties, once built, during their lives in service. The two industries are sometimes considered a single industry of construction and real estate.

## **Progress Outlines 1995–2019**

### ***South Korea***

The country has embarked on a policy of redistributing the population to some extent to reduce over concentration on Seoul. A new administrative capital, Sejong, 144 km from Seoul is under construction and 11 ‘innovation’ cities are being developed, each of which will ‘specialise’ in two or three areas. For example, Busan will specialise in marine fisheries, in the finance industry and the film making industry. The new cities necessarily include much housing construction. The start of our 25 year window saw the beginning of construction of the new international Seoul airport at Incheon, which opened in 2010. Its fourth runway is currently being built and a fifth is intended as the final phase. During the 25 years, the country’s transportation network has benefitted from a high speed rail line of 398 km and 27 no. long span suspension and cable stayed bridges. Over 120 supertall buildings have been constructed across the nation. The construction industry contribution to GDP has varied between 5.5% and 4% over most of the 25 years. Like most others in this book, the industry was badly affected by the Asian financial crisis of 1997–1998. Construction share of GDP was smaller at the end of the 25 year period than at the start, but this is really a reflection of the growth of the South Korean economy in sectors other than construction.

Korea has persistently suffered from high housing prices and several times the government has adopted cooling measures in the forms of taxes, price controls and injections of lower priced government built housing. An unusual measure in this respect, to encourage activity, was a guarantee to private developers that the government would purchase ‘unsold’ units, to then lease on the rental market.

In South Korea, contractors bid to build a given design in competition with other contractors, as is common almost everywhere. Although there is no mention in the chapter of design and build contract variants, these, in fact, are also seen in South Korea. Unusual among our eight construction economies, is that contractors are divided rigidly into general contractors and specialty contractors, whereby the former only plan and manage projects and all practical construction itself must be done by the latter. This legally required functional division,

however, will change in 2022 and more flexibility will be possible. Of course, the project teams of main contractor and sub-contractors, often seen in other countries, may not be very different to the Korean model in effect.

Quite late compared to some other countries, conventional pattern public private partnership (PPP) projects were first undertaken in the 1990s to enable access to private capital in kick-starting public projects. *Privately inspired* PPP projects are also encouraged in Korea helped along by government funding, which are later recouped through fees paid by the ultimate users.

In South Korea, the government, through its Ministry of Land, Infrastructure and Transport, monitors and drives up standards of all types, drives the use of new technologies and exercises the coordination function. ‘Public procurement services’ (PPS) is a separate government entity which manages public projects initiated by government departments and is also responsible for maintaining standards. The PPS is playing a leading role in the gradual adoption of building information modelling (BIM) technology in the public sector, producing the first ‘primer’, or guide, in 2010. The 6th edition of that primer was issued in 2019.

There is concern with the quality of the workforce and the difficulty in attracting recruits. To attract more recruits, pay structures are being improved and in 2017 the government began a major campaign to improve site safety, aimed at halving the death rate by 2022. There is also the urgent desire to accelerate the advent of information technologies. Improving productivity depends on professionalism in part, but very much on new technologies including construction technologies themselves and information technology applications to all aspects of the procurement process. The chapter notes that underground/basement construction processes are habitually slow, suggesting that new technologies in this field might be most effective in shortening construction durations. No problems concerning land, plant, materials and finance were raised in the chapter.

South Korea has always maintained a strong presence in the overseas construction market, mainly specialising in the construction of industrial plant. Before 1995, it was second only to the United States for a time, but the various financial and oil price crises reduced profits and activity in our 25 year period. Even so, the commitment to overseas work remains very strong today. There are many high power education and training courses in South Korea aimed at graduating individuals knowledgeable in construction methods, management and finance best practice at international levels, deliberately aimed at fitting Korean firms to remain competitive in the overseas market.

South Korea is ending the 25 year period with aggressive policies to accelerate the introduction of information technologies of all types. The Covid-19 pandemic may be adding to the sense of urgency. It is pointed out that there are sensing technologies under way that should reduce the extent of face to face worker proximity on site.

