APEC Cities and Built Environments (BE) Strategy: Building Back Better in the Post COVID-19

APEC Emergency Preparedness Working Group

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FINAL REPORT

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Executive Summary

This report is prepared as a summary for the APEC Project: EPWG 02 2021A APEC Cities and Built Environments (BE) Strategy: Building Back Better in the Post COVID-19. This project is under the APEC Emergency Preparedness Working Group (EPWG), approved in 2021. This project was carried out in 2022 and involves four research methods: a systematic literature review to identify the issues and challenges related to COVID-19 and cities and built environments, interviews and case studies on a selected APEC member economy's city for the lesson learned, virtual workshop to discuss the situation and best practices from other member economies, and scenario planning and analysis to understand the plausible futures of APEC cities and built environments post-COVID-19 pandemic. A systematic literature review was conducted to develop a strategic recommendations approach that future shape urban management and built environments based on an in-depth understanding of the issues and challenges faced by cities during the COVID-19 pandemic. The issues and challenges faced by the cities during the COVID-19 pandemic are divided into four dimensions. They are 1) Socio-economic, 2) Technology and infrastructure, 3) Planning, design and environment, and 4) Management and governance. Overall, it is suggested to prioritise the actions to synergise the effort to bridge the gap between pandemic attacks and how cities and built environments are planned and designed. These dimensions of issues and challenges were utilised to develop factors influencing the impact and uncertainty in scenario planning and analysis. Interviews with the experts in the built environment industry from selected APEC city representatives were organised for case studies to discuss and refine a detailed strategy on "pandemic-resilient cities and built environments" based on lessons learned or best practices. The representatives are from Indonesia, Japan, Australia, Singapore and Malaysia, and their case study is in Lombok, Kashiwanoha, Sydney, Singapore city and Subang Jaya. A virtual workshop was held on 15 and 16 August 2022 to formulate an APEC strategy for creating a multi-stakeholder implementation approach for "pandemic-resilient cities and built environments". The two-day workshop is divided into three sessions, a talk session by the keynote speakers, two forum sessions with eight panellists who are experts in their respective fields and the scenario planning and analysis session. Thirty-five participants attended the workshop from various APEC member economies. Finally, the project developed recommendations for APEC Cities and Built Environments (BE) Strategy: Building Back Better in the Post COVID-19.

1. Introduction

The global pandemic, COVID-19, has caused massive devastation and losses worldwide, including in cities in Asia-Pacific. According to a report published by the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) in "The Future of Asia and Pacific Cities", 2020 , 95 per cent of COVID-19 cases resulted from urban areas (high spreaders of infection rate), which proved that cities had been the most vulnerable areas during the COVID-19. To minimise the infection rate, most cities have imposed a lockdown policy and thus, causing significant losses, particularly in economic sectors such as total gross domestic product (GDP) and employment rate.

The COVID-19 pandemic in a built environment has highlighted the need to strengthen and integrate synergies between public health and how we design cities to mitigate future pandemic risks. This project focuses on investigating the issues and challenges faced by APEC economies during the pandemic as well as understanding better the economy, technology, and infrastructure to shape "Pandemic-resilient cities and built environment", in line with Sustainable Development Goals Eleven (SDG 11)-Making cities and human settlement inclusive, safe, resilient, and sustainable. In short, this project provides a comprehensive strategy to assist stakeholders within APEC economies during decision-making in dealing with pandemic risk in the future.

The project aimed to develop APEC Cities and Built Environment (BE) Strategy: Building Back Better in the Post COVID-19 with the following research objectives:

a) To develop a strategic recommendations approach that will shape urban management and built environments based on an in-depth understanding of the issues and challenges cities face during the COVID-19 pandemic.
b) To discuss and refine a detailed strategy on "pandemic-resilient cities and built environments" based on lessons learned or best practices captured from relevant stakeholders (from different APEC economies).
c) To formulate APEC strategy in creating a multi-stakeholder implementation approach for "pandemic-resilient cities and built environments".

EPWG 02 2021A APEC Cities and Built Environment (BE) Strategy: Building Back Better in the Post COVID-19 project is a project under the APEC Emergency Preparedness Working Group (EPWG) approved in the year 2021. This project is aligned with the APEC Disaster Risk Reduction (DRR) Framework as it establishes collective resources and initiates APEC transdisciplinary DRR public-private collaboration among member economies.

The project has three outputs which are:

a) A report on lessons learned and the way forward for the 'Next Normal': A scenario analysis and systematic review
b) Virtual workshop for multidisciplinary action strategy
c) Final report

1.1 Research Work

The research focused on understanding the issues and challenges faced by the APEC member economies and their progress into a lesson learned and the way forward for the next normal. A total of three research strategies have been implemented throughout the research work: systematic literature review, expert interview, and case study. For details, refer to annex 1, Systematic Literature Review Report.

1.1.1 Systematic Literature Review

The first research strategy is the Systematic Literature Review (SLR) adopted from Xiao and Watson (2019) based on the six stages: formulation of research questions, search criteria and identification, screening process, title and abstract screening, quality assessment and data extraction. The aim of SLR in this project was to find clarity of scholarly communication, validity where the literature is defensible against bias, and auditability of the literature to get accurate results (Booth et al., 2021). At the end of the process, 33 articles were included in the synthesis for this research project.

1.1.2 Expert Interview

The second research strategy involves interviews with urban and regional planning experts from five (5) APEC economies. This research strategy aimed to obtain necessary information reflected in the knowledge, opinions, and estimates of the respondents, who are competent persons (Bezpalko et al., 2016). Five (5) experts from APEC member economies: Indonesia, Japan, Australia, Malaysia, and Singapore were selected. The experts were from various backgrounds, including government agencies, academia, industry practitioner, and society member.

1.1.3 Case Study

The third research strategy is the case study. The experts suggested that the case study include cities that have successfully implemented strategies in managing the issues and challenges faced during the COVID-19 pandemic. The case study gives a holistic view of a particular phenomenon or series of events and provides a bigger picture using many evidence sources. Each city has unique selection aspects, which can be a lesson learned across APEC economies.

Table 1 List of cities for the case study from selected APEC member economies

APEC Economies	Cities	Selection Aspects
Indonesia	Lombok	Island Resilience
Japan	Kashiwanoha	Smart city
Australia	Sydney	Community recovery
Malaysia	Subang Jaya	Micro-planning approach
Singapore	Singapore	Good governance

1.2 Virtual Workshop

The two-day hybrid workshop was held virtually via the Microsoft Teams platform, while some speakers attended the workshop physically at Cyberview Resort and Spa in Cyberjaya, Selangor. The workshop was held from 15th August to 16th August 2022 by the Institute of Sultan Iskandar (ISI) and Construction Research Institute of Malaysia (CREAM), supported by the Asia-Pacific Economies Cooperation (APEC). It was attended by 35 participants from government/public, private/industry, and academia sectors from six APEC member economies namely Canada, Peru, Chile, Indonesia, New Zealand, and Malaysia.

This workshop focused on gathering ideas from multi-stakeholder/multi-disciplinary action strategies within APEC economies by sharing best practices, identifying views, and seeking practical solutions in the economy, technology, and infrastructure to shape pandemic-resilient cities and the built environment. The two days workshop comprised keynote presentations, forum discussions and a workshop for developing scenarios for APEC's future post-pandemics. For details, refer to Annex 2, Workshop Summary Report.

Day 1 – Day 1 of the event began with the Opening Remarks by Dato' Ts. Dr Gerald Sundaraj, Chief Executive Officer of Construction Research Institute of Malaysia, followed by Welcoming Remarks by Professor Dr Syed Ahmad Iskandar Syed Ariffin, Executive Director, Institute Sultan Iskandar. The event continued with Forum 1 whereby four experts were invited to be the panellists to present on the topic of "Multi-stakeholders Collaboration Towards Pandemic-Resilient Cities and Built Environments". The event proceeds with presentations from Keynote Speakers 1 and 2 focusing on "Pandemic and Planning for Resilient Cities" and "Building More Resilient Cities to Endure COVID-19 and Future Pandemic Risk". The event then continued in the afternoon with Forum 2 whereby four panellists were invited present on the topic of "Best Practices and Lessons of Coronavirus".

Day 2 – On Day 2, the virtual workshop was conducted based on a discussion format. The session aimed at developing resilience strategies based on the plausible future of APEC

member economies through scenario planning and analysis. For scenario planning, participants' data attainment process was divided into two main exercises/sessions: Realising "What will APEC cities and built environments look like post-COVID-19 pandemic?" and "Visualising the APEC cities and built environments post-COVID-19 pandemic".

There were 35 participants, including keynote speakers, forum panels, moderators, facilitators, and participants attending the virtual workshop, with 18 male participants and 17 female participants striving for gender equality.

35 Participants

51% Male   49% Female

- 4 Sponsoring Economies – United States, Mexico, Japan, Republic of China
- 6 APEC member economies from various organisations – Australia, Canada, Chile, Indonesia, New Zealand, and Peru
- Various Local Organisations – URBANICE, NADMA, PlanMalaysia, Malaysia Urban Design Association

2. Issues and Challenges Faced by Cities in the APEC Region During the COVID-19 Pandemic

The project's first objective is to develop a strategic recommendations approach that shapes future urban management and built environments based on an in-depth understanding of cities' issues and challenges during the COVID-19 pandemic. Despite many studies on the COVID-19 pandemic, evidence on the issues and challenges focusing on cities and built environments is still underexplored. Therefore, the project carried out a systematic literature review focused on answering the questions regulate on the issues, challenges, and other impacts of the pandemic on cities and built environments.

The systematic literature review's final evaluation included 33 articles in the last process stage; data extraction. The data extraction produced four thematic categories from the articles with the themes of planning, design, and environment, socio-economic, management and governance, and technology and infrastructure. The details of the thematic categories for the issues and challenges are listed in the table below.

Table 2 Identified Issues and challenges according to themes

Thematic Category	Aspects	No of Articles
i. *Socio-economic*	Economic impacts, unemployment rate, socio-cultural inequality, food security,	**12**
ii. *Technology and infrastructure*	Logistics, transportation, mobility, digital infrastructure and technological services	**5**
iii. *Planning, design and environment*	The use of urban spaces, housing design, building spaces, urban design, and environmental quality (air, water and noise quality)	**16**
iv. *Management and governance*	Urban management, governance system	**6**

2.1 Exploring the issues and challenges with solutions, strategies and best practices

The identification of solutions and strategies are based on four themes; socio-economic, technology and infrastructure, planning and design and governance and management. Overall, it is suggested to prioritise the actions to synergise the effort to bridge the gap between pandemic attacks and how cities and built environments are planned and designed (McCartney, Pinto & Liu, 2021; Megahed & Ghoneim, 2020; Salih & Hussein, 2021; Sharifi & Khavarian-Garmsir, 2020).

Table 3 Solutions and best practices based on the identified issues and challenges for each theme

Theme	Challenge/ Issue	Solutions/ Best Practices
Socio-economic	Inequality	• Increasing the economic base for responding to the COVID-19 pandemic (Chen & Quan, 2021) • Promote circular economy (Girard & Nocca, 2020) • Diversify the informal economy (Martinez & Short, 2021)
	Job loss, increasing unemployment rate	• Continuously adjust industrial structures by attracting foreign investment to improve economic resilience (Chen & Quan, 2021) • Establish action plans for recovery (tourism sector) (Kowalczyk-Aniol et al., 2021)
	Disruptions in supply chains that have impacted food security	• Industry collaboration and diversification (McCartney et al., 2021).
Technology and Infrastructure	Digital Divide	• Increase investment in digital infrastructure and vulnerable target areas • Digital transformation and promote telecommuting (Megahed & Ghoneim, 2020)
	Traditional infrastructure systems cannot cope with the current demand	• Use of robotics to facilitate healthcare facilities (Hu, Zhong et al., 2020) • Advancements in cloud-based system technologies (Gong et al., 2020)

		• Invest in artificial intelligence and touchless technologies (Megahed & Ghoneim, 2020)
Planning and Design	Poor coverage of technological services and infrastructure	• Promote digitalisation through incentives and the development of digital skills and capabilities (Amankwah-Amoah et al., 2021)
	Lack of green space to accommodate recreational activities	• Improve financing on green infrastructure at various scales – city, neighbourhood, and site (Mell & Witten, 2021) • Community-led planning for equitable green infrastructure provision (Mell & Witten,2021). • Provision of a diverse mix of urban green space (Ugolini et al., 2020)
	Accessibility and Transportation	• Advocate 15 minutes city, walkability and micro-mobility (Moreno et al., 2021) • Promote telecommuting (Megahed & Ghoneim, 2020)
	Environmental Quality	• Scaling up of existing environmental policy (Jain & Sharma, 2020) • Promote spaces for dual needs – social and environmental purpose (Moore et al., 2022)
	Poor housing design	• Redesign post-pandemic housing (Megahed & Ghoneim, 2020) • Develop guidelines for future housing design (Stoiljković, 2022)
Governance and Management	Inefficient urban governance in dealing with the pandemic	• Need for intermediate confinement policy (Carploe Pinedo, 2021)
	Poor emergency and recovery plans No long-term planning	• The need to establish a long-term recovery plan (Sharifi & Khavarian-Garmsir, 2020)
	Lack of community engagement	• Public and private sector collaboration (McCartney et al., 2021) (Anttiroiko, 2021)
		• Transformation of governance and urban management (Kowalczyk-Aniol et al., 2021)
	Insufficient recovery funds	• Design an economic stimulus plan (Anttiroiko, 2021; Sharifi & Khavarian-Garmsir, 2020)

3. Lessons Learned and Best Practices Captured in the APEC Region

Part of objective one is to develop a strategic recommendations that shapes future urban management and built environments. From the issues and challenges during the COVID-19 pandemic identified in the systematic literature review, we analysed the strategies implemented within the APEC member economies. The selected economies were from the interviews and case studies conducted with the expert representing the economies. The economic members are Indonesia, Japan, Australia, Malaysia and Singapore.

3.1 Indonesia

COVID-19 has hit hard to Indonesia, especially in the economic sector, which slowed down in 2020. In addressing such issues, Indonesia re-examined its policy (National Medium-Term Development Plan, RPJMN) and shifted its focus on handling COVID-19. While recovering from the pandemic, there are also challenges, such as food security problems in terms of similar sources of livelihood, supply change during the pandemic and food production waste, as well as digital economy challenges in terms of Indonesian's internet and average mobile internet speed still lacking behind, weak cyber security and lack of digital talent.

Lombok – Island Resilience
The city of Lombok was selected due to its resilience to climate change and thus prepared for the COVID-19 Pandemic. The city is better prepared than other cities regarding food security, water, health, and finances, even without advanced technology. The earthquake in 2018 and COVID-19 in early 2020 hit hard and disrupted Lombok's livelihood recovery. The community in Lombok suffered from issues and problems such as economic loss, making the food industry drop, thus reducing the income of waged workers.

Table 4 Best practices and lessons learned from Lombok and Indonesia

Theme	Indonesia	Lombok
Socio-Economic	• Strengthen food security by encouraging participation in urban farming and supporting local businesses.	• Lombok residents prepared and implemented emergency measures immediately as they are constantly being prepared for climate change (World Neighbors, 2020): • The installation of handwashing stations • The distribution of masks. • The emergency teams ramped up contact tracing from a high-risk area • Disinfectant spraying in public areas

		• Routine visits with quarantined people to provide support during isolation • Collected data on households at risk of falling into poverty (assistance for basic food and non-food items). • The government provided daily health and temperature checks of people in quarantine.

Technology and infrastructure	• Development of new programs such as:
	  - Digital talent scholarship
	  - National Digital Literacy Movement Program
	  - 1000 Digital Startups Program
	• The Ministry of Communication and Informatics targets to provide internet excess to all religions.
	• Preparing a personal data protection law with commission 1 of the Indonesian House of Representatives for digital security
	• The Ministry of Public Housing becomes the leader in determining the policies in terms of infrastructure.
	• The transportation sector reduces the spread of the virus by:
	  - Restricted access to the people
	  - Fortify the public transport system
	  - Looking for alternative public transportation
	  - Implemented radical data transparency
		• N/A

Planning, Design, and Environment	• The Ministry of Social Affairs controls medical and other waste during COVID-19.	• N/A
Management and governance	• The National Disaster Management Agency plays a vital role as a policymaker, leading the COVID-19 handling task force. • Policy adaptation and the implementation in the society (bottom-up system) to enhance resilience • National Medium-Term Development Plan has modified all the strategies for COVID-19 in terms of physical development. • The Ministry of Health leads and determines policies such as implementing vaccination and COVID-19 treatment.	• The government has implemented the multi-purpose cash assistance (MPCA) programme in Lombok for the people's well-being. (Koirala et al., 2020)

3.2 Japan

In Japan, particularly the tourism sector's performance in tourist arrival, transportation, and accommodation declined, affecting the citizens' livelihood. However, Japan responded promptly and was flexible towards the solution needed. The citizens changed their lifestyles and working environment and flexed their spaces into multi-use. They rapidly progress towards the digitalisation of the cities and increased teleworking environment. The impacts of COVID-19 thus created an agile town development model.

Kashiwanoha – Smart City

The Kashiwanoha Smart City Plan guided the planning and management of Kashiwanoha city. The city focussed on technological advancement (information and communication) in adapting to the "New Normal" of COVID-19. The plan improves the convenience of mobility within the city by introducing self-driving buses, visualising and monitoring traffic around the station. It also focuses on creating environment-friendly living toward decarbonised society.