## ***Malaysia***

In 1990, Malaysia produced Vision 2020, a 30 year plan to become a modern industrialised country by 2020. In the case of construction, the 2006–2015

Construction Industry Master Plan, followed by the 2016–2020 Construction Industry Transformation Programme have guided progress. For most of the 25 years the contribution of construction to GDP has been between 3% and 4% but has risen to about 5.5% in 2019. Major projects have turned Kuala Lumpur into a modern city and new transportation networks have united peninsular Malaya. Major transportation infrastructure is under construction to connect Sabah and Sarawak and on to Brunei. Connection will also be made with Indonesia's new capital city planned for the East Kalimantan region. The 1998 East Asian financial crisis hit Malaysia hard and the construction industry contracted by about 24% in 1998, with most major projects coming to a complete standstill for some months. Recovery was quite quick, however. The 2008 global crisis had a relatively less negative impact on construction.

In the early 1990s, the Malaysian government well recognised the key role the construction industry would play in fulfilling its 2020 target aims and following much dissatisfaction by society with the quality of the industry's outputs and its inefficient processes, established the Construction Industry Development Board (CIDB) in 1994, as a Federal Statutory Body under the Ministry of Works; a momentous step. The CIDB has powers to regulate the industry, to register firms and individuals meeting its required performance standards and to enforce those standards in the field. It has major training and coordination roles in advancing standards and encouraging new technologies and construction systems. Similarly, in the mid-1990s, India and Indonesia established pan-industry coordination bodies. Hong Kong, in 2007, set up its Construction Industry Council (CIC), with consultative, coordination planning and advisory roles but lacking enforcement powers.

As in all countries, the industry has a fragmented structure of large firms and many small firms, specialising in different aspects of the procurement process, with the attendant productivity and built quality disadvantages, partly alleviated in Malaysia by the CIDB encouraged increasing use of integrated building systems (IBS) and 'design and build' procurement models. A particular feature is that the industry depends on imported labour for part of its workforce, negatively affecting workforce skill levels overall. Skills training is being enhanced accordingly in Malaysia with the view also to make careers in construction more attractive to the local population.

The government, through the CIDB, is proactive in pressing for higher standards of professionalism and there is no lack of drive and ambition. Systems to measure the built quality achieved by contractors are in use and scoring systems to assess environmental sustainability, too, for designs and completed buildings. Information technology applications are encouraged; BIM especially, as a technology and its use as a 'philosophy' perhaps, has been promulgated for quite some years and is slowly gaining traction. Right now, at the end of our 25 year window, the CIDB is concentrating on the eight focus areas of *quality, safety, professionalism, sustainability, skills training, technology, exports and competitiveness*, all backed by systems of implementation committees operating on a national basis involving all parties. In fact, the Malaysia chapter, with Indonesia perhaps, details government promoted development plans to a greater extent than other chapters,

giving readers a good picture of the degree of leadership a government can give and the importance it assigns to the construction industry.

Malaysia exports construction services to East Asia and the Middle East and sees this as contributing to its economy and national reputation. Over the last 40 years, 25 large projects have been delivered each year on average. Malaysia is a participant in recent regional free trade agreements and recognises the importance of upgrading its competitiveness, not only to win overseas business but also to constrain the foreign competition expected to increase in its home market.

### ***Vietnam***

Vietnam was a centrally planned economy until 1986 with very low construction industry growth rates of the order of 2.25%. On becoming a market oriented economy in 1986 with inward foreign investment also encouraged, the response was good. It became even better in our 25 year period when the decision was taken, in 1996, to let 'business persons' run the construction industry rather than government bodies. The chapter points out that important Construction Law, Housing Law and Bidding Law legislation was enacted in 2003 and updated in 2014. The rights and responsibilities of various stakeholders in the construction process were defined and a real estate sector developed.