Table 5 Best practices and lessons learned from Kashiwanoha and Japan

Theme	Japan	Kashiwanoha
Socio-Economic	• Accurately respond to the diverse needs of every citizen (Deepening human-centred and citizen-oriented community development) • Conducting a social experiment in a town like a park • Overcome aging issues through natural communication during a pandemic.	• The Kashiwanoha Smart City Plan provides all generations can live in good health by: - Personal health service (Kashiwa-No-Ha Passport). - Improving patient services by grasping the flow of people in the hospital
Technology and infrastructure	• Simulation and effect verification using data, new services by digital technology • Demand simulation with urban services and data-driven urban planning (provide mobility services such as buses using autonomous driving technology based on data utilisation and analysis).	• Implementation of the Kashiwanoha Smart City Plan with advances in technology • The Kashiwanoha IoT Business Co-creation Lab, aimed at private, government agencies, and research institutions, uses IoT communication infrastructure to create IoT-related business opportunities and support collaboration, contributing to new business creation. (Deloitte Tohmatsu Group, 2021) • The Kashiwanoha Smart City Plan improves the convenience of mobility within the region with the station at the centre by: - Introducing self-driving buses - Visualising and monitoring traffic around the station.
Planning, Design, and Environment	• Creating space through the integrated utilisation of public and private urban assets, such as the fusion of work, housing, and amusement	• The Kashiwanoha Smart City Plan provides environment-friendly living toward a decarbonised society by:

	• Renovation of urban assets, such as turning vacant houses into coworking spaces • Variable and flexible utilisation of city settings such as streets and open spaces	- Using a cloud computing system for area energy management service (AEMS) and improving the accuracy of demand forecasting - Maintaining a management platform for solar power generation. • The Kashiwanoha Smart City Plan creates urban spaces that attract people and support their lives by: - Using monitoring data from AI cameras and sensors. - Preventive maintenance management by sensing and AI analysis
Management and governance	• Implement measures promptly and flexible in response to needs (agile town development) • Public, private, and academic stakeholders collaborate to share the city's vision. • The Ministry of Land, Infrastructure, Transport and Tourism promote the "Model Cities for New Town Development" project with six conditions: - Enhancement of open space - The utilisation of idle stock like vacant lots or houses - Development of telework facilities - Installation of information and communication infrastructure equipment - Data utilisation	• Kashiwanoha, a smart city development project, involved collaboration between stakeholders (Urban Design Center, Kashiwanoha Town Management (UDCK) and public private-academia partnership, including real estate company Mitsui Fudosan. (Deloitte Tohmatsu Group, 2021)

3.3 Australia

The COVID-19 pandemic highlighted various issues and challenges in Australia, particularly in health, technology, and construction. Australia has been over-reliance on international trade and tourism, and when the restriction to cross borders was implemented, cities in Australia were left neglected. However, the cities focused more on healthy alternatives for their citizens by promoting bike riding and pedestrian-friendly activities. Thus, the cities have changed in design and build to cater to the locals' needs. Furthermore, they provide a ready-to-use IoT and circular economy approach in the public space and buildings.

Sydney – Community Recovery

The city of Sydney was selected based on its community recovery agenda. During the COVID-19 pandemic, Sydney has taken a big hit, especially in the social aspects. The pandemic has changed the lifestyle and city pattern, such as the disruption to everyday transport choices in Sydney. For instance, people have switched from public transport to

cycling, while the lack of safe and secure cycling facilities has become an issue. In addition, with the high arrival of foreigners, public health alerts on COVID-19 have frequently ignored the needs of culturally and linguistically different among the communities. There was also an increased inequity in food access in Greater Sydney's food system, and the decrease in the informal economy, including the peer-to-peer rental market, affected the community's livelihood. However, Sydney overcame those challenges with the Community Recovery Plan: City of Sydney to step toward life after the pandemic (the city's future) in terms of economy, society, and environment.

Table 6 Best practices and lessons learned from Sydney and Australia

Theme	Australia	Sydney
Socio-Economic	• Re-socialise people's connections and relationships before revitalising the cities. • Hand sanitiser and masks have become affordable and become a regular habit for people (social stigma disappeared).	• Emphasises the need for variation across language groups by tailoring public communication efforts to translation, health literacy and communication channel accessibility. (Ayre et al., 2022) • Develop a more centralised information network amongst food relief organisations to better identify needs. (Craven and Meyer, 2020)

Technology and infrastructure	• IoT is part of the solution
	  - Digital twin technology for model pandemic response
	  - Technology mesh with low-tech solutions
	  - Digital governance for data management
		• Reactivating commuter cycling by providing safe and secure cycling facilities such as bike land. (Waitt and Stanes, 2022)
		• Priorities the planning of "active transport" modes (Cilliers et al., 2021)

Planning, design, and environment	• Design and build the city primarily for those living there, only attracting people from outside (Economy recovery).	• Accommodate flexible uses, users, and activities as part of city planning approaches • High-value connection spaces to support accessibility and availability (Cilliers et al., 2021) • Urban spaces planned for an enhanced experience and meaningful encounters (Cilliers et al., 2021) • Healthy environments are prioritised as part of broader spatial planning approaches (Cilliers et al., 2021) • Focus should be placed on the more significant deployment of collaboration technologies (Cilliers et al., 2021)

Management and governance	• Any strategies for a pandemic must go through the cycle of **"Respond – Recover – Re-evaluate".**	• Implementation of Community Recovery Plan: City of Sydney to step towards life after the pandemic (Green Global Connected, 2020) • Implementation of COVID-19 Recovery Strategy 2021 for economic recovery (Committee for Sydney, 2021) • Implementation of City-Shaping impacts of COVID-19: Towards a resilient Greater Sydney (Greater Sydney Commission, 2020) • Implementation of NSW Street Treatments for COVID Recovery for the transportation measures. (NSW Government, 2020)

3.4 Malaysia

COVID-19- impacted the health sector in Malaysia the most, and the impact slowly ripples to other economic and social sectors. Therefore, Malaysia focused on its policy and guideline to improve the productivity and livelihood of the community. The traditional economy has shifted to the digital economy. This new trend of commercial aspects has been integrated into Twelfth Malaysia Plan (2021-2025) and further investigated by the new planning guideline for the retail sector. Urban farming policies enforced food security by leasing or temporarily allowing the community to grow their food. Attention was also given to the new housing design as a multi-functional place to educate, work and leisure.

Kuala Lumpur/Subang Jaya – Sustainable City with Microplanning Approach
Subang Jaya City was selected because the city implements initiatives toward a sustainable city focusing on the microplanning approach during the pandemic.

Table 7 Best practices and lessons learned from Subang Jaya and Malaysia

Theme	Malaysia	Subang Jaya
Socio-Economic	• The new trend of commercial aspects has been integrated into Twelfth Malaysia Plan (Rancangan Malaysia ke-12), and then PLANMalaysia will review and investigate new planning guidelines for the retail sector. • Ministry of Housing and Local Government (KPKT) has published Dasar Kebun Komuniti Bandar (DKKB) as food security by leasing or temporarily allowing the community to grow their food.	• Subang Jaya City Council distribute food and disinfecting solutions to the poor, registers e-hailers, food handlers, and dispatchers, and provides emergency assistance such as flash floods.

Technology and infrastructure	• PlanMalaysia is moving toward a smart city by investing a lot and providing essential criteria for the smart city (Melaka as the testing pilot project). • PlanMalaysia is working with the Malaysia Communications and Multimedia Commission (MCMC) for the new development of the communication tower. • Plan Malaysia is developing the guidelines for active transportation for the local plan.	• Subang Jaya has set up an Operational Room for COVID-19, whose main tasks are to collect and display data on daily and cumulative COVID-19 cases. • MBSJ supports contact tracing, which assists the Health Department in PPE making and ensures that all the latest information is disseminated to the public via social media. • Technological solutions by implementing a customer-friendly approach such as sending notifications via email, increasing awareness of online transactions, and creating mobile apps for checking and payment platform.
Planning, Design, and Environment	• Plan for better quality housing (different usage); for instance, the Malaysia ministry promotes the People's Housing Project (PPR), which is equipped with internet for online education. • Plan the city not overcrowded in high density. • PlanMalaysia have translated Act 446, which stated the living space for the migrant workers, into the planning guidelines (Central Living Quarter and Temporary Living Quarter). • PlanMalaysia will review the Neighbourhood Conceptia. • PlanMalaysia has started to acknowledge and investigate hybrid planning since the change of function in the building.	• Subang Jaya City Council monitors public places and ensures that essential services are conducted safely by regulating operating hours and implementing social distancing through the enforcement team. • Subang Jaya City Council ensures that garbage collection and general area cleaning continue functioning, that all infrastructure is in good working condition, that markets and bus stops are disinfected, and that operators disinfect their premises. • Leverage existing assets to create new business opportunities, such as transforming a library into a short-term workspace for rental and imposing direct debit payment.
Management and governance	• In Malaysia, the federal government prepares the guidelines and procedure for the regulation, while the PBT plays its part in implementing the policies. (Local base system)	• Good collaboration not only within the various departments of the City Council but also with other external departments, such as the Fire and Rescue Department Petaling Health Office, in contact tracing positive COVID-19. • MBSJ aids traders and residents through the vertical collaboration for budget 2021, focused on recovery measures for the grass-root level. • Subang Jaya developed a Financial Back-Up Plan as one of its Disaster Risk Management strategies to involve sustaining cash flow by finding new income sources and reducing administration costs.

3.5 Singapore

Singapore – Good Governance

Singapore was selected because it implemented good management and governance in managing the pandemic of COVID-19. They are pandemic-ready as they developed a systematic pandemic readiness and responsiveness plan after learning from the SARS outbreak. The establishment of the Disease Outbreak Response System Condition (DORSCON) framework serves as a planning tool to assist the Homefront Crisis Management System (HCMS) in managing COVID-19.

Table 8 Best practices and lessons learned from Singapore

Theme	Singapore
Socio-Economic	• Singapore established the financing of the healthcare system by giving funding support such as Medisave, MediSHield, Medifund and ElderSheild. • The government provide several fiscal measures such as Unity Budget to fund the outbreak, the Care and Support Package to relieve households, the Stabilisation and Support Package to assist businesses and so on. • Singaporeans trust, support cooperation and have confidence in the government.
Technology and infrastructure	• The Ministry of Health reported clarifications on its website and uses social media such as Gov. sg WhatsApp as a platform for COVID-19 updates.
Planning, Design, and Environment	• A resident lost his Singapore permanent residency and will be banned from re-entering Singapore due to breaching the Stay-Home measure.

Management and governance	• A systematic pandemic readiness and responsiveness plan was developed after learning from the SARS outbreak.
	 • The establishment of the Disease Outbreak Response System Condition (DORSCON) framework is a planning tool to assist the Homefront Crisis Management System (HCMS) in managing COVID-19.
	    - Establishment of a network of Public Health Preparedness Clinics (PHPCs) which are primary health clinics established in times of central need
	    - Hospitalise and isolate the infected
	    - Trace contacts rigorously
	    - Make social messaging clear
	 • Singapore has not enforced exceptional powers and is transparent.

4. Strategy towards 'Pandemic Resilient Cities and Built Environments'

The project's second objective is to discuss and refine a detailed "pandemic-resilient cities and built environments" strategy based on lessons learned or best practices from relevant stakeholders (from different APEC economies). The strategy was discussed during the virtual workshop attended by various APEC member economies, including Canada, Peru, Chile, Indonesia, Australia, New Zealand and Malaysia. The experts from industry and academics were invited to present on topics related to the "Pandemic Resilient Cities and Built Environments" strategy. As part of the strategy, enhancing pandemic response, mitigation and preparedness will enable the cities and built environment to be resilient against future pandemic attacks.

4.1 Strategy Development

4.1.1   Response

Mr Mohd Faizal Abd Hamid from the National Disaster Management of Malaysia delivered a keynote speech entitled "Pandemic and Planning for Resilient Cities". He defined the situation in today's world as a VUCA (Volatile, Uncertain, Complex and Ambiguous) environment. In brief, he emphasised the multi-agency coordination in Malaysia's whole government approach to managing the VUCA environment.

The coordination is between the policy, technical, and implementation levels. From the coordination, the three catalysts of the government approach are 1) Policy synchronisation, 2) Enforcement coordination, and 3) Smart collaboration. Policy synchronisation will help inter-agencies to coordinate by having a similar understanding of the central/economy-wide policies used through the National Security Council Enforcement. Enforcement coordination by creating the National Taskforce that deployed the major assets, intelligence, and workforce coordination among security agencies. Lastly, Smart collaboration for developing temporary hospitals, quarantine centres and testing laboratories.

He also addressed the important aspects of planning to develop resilient cities. The six aspects of the way forward are: 1) Leadership, 2) Decision making, 3) Communication, 4) Technology, 5) Adoption, and 6) Engagement. Leadership requires understanding every role and function of agencies to have clear visions for short- and long-term planning. Decision-making starts with gathering information from agencies and stakeholders and working towards strategic foresight to identify emerging trends and priority issues to stay relevant and build resilience. Communication delivery needs to be strategically creative, prompt and accurate. Technology changes lifestyles, work ethics and communication, thus embracing technology for the betterment of productivity—adaptation towards

COVID-19 by considering transmission aspects in every activity. Engagements from any end build understanding and rapport, thus leading to solutions for future issues.

Ms Gita Yulianti Suwandi from the Indonesian Disaster Management Agency presented a talk on "Building More Resilient Cities to Endure COVID-19 and Future Pandemic Risk". The outline of her presentation covered ways of making the cities (in Indonesia) resilient.

Her presentation highlighted the situation of COVID-19 in Indonesia, where Jakarta's air quality during the pandemic improved tremendously due to the reduced amount of transportation on the roads. Besides that, she lists the initiatives by the Indonesian government to accelerate the handling of COVID-19 cases, which include forming a Task Force to coordinate inter-agency activities to prevent and overcome the impact of the disease. The task force was not only formed at the central level but also at the provincial and district level. Therefore the coordination can be implemented from central to district governance.

She emphasised Lombok Island as a resilient city and laid out its strategy to conquer the pandemic. The first strategy is to accelerate the preparation of the Draft Regional Regulation (Perda) preparation on handling COVID-19. The second strategy is strengthening the facilities and infrastructure to handle the pandemic. The third strategy is to tighten the discipline of implementing the health protocol. Moreover, the last strategy is expanding contact tracing for positive COVID-19 patients, particularly in the red zone.

However, she also addressed some challenges that require attention in building more resilient cities. Coordination remains an issue in integrating all agencies and thus requires collaboration from all agencies. Research on pandemics and disasters requires more exploration to assess potential risks and solutions. Integrating Disaster Risk Management into the Central and Subcentral planning and budget is essential. Leadership plays an important role in the time of crisis. Lastly, always be prepared for changes due to disasters and pandemics in the order of life and livelihood of an economy and even the world.

Both speakers have highlighted implementing innovative and resilient city designs and policies to avoid disease transmission in response to COVID-19. The emphasise is on planning and building more pandemic-ready cities to be resilient economies. The most important aspect in response is that multiple agencies should be ready to collaborate and coordinate between agencies as they have their roles and functions to mitigate the risk and find solutions strategically. This enables an improvement in communication to deliver information regarding the situation of the disaster or pandemic.

4.1.2   Mitigation
Forum 1 is themed "Multi-stakeholders Collaboration Towards Pandemic-resilient cities and built environments" to develop a strategy for the resilience of cities and built

environments. The session began with a brief introduction by the Moderator, Prof. Dr Shuhana Shamsuddin, the President of the Malaysia Urban Design Association, that discussed the importance of collaboration between stakeholders toward the resilience of the cities. There were four panellists involved in Forum 1; they are Dr Chee Ping Ngang, Deputy Director of Corporate Affairs from PLANMalaysia, Associate Prof. Dr Mohd Ramzi Mohd Hussain, Associate Professor in the Department of Landscape Architecture IIUM, Dr Khairul Hisyam Kamarudin, Senior Lecturer in the Department of Urban and Regional Planning UTM, and Mr Ahmad Farhan Roslan, Researcher from CREAM.

In short, Dr Chee Ping Ngang presents on Public-Private-People Partnerships to cope with the emerging trends that shape the city and urban planning in this 21st century. In this 21st Century, the cities are challenged by the Industrial Revolution 4.0, climate change and the COVID-19 pandemic. 54% of the population lives in the city, which creates a bigger environmental problem and has become a hotspot for pandemic infection. Therefore, living in the cities requires a collaboration between the public sector, private sector and the people to overcome the challenges of urbanisation. The partnership involves prioritisation, goal setting, planning, implementation or action, monitoring and review process. This process will increase the cooperation of the partnership.

Assoc. Prof Dr Mohd Ramzi Mohd Hussain elaborated on the Urban Green Space for mental-health sustainability during the pandemic outbreak. Urban Green Space is a unique source of community resilience throughout the pandemic lockdown and quarantine. It relieves the risk of outbreak transmission and the social isolation of city life. Spending more time in green spaces affects emotional wellness since a growing body of pre-pandemic evidence suggests that living close to and spending time in green spaces is linked to improving mental health. This initiative is also important in post-pandemic times as cities have to be reimagined on the importance of local living for neighbourhood-based planning. This requires multi-stakeholder collaboration to create resilient cities.

Dr Khairul Hisyam explained the basic concept of self-help, mutual assistance, public assistance and steps in building a pandemic-resilient urban community. Self-help is about protecting oneself, mutual assistance is about cooperation and mutual support in the local communities, and public assistance is about governmental support. This system requires collaboration to be stable, which involves three aspects of resilience. The first aspect is the capacity to sustain systemic shock while preserving existing functions and structures. The second aspect is the adaptability to face challenges. The third aspect is the transformability to create new trajectories rooted in radical changes. These three aspects of resilience illuminate the need for diversity in action at individual, community and institutional levels.

The last panellist, Mr Ahmad Farhan Roslan, recommended fostering multi-stakeholder collaboration in building pandemic-resilient cities and built environments. He initially characterised the multi-stakeholders as a shared responsibility between stakeholders from various sectors, with diverse viewpoints, requiring interactive process, cooperatively

planning and implementing actions, and sharing resources and risks. The multi-stakeholders collaboration has several barriers, such as trade-offs where a decision needs to be made between two desired goals as they cannot be achieved simultaneously, governance where interaction among networks of actors that conflicting objectives to solve societal problems, fragmentation and silos across several sectors, the capacity of the organisation, access to data and funding. Therefore, he recommended that multi-stakeholders collaboration requires creating a shared vision, trade-off management, robust governance, learning and action alliances and digital transformation to overcome these barriers.

The main takeaways from Forum 1 were:
- Collaboration requires participation from stakeholders from various sectors.
- Each sector must understand the collaboration's main vision for the multi-stakeholders to work together.
- This understanding could initially level the process of mitigation of risks.
- New technological approaches can be adopted for better management of present and future collaborations.
- The physical (urban access, infrastructure, environmental factors, and land use patterns) and non-physical (socio-cultural, governance, and economic factors) aspects of resilient urban strategies have been focused on, which may help to develop an understanding of health- and disaster-related risks in pandemics.

4.1.3 Preparedness

Forum 2 is themed "Best Practices and Lessons of Coronavirus". Assoc Prof. Dr Hacharanjit Singh, from the Azman Hasim International Business School, Universiti Teknologi Malaysia, moderated the session. He began with a brief introduction to the situation of the COVID-19 pandemic that had happened around the world, thus explained on the importance of learning from the best practices and lessons of Coronavirus from different APEC member economies. The panellists for this session were Ms Alexandra O'Mara (Australia), Dr -Ing Santy Paulla Dewi (Indonesia), Dr Mohd Rizal Osman (URBANICE, Malaysia) and Dr Wan Nurul Mardiah Wan Mohd Rani (Institut Sultan Iskandar, Malaysia).