Large companies were established to build such infrastructural needs as power plants and cement making plants. The period 1996–2000 saw 5,000 km of roads built and upgraded, 200 km of new rail track, new bridges totalling 14 km in length, ports expanded to 45 million tons per annum (pa) and airports to 6.5 million people pa. National GDP averaged a growth rate of 6.95% pa. Over the whole 25 year window of this book, in fact, GDP averaged 6.9% growth, with the construction industry component of that averaging 8.5% growth. The construction workforce was 3% of the national workforce in 1995, 5% by 2007 and 8% by 2018. In 2012, wage rates in construction outstripped those in the general economy for the first time and have remained higher ever since. The 1998 and 2008 financial crises did affect Vietnam, as most of our eight countries, with sharp contractions recovered from quickly. In 2011 also, there was an investment slump induced contraction in activity as apartment prices dropped by 25%.

Alongside continuing new construction, Vietnam was careful to build up a construction materials industry to reduce imports over time. In particular, low energy 'non-baked' building block manufacturing, tiles, construction glass and sanitary ware. The country is now also self-sufficient in cement. The engineering sector, too, is important in now producing 70% of the country's demand for lifts and tower cranes. Indeed the steady improvement in construction technology, turned Vietnam into 'a 30-storey industry' by 2010, from a 5-storey industry in 1990, via a 10-storey stage. The 65-storey shopping mall, Lotte Hanse, was completed in 2014. Compared with 1995, Vietnamese construction technology has advanced in foundation work including bored piling, tunnelling, slipforming, large component precast concrete cross section structural elements and cable stayed bridge decks.

As for the future, the outlook remains buoyant, with construction growth expected at about 7.5% pa for the next 10 years. Urbanisation will proceed apace. One-third of the population are urban dwellers today, planned to grow at 2.6% pa towards an urban population of 60% in 2050. There is much housing to be built and schools, gradually turning to more hospitals and care homes as the present young population ages. The funding of the necessary road and rail networks, sewage works, water supply and drainage infrastructure projects, however, is forecast as something of a problem. On current trends, it is expected that Vietnam, in 2040, will have succeeded in building only 83% of its infrastructure needs.

The Vietnam chapter does not discuss issues of built quality and safety on site, nor the recruitment of workers to the industry. The latter is not a problem in Vietnam, it seems. Concerns to address environmental sustainability are referred to. Perhaps 'getting things built' and a degree of 'self-sufficiency' are the key emphases at this stage of Vietnam's economic development.

### ***Sri Lanka***

For half of our window, Sri Lanka was immersed in a civil war which ended only in 2009. There was also the major tsunami of 2004 to contend with as well as the 2008 global financial crisis. The 1998 Asian financial crisis seems not to have affected Sri Lanka. The war, however, sucked in resources, significantly reducing the scope for investment in the economy, including construction. When the war ended the construction industry share of GDP was about 6%, but this became 8.1% by 2012 and 9.6% by 2014, reflecting the acceleration given to construction activity through massive public investment. Part of the drive reflected the government desire of 2006 to even up the economic status of the different regions of the country. The Colombo region was much better off than most of the rest of the country. Expressways across the country were built and airports and ports developed. A much enlarged real estate industry emerged.

In 2015, there was a change of government and the brake was applied to construction for a time. Some large prestigious real estate projects were even temporarily halted. The new government wanted to take stock. The overheated boom had revealed serious skills shortages, mushrooming materials' prices driven by the demand for imports and steep increases in wages for workers on site. The industry picked up after a short interlude. Investment in construction, for example, rose by 16% in 2017 and the industry contributed 9% of national GDP in 2018. Foreign direct investment was welcomed and conditions for foreign enterprises made identical to local ones. Foreign enterprises can even become owners of built assets. Foreign firms are expected to employ local labour and craftsmen, though this is not always fully possible. Imported labour largely derives from Myanmar and Nepal. The situation is not helped by the long tradition of Sri Lankan craftsmen working overseas, much sought after, especially in the Middle East. The chapter also notes the reluctance of the young to make a career in construction. Concerns are now rising about the failure of foreign firms to transfer technologies as expected. Under debate is the possibility that foreign firms, in the future, may only be admitted to the Sri Lankan market on a joint venture basis with a local contractor.