In short, Ms Alexandra O'Mara presented the COVID-19 experience in Australia, focusing on New South Wales. The city focussed on several areas of city-shaping impacts of COVID-19. The focus areas are: 1) community wellbeing is essential to resilience, 2) rapid recalibration of jobs and productivity is critical to economic recovery, 3) changes to where we work influence where we choose to live, 4) changes to where and when we work and shop alters demand for transport services and freight logistics, 5) digital technology is vital infrastructure thus universal access is needed, 6) investment in open, public and shared spaces connects communities and support lifestyles, 7) a metropolis of three connected

cities supports local outcomes, 8) collaboration and evidence are central to responsive and efficient government and 9) scenario planning provides for adaptive management and agile responses. She also presents examples of best practices from New South Wales. The government of NSW focuses on economic stimulus through fast-track planning acceleration programs. This short-term program drives direct investment and creates jobs and public benefits. The economic stimulus also focuses on accelerated infrastructure funds to fund infrastructure in key growth areas and enable development activity. People could keep their jobs by investing in infrastructure projects, and the construction industry will move forward throughout the COVID-19 crisis.

Dr -Ing Santy Paulla Dewi (Indonesia) explained the steps taken in re-assessing the gentrification process post-pandemic in the Semarang old town. The revitalisation of Old Town Semarang was held from 2017 until 2019, with physical improvements such as road, drainage, signage and street furniture. The Old Town is a cultural heritage with potential tourism value and economic potential to improve the community welfare. However, when the COVID-19 pandemic struck, the number of tourists decreased by more than 50%, followed by the imposition of emergency community activity restrictions. The city's income has decreased significantly, with buildings being offered to sell and businesses being closed. The pandemic affects the dynamic of gentrification that will not abolish the process, yet it will repeat the process or be called de-gentrification.

Dr Mohd Rizal Osman (URBANICE Malaysia) described the best practices in Malaysia, focusing on the Subang Jaya district, which has produced a Subang Jaya Economic Recovery Strategy Report. The report outline nine (9) main strategies, which include 1) business and job opportunities, 2) resilience and climate change, 3) mobility, and 4) governance. The implementation of these strategies is divided into short-term (1-2 years), medium-term (2-4 years) long-term (4-7 years). In the short-term plan, Subang Jaya will 1) provide entrepreneurship and skills-integrated platform, 2) promote Subang Jaya tourism and local attractions, and 3) diversify the local economy through empowering small and medium enterprises. Subang Jaya will 5) transform underutilised spaces and buildings for community and commercial use in the medium-term plan. In the long-term plan, Subang Jaya will 6) develop a greenhouse gas inventory and 7) enhance crisis management plans, 8) revise Subang Jaya policies and plan, and 9) expand and integrate the pedestrian cycling lane network and promote community-based transformation.

Dr Wan Nurul Mardiah Wan Mohd Rani (Institut Sultan Iskandar, Malaysia) concluded with a summary of the issues and challenges of the COVID-19 pandemic that impacted the cities and built environments. The issues captured are mainly related to socio-economic, technological and infrastructure, planning design and environment and management and governance. From the issues and challenges, there are four key areas for recovery actions taken from the Subang Jaya that focuses on creating an "enabling

policy-enabling environment". The key areas are 1) business and job opportunities, 2) resilience and climate change, 3) mobility, and 4) governance.

Based on the project's key findings, she shared the best practices and lessons from the COVID -19 pandemic.

The main takeaways from Forum 2 were:

- Every city has their strategies for developing resilience post-pandemic.
- The strategies are developed for the community for their survival to get through the COVID-19 crisis.
- Proactive measures such as the capacity building of people toward any outbreak and different simulation processes (models of transmission pattern) can be adopted for future pandemics.
- Enhancing urban resiliency in housing, public spaces, and cities brings effective outcomes to combat the pandemic.

4.2 Scenarios building into plausible future

This project discussed the plausible future of APEC cities and built environments post-pandemic. On the second day of the workshop, two sessions were conducted on building the scenarios. These sessions extended the efforts done in the scenario report planning in the systematic literature review phase.

4.2.1 Realising "What will APEC cities and built environments look like post-COVID-19 pandemic?"

The first session is about realising what APEC cities and built environments will look like post-pandemic. This session lays out the factors analysed in the systematic literature review. The participants then choose these factors as having a very high impact and uncertainty on developing future resilience. They have agreed that 1) education, training and skills, 2) health and healthcare, and 3) technological services are the highest factors impacting the future of APEC cities and built environment resilience. The uncertainty factors critical to APEC cities and built environments are 1)social and cultural behaviour, 2) GDP or general economy and 3) healthcare. Thus, with the influence of these factors, the participants analyse the possible scenarios of the APEC cities and built environments future post-pandemic.

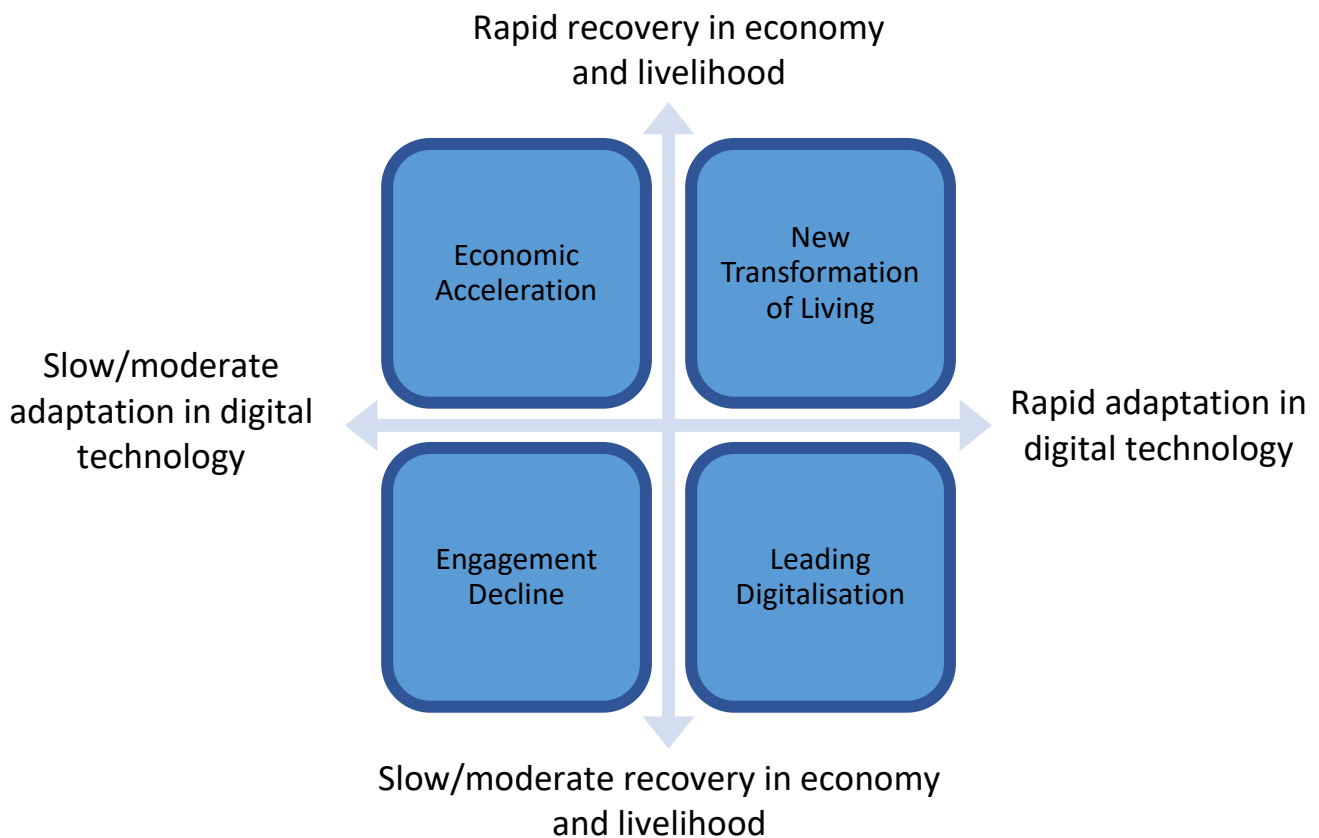### 4.2.2 Visualising the APEC cities and built environments post-COVID-19 pandemic

The second session is about visualising the APEC cities and built environments post-pandemic. In this session, the participants imagined and decided on the future of APEC cities and built environments based on their selected factors. They discussed and

recorded their discussion into four possible scenarios, which were organised into several dimensions/grids to classify the factors.

Table 9 Selected factors that were identified during the workshop and organised under positive and negative dimensions

Factors	Positive Dimension	Negative dimension
High impact		
1) Education, training and skills	Digital technology and green design focused	Pressure for increased digital skills education
2) Health and Healthcare	Public health supported by digital technology and environmental protection	Low healthcare provision and lower public health
3) Technological services	Rapid adaptation in digital technology	Slow/moderate adaptation to digital technology
High Uncertainty		
1) Social and cultural behaviour	More connectedness and solidarity among the community	Less connectedness and solidarity in the community
2) GDP or the general economy	Rapid recovery in economy and livelihood	Slow/moderate recovery in economy and livelihood
3) Healthcare	Increasingly connected through the digital technology platform.	The transition toward the connected platform

The participants classified the dimensions into more positive and more negative development depending on their perspectives. The factors that were chosen are GDP/general economy and technological services. The "GDP/general economy" is the uncertainty factor, referred to as "Rapid recovery in economy and livelihood, which is the positive dimension. On the other hand, the negative dimension is "Slow/ moderate recovery in economy and livelihood". For technological services; the positive dimension was referred to as "Rapid adaptation in digital technology, and the negative dimension is referred to as "Slow/moderate adaptation in digital technology".

Rapid recovery in economy
and livelihood

Economic Acceleration	New Transformation of Living
Engagement Decline	Leading Digitalisation

Slow/moderate adaptation in digital technology

Rapid adaptation in digital technology

Slow/moderate recovery in economy and livelihood

The scenario planning and analysis set out plausible future scenarios by identifying the uncertainties and impact related to the APEC cities and built environment post-COVID-19 pandemic. The effect of economics, technology and infrastructure, planning, design and environments and management and governance were studied, and the implications of these changes were imagined and examined. The factors and dimensions discussed are closely related, and advancement and disruption to one factor will depend on another. Therefore the strategies influencing the APEC cities and built environments are also closely interconnected and affect each other.

4.2.3   Strategies for APEC cities and built environments post-COVID-19 pandemic

The scenarios above describe four plausible futures for the APEC cities and built environments post-COVID-19 pandemic. The participants agree that scenarios "New Transformation of Living" is desirable, whereas "Economic Acceleration" and "Leading Digitalisation" are preferable to "Engagement Declined". A future in which we have failed to adapt to technology and cannot keep up with economic recovery would be unacceptable. How education, healthcare and services are managed and how much is invested in the communities will greatly impact the future. In order to build back better after COVID-19, strategies are presented below to seize the opportunities to recover and avoid returning to the usual practice of creating a positive vision of the future.

5. Recommendations

In formulating APEC cities and built environments strategy in creating a multi-stakeholder implementation approach for "pandemic-resilient cities and built environments", the following are recommended.

5.1 Spatial planning intervention

Spatial planning intervention is undoubtedly necessary to be pursued post-pandemic because some spaces have become abandoned, underutilised, or have changed their purpose due to the pandemic. This intervention can also be part of the response, mitigation and preparedness strategy for the future pandemic attack. In addition, it also contributes to adaptive and disaster-resilient cities that can support sustainable development. The spatial planning intervention includes the adaptive reuse of space, modification of zoning, 15 minutes city and natural resources mitigation and conservation.

Adaptive reuse of space
  i.   Repurposing of an existing structure (abandoned, rescale etc.) for new use
  ii. Accommodate flexible uses, users, and activities as part of city planning approaches
  iii. Strengthening the facilities and infrastructure to handle the pandemic by using existing space and converting it into hospitals or isolation centres
  iv. Creating space through the integrated utilisation of public and private urban assets, such as the fusion of work, housing, and amusement
  v.   Renovation of urban assets, such as turning vacant houses into coworking spaces
  vi. Variable and flexible utilisation of city settings such as streets and open spaces
  vii. High-value connection spaces to support accessibility and availability

Modification of Zoning
  i.   A zoning change deviates from current zoning requirements for repurposing land
  ii. Such consideration for areas with a great and prolonged surplus of commercial space
  iii. Transforming underutilised spaces and buildings from commercial to community use
  iv. Developing mixed usage of commercial and residential
  v.   The gentrification process post-pandemic

15 minutes city
  i.   Residential urban concept in which either walking or cycling can accomplish most daily necessities from residents' homes
  ii. People-centred urban development

iii.   A boost to the local economy

iv.   The physical and mental health benefits of active travel, cleaner air, easy access to healthy food options, quality green space, and stronger community ties that reduce loneliness

v.   A more equitable, inclusive city and a stronger sense of community

vi.   Expand and integrate pedestrian cycling lane network and promote community-based transformation.

vii.   Reactivating commuter cycling by providing safe and secure cycling facilities such as bike land

viii.   Multipurpose building

Natural resources mitigation and conservation

i.   Healthy environments are prioritised as part of broader spatial planning approaches

ii.   Increase the quality of urban settings, enhance local resilience and promote sustainable lifestyles, improving both the health and the well-being of urban residents

iii.   The Urban Green Space for mental-health sustainability during the pandemic outbreak

iv.   Urban residents have adequate opportunities for exposure to nature

v.   Strengthen food security by encouraging participation in urban farming by leasing or temporarily allowing the community to grow their food on public land.

vi.   Boost cities' local economy and ensure food security after the pandemic.

5.2 Capacity building which includes stakeholders' collaboration and community participation

Individual development

i.   Developing and strengthening the skills, instincts, and abilities to survive, adapt and thrive during the pandemic

ii.   Self-help is about protecting oneself, mutual assistance is about cooperation and mutual support in the local communities, and public assistance is about governmental support.

iii.   Knowledge and skills development through learning and training

iv.   Changing attitudes and behaviours

Community participation

i.   Community empowerment and participation

ii.   Re-socialise people's connections and relationships before revitalising the cities

iii.   Ability to adapt to change

    iv.   More connectedness and solidarity among community
    v.   Community wellbeing is essential to resilience

Stakeholders collaboration
    i.   Multi-stakeholder partnerships mobilise and share knowledge, expertise, technology and financial resources.
    ii.   Policy synchronisation, enforcement coordination, and smart collaboration.
    iii.   Public-Private-People Partnership
    iv.   Creating a shared vision, trade-off management, robust governance, learning and action alliances and digital transformation to overcome these barriers.

5.3 Technological and digital inclusion

Education, training and skills
    i.   The use of digital technologies to support learning and maximises the learning experiences
    ii.   Help in addressing the functional barriers experienced by students and teachers
    iii.   Inclusive education
    iv.   To make technology work in education requires empowered school leaders, fit-for-purpose infrastructure, better teacher recruitment and training, parental participation and effective assessments and relevant skills for learners
    v.   Digital technology and green design focused

Health and Healthcare
    i.   Implement data-driven and evidence-based protocols for clear and effective communication to build community trust
    ii.   Prioritize digital health, particularly improving digital health infrastructure and reaching digital maturity
    iii.   Cultivate a healthcare workforce with the knowledge, skills, and training in data and digital technologies to address current and future public health challenges.
    iv.   Ensure surveillance systems with an effective public health response

Technology services
    i.   Encourage rapid adaptation of digital technology throughout the community
    ii.   Internet of Everything with full implementation across services
    iii.   Invest in digital governance for data management
    iv.   Increasingly provide a connection through a digital technology platform

5.4 Economic empowerment

 i. Facilitating new development projects
 ii. Authorities shall identify a suitable project to be granted fast-track approval
 iii. Economic stimulus through fast-track planning acceleration programs
 iv. Fast track programs drive direct investments and create jobs and public benefits
 v. Create accelerated infrastructure funds to fund infrastructure in key growth areas and enable development activities
 vi. People could keep their jobs with investment in infrastructure projects, and the construction industries will move forward throughout the COVID-19 crisis

Provide entrepreneurship and skills-integrated platform
 i. Develop the abilities of existing entrepreneurs to grow their businesses to greater levels of success
 ii. Benefit economies by fostering creativity, innovation and self-employment
 iii. Creation of new businesses

Diversify the local economy by empowering small and medium enterprises
 i. Shifting an economy away from a single income source to multiple ranges of sectors and markets for the small and medium enterprises
 ii. Building resilience against fluctuations in extra-regional economic activity
 iii. Reducing vulnerability to income loss due to volatility of product price on the market
 iv. Encourage positive economic growth and development

6. Conclusion

In conclusion, the project has delivered all of the research methods required and fulfilled all the project's objectives. The systematic literature review has uncovered four dimensions of issues and challenges during COVID-19 in cities and built environments derived from 33 selected articles. The interviews and case studies, on the other hand, have provided the potential solutions as well as best practices from selected APEC member economies through their expert representatives that were held in August 2022, verified the result of strategic recommendations from issues and challenges to formulate the strategy in creating multi-stakeholder implementation approach for 'pandemic resilient cities and built environments". The workshop convened domestic and regional stakeholders and international experts from APEC economies. Lastly, the scenario planning and analysis have identified specific issues and challenges during COVID-19 in cities and built environments and developed strategies towards building back better post-COVID-19.

The project was participated by a well-balanced number of female and male participants. The participants were from Indonesia, Japan, Australia, Singapore, Chile, New Zealand, Peru, Canada and Malaysia. Most were members of the Emergency Preparedness Working Group (EPWG), Health Working Group (HWG), and academia and industry representatives. The participation of various agencies from public and private organisations from various APEC economies in this project indicates that the issues of the COVID-19 pandemic are crucial and significant. Thus, they support developing strategies for APEC cities and built environments post-pandemic.

The development of recommended strategies has highlighted the need to strengthen and integrate synergies between public health and the way cities are designed to mitigate future pandemic risks. The strategies suggested urban management strategies to with integrate pandemic and other biological considerations into the design, consider important factors such as economy, technology and infrastructure that shape the development of pandemic-resilient cities and built environments and include co-creation and partnership approaches to manage and facilitate the process for creating inclusive, safe, resilient and sustainable cities.

This project supports cities and builds environmental resilience by sharing best practices and lessons from various APEC member economies. It is also intended to collaborate with APEC fora, domestic (or regional) and international organisations, academicians and practitioners to develop strategies for the future benefits of pandemic resilience for cities and built environments.

Acknowledgement

About Institut Sultan Iskandar

Institut Sultan Iskandar (ISI) is a company limited by guarantee established in 1991 by Universiti Teknologi Malaysia with an initial endowment from the late Majesty Almarhum Sultan Iskandar. Supported by established local and international networking, ISI is equipped with a pool of specialised and highly skilled talents to undertake challenging assignments.

The institute is an independent non-profit making research and development entity specialising in Built Environment and Sustainability, providing services to various stakeholders,s including the government and private sectors, the universities and industries and the community.

About Construction Research Institute of Malaysia

Construction Research Institute of Malaysia (CREAM) was incorporated on the 26th of March 2004 as a company limited by guarantee without having a share capital under the Companies Act 1965, under the CIDB's research function while enabling CIDB to concentrate on the performance of its core functionality. Towards realising the establishment of CREAM, the Board of Trustees of CREAM has assumed the overall responsibility for the planning, implementation and management of the R&D projects and related activities.

APEC Cities and Built Environments (BE) Strategy: Building Back Better in the Post-COVID-19 APEC

SYSTEMATIC LITERATURE REVIEW REPORT

Contents

Executive Summary

The COVID-19 pandemic became the worst biological disaster in history and caused a significant impact on the economy, society, and environment, including the APEC economies. In addressing the pandemic, the APEC economies have immediately responded and implemented early measures and recovery plans with the coordination and collaboration of all stakeholders.

This project investigates the issues and challenges faced by APEC economies during the COVID-19 pandemic. It develops APEC strategies and approaches involving multi-stakeholders in shaping future pandemic-resilient cities and built environments based on lessons learned or best practices from selected APEC economies.

The methodology involves three research strategies: systematic literature review, expert interview, and case study. A total of five experts representing APEC economies: Indonesia, Japan, Australia, Malaysia, and Singapore, as well as five cities were suggested by each expert and selected as study cases followed by their section aspects: Lombok (Island resilience), Kashiwanoha (Smart City), Sydney (Community recovery), Subang Jaya (Micro-planning approach) and Singapore (Good governance).

The findings resulted in four themes from 33 articles in the systematic literature review. The themes act as the dimensions for the research on identifying issues and challenges impacted by COVID-19 and adapting potential solutions and strategies. The issues and challenges highlighted the socio-economic matters such as the economic impacts, unemployment rate, socio-cultural inequality, and food security; the technology and infrastructure matters such as the logistic, transportation, digital infrastructure, and technological services; the planning, design and environment issues such as the use of urban spaces, housing design, urban design, and environmental quality; and the management and governance matters.

The report recommended, based on the issues and challenges, there is the need for 1) the establishment of economic recovery plans by diversifying the economic structure in both formal and informal sectors for different social groups; 2) increase investment in digital infrastructure implementation in healthcare facilities, digital economy, telecommuting and mobility; 3) promoting community-led planning, neighbourhood planning concept and green infrastructure as well as developing post-pandemic housing design and 4) establishment of intermediate respond policy for prior pandemic and long-term recovery plan with collaboration between every stakeholder to mitigate COVID-19 pandemic.

1.0 Introduction

The Coronavirus (COVID-19) pandemic emerged as the world's worst biological crisis and is also known as one of the most lethal catastrophes, with approximately 505 million positive cases and more than 6.2 million deaths recorded (WHO, 2022). COVID-19 is a disease caused by a novel coronavirus known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). On 11 March 2020, COVID-19 was announced and declared officially by the World Health Organization (2020) as an outbreak pandemic, the highest level of health emergency since the H1N1 "swine flu" in 2009.

Generally, economies and cities worldwide, including the APEC economies, are severely affected by the COVID-19 pandemic that has challenged the people's livelihood, particularly in the economic sector, health care and social dimensions. As of 2020, the APEC region has almost 40% of COVID-19 cases worldwide (Rhea & Emmanuel, 2020). Due to the significant impact that the pandemic has caused, COVID-19 is a wake-up call for governments, leaders and relevant stakeholders to work together to strengthen preparedness and provide collective actions to bounce back, mitigate the risk and reduce losses. The transmission of the COVID-19 virus focuses on spaces that are highly dense, crowded and enclosed spaces such as offices, schools, malls, and public spaces, which are often associated with cities. Hence, being the entry point for the spread, cities need to play a significant role as a line of defence in controlling the spread of the virus (UN-Habitat, 2021). As a result, governments around the world imposed strict policies, which include movement restrictions, lockdowns, and travel bans, to minimise the spread of the virus. However, the strict health policies imposed have caused significant economic losses with an estimated output loss of USD 2.1 trillion, and approximately 23 million workers will become unemployed among APEC economies in 2020 (Hernando and San Andres, 2020).

In responding to the pandemic, the APEC economies have immediately implemented a range of economic response and recovery actions to mitigate COVID-19. These include high-level commitments, expert analysis and best practices as innovative tools and practical projects. However, such measures require coordination and collaboration of every stakeholder, such as governments, international organisations, the private sector and the community in APEC economies, to deal with the challenges posed by COVID-19 and encourage economic growth (Asia-Pacific Economic Cooperation, 2022).

This report aims to establish a systematic literature review (SLR) that explores the various issues and challenges faced by APEC Economies and identifies lessons learned and best practices on the strategies for strengthening cities and building environmental resilience towards the pandemic. The systematic literature review is part of the APEC Cities and Built Environments (BE) Strategy: Building Back Better in the Post-COVID-19 APEC Project with the following research objectives:

   i.   To develop a strategic recommendation and approach that future shape urban management and built environments based on an in-depth understanding of cities' issues and challenges during the COVID-19 pandemic.

  ii.   To discuss and refine a detailed strategy on "pandemic-resilient cities and built environments" based on lessons learned or best practices from relevant stakeholders (from different APEC economies).

 iii.   To formulate APEC strategy in creating a multi-stakeholder implementation approach for "pandemic-resilient cities and built environments".

The SLR aimed to address Project Objective One (i), which explored the related literature on the impacts of the COVID-19 pandemic on cities and built environments. Therefore, the review focuses on answering the following research questions:

i.   What are the issues and challenges during COVID-19 in cities and built environments?
ii.   How is the pandemic affecting cities and the built environment?
iii.   What are the solutions and strategies for COVID-19 pandemic-resilient cities and built environments?

Findings from the review analyses will identify and formulate transformative strategies for pandemic-resilient cities and built environments by exploring the lessons learned and best practices that the case study cities have adopted to adapt and bounce back from the pandemic.

2.0 Methodology

The study focuses on developing the APEC cities and built environments (BE) strategy and offering solutions to build back better post-Covid-19. The research is a design based on the objectives previously stated. For the first phase, this research will answer the question of Objective 1: To develop a strategic recommendation and approach that future shape urban management and built environments based on an in-depth understanding of cities' issues and challenges during the COVID-19 pandemic. From the objective, the research delivers three research methods, elaborated below.

2.1 Systematic Literature Review

The first research strategy is the systematic literature review (SLR). The main factors in conducting SLR are finding clarity of scholarly communication, validity where the literature is defensible against bias, and auditability of the literature to get accurate results (Booth et al., 2021). The research adopted the procedure for conducting systematic literature reviews from Xiao and Watson (2019), based on the six stages: formulation of the research question, search criteria and identification, screening process, title and abstract screening, quality assessment and data extraction (Figure 2.1).

The articles included in this literature review aim to answer the three main research questions (RQs):
RQ1: What are the issues and challenges during COVID-19 in the cities?
RQ2: How is COVID-19 affecting cities and the built environments?
RQ3: What are the existing solutions/strategies for COVID-19 pandemic-resilient cities and built environments?

The strategy when selecting the research articles was to start with a search query using combinations of keywords from RQs. Then, the identified articles will determine their relation to the inclusion and exclusion criteria through title and abstract screening.
• **Inclusion criteria:** Related to COVID-19 and Cities and Built Environment and discuss the issues, challenges, solutions, and strategies for post-pandemic.
• **Exclusion criteria:** Articles not written in English, dated before 2019, and duplicates.

In total, **109** articles underwent the quality assessment process. The articles were screened based on the **seven** domains for quality assessment (QA) procedure: aim, methodology, population, intervention, comparison, outcome, and context. The articles were ranked according to the weight score given for each domain. A high-quality article equals a 1.0 score, medium quality equals a 0.5 score, and low quality equals a zero value score. Scores were given to all domains, and the total score was converted into the average score in percentage. Articles with average QA scores of 60% and above are included in the research (Paneerchelvam et al., 2020). As a result, **33** articles have been included in the data extraction stage and are summarised in the appendix.

Stage 1

Formulation of Research Questions (RQ)

RQ Formulation based on PICOC concept → RQ1 RQ2 RQ3

Stage 2

Search Criteria and Identification

Search query from combinations of keywords from RQ →

Science Direct (18 articles)

Scopus (184 articles)

Web of Science (274 articles)

Stage 3

Screening Process

476 articles identified through database searching →

Publication: English only
Date range: 2019-2022
Selected types
Open Access
71 articles duplicated

Stage 4

Title and Abstract Screening

405 articles after duplicates removed

Double-blinded peer-review →

Assessment Criteria:
a) Related to Covid 19 and Cities and Built Environment
b) Discuss the issues, challenges, solutions and strategies for post-pandemic

Stage 5

Quality Assessment (QA)

109 articles screened

Quality assessment procedure →

7 domain for QA:
D1: Aim
D2: Methodology
D3: Population
D4: Intervention
D5: Comparison
D6: Outcome
D7: Context
>60% will be included

Stage 6

Data Extraction: Thematic Analysis

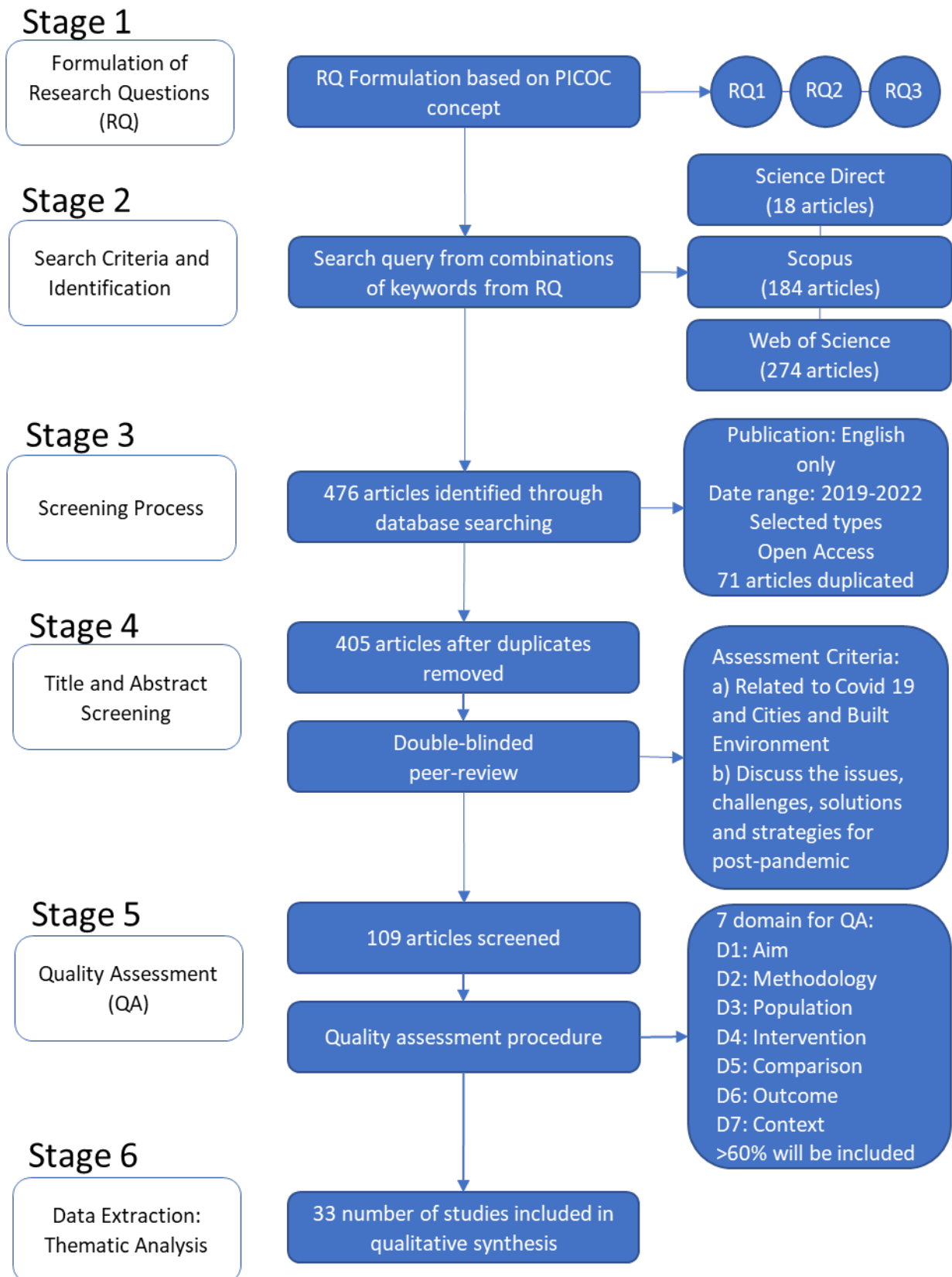33 number of studies included in qualitative synthesis

Figure 1 Six stages of the systematic literature review procedure (Source: Adapted from Xiao and Watson, 2019)

2.2   Expert Interview

The second research strategy is a series of interviews with experts with a background in urban and regional planning professions. The purpose of the expert interviews was to obtain necessary information reflected in the knowledge, opinions, and estimates of the respondents, who are competent persons (Bezpalko et al., 2016). The interviews were conducted systematically and aimed to structure and collect comprehensive expert knowledge and opinions to achieve a high level of comparability (Döringer, 2021). Therefore, the interview's list of questions is structured as open-ended questions concerning the issues and challenges, impacts and strategies of cities and built environments in the situation with the Covid-19 pandemic.

The study identified five experts representing selected APEC economies: Indonesia, Japan, Australia, Malaysia, and Singapore. The experts are from various backgrounds, such as government agencies, academia, industry practitioners, and society member. Table 2.1 lists the selection criteria for all the experts invited to participate in the interview sessions. The interview sessions were held between March and April 2022.

Table 10 The selection criteria for each expert invited for the expert interview

APEC Economies	Affiliation	Selection Criteria
Indonesia	Head of Program and Budget Preparation Division II, (Kepala Bagian Penyusunan Program dan Anggaran II) Badan Nasional Penanggulangan Bencana Republik Indonesia (National Disaster Management Agency of the Republic of Indonesia).	Responsible for developing policies and action plan -The new policies to be developed for the long-term using the strategic recommendation on the 'pandemic resilient cities and built 'environments
Japan (Co-Sponsor)	Professor, Department of Planning, Architecture and Environmental Systems, College of Systems Engineering and Science, Shibaura Institute of Technology.	Think tank in providing recommendation -Academia will provide ideas and inputs towards the development and formulation of the strategic recommendation to be implemented
Australia	Director, Cities and Places, URBIS, Brisbane.	Provider and joined forces in strategy implementation - Industry practitioners will develop and implement the ideas based on the strategies
Malaysia	Director, Corporate Division, PLANMalaysia (Federal Department of Town and Country Planning)	Responsible for developing policies and action plan -The new policies to be developed for the long-term using the strategic recommendation on the 'pandemic resilient cities and built 'environments
Singapore	Postdoctoral Fellow, Asia Research Institute, The National University of Singapore.	Think tank in providing recommendation -Academia will provide ideas and inputs towards the development and formulation of the strategic recommendation to be implemented

2.3   Case Study

During the interview, the experts suggested a case study representing their economies with the best strategies for managing their cities during the COVID-19 pandemic. The case study gives the researcher a holistic view of a particular phenomenon or series of events and provides a bigger picture using many evidence sources (Noor, 2008). The research employs multiple case studies. Each case study follows a replication method where this research includes five case studies and can be considered very robust findings.

Table 2.2 shows the experts' recommendations for the city case study in their economy. Each city has unique selection aspects, which can be a lesson learned across APEC economies. The selection of case studies is the third research strategy that furthers the information related to developing strategic recommendations and approaches that shape the future of urban management and built environments.

Table 11 List of selected cities for the case studies and their selection aspects

APEC Economies	Cities	Selection Aspects
Indonesia	Lombok	Island Resilience
Japan	Kashiwanoha	Smart city
Australia	Sydney	Community recovery
Malaysia	Subang Jaya	Micro-planning approach
Singapore	Singapore	Good governance

3.0 Covid-19 Pandemic And Cities

Historically, the pandemic has been a significant pushing factor that shaped cities in the past. However, the COVID-19 pandemic is not the world's first pandemic that has changed how cities are managed and planned. The black death crisis, also known as the plague, occurred in the 1300s and happened in Afro-Eurasia. It has dramatically affected the design and planning of European cities by introducing larger public spaces and squares that enabled better access to nature and encouraged broader social interactions among people. In the 19th Century, the respiratory virus, known as the "Spanish Flu" pandemic, emerged. The pandemic happened during the second industrial revolution between 1918-and 1925impacted cities and urban spaces. As a result of the deadly flu, more than 50 million deaths were recorded, the pace of development has slowed, and activities within urban areas have become limited. The situation was similar to what happened during the COVID-19 pandemic. Pandemics and other health crises have challenged planners and development authorities to develop better ideas and approaches to improve and change how cities and the built environment are designed and managed (Idawati, 2021). This situation can also be an opportunity to reshape cities towards enabling cities to become more resilient and sustainable.

Within the scope of the built environment, the impact of the COVID-19 pandemic focuses on the cities' infrastructure and economic and technological aspects. For instance, the uses of big data, online communication and the digital economy have proliferated and become means to balance the business, economy, and education, as well as social interaction during social distancing and lockdown implementation (Thomson et al., 2020). Martinez (2021) discusses the pandemic's urban implications, including the use of public spaces, transportation, and connectivity. COVID-19 has brought issues and unprecedented challenges to the cities; however, it also delivered a new idea, commonly referred to as the "New Normal". The 'new normal was used to enable the public to be more adaptive and resilient

toward the pandemic. All these problems not only focus on the fast response and recovery towards COVID-19 but also on providing sustainable urbanisation that will improve the overall health systems and urban resilience. Therefore, it is vital to ensure that the built environment can facilitate containing the spread of any infectious disease to improve overall urban resilience, particularly concerning public health crises (Stoiljković, 2022).

The systematic literature review focuses on identifying issues and challenges derived from the COVID-19 pandemic, explicitly focusing on the context of cities and the built environment. In addition, the potential solutions and strategies to adapt and normally live with pandemics were also assessed and analysed to enhance the resilience level of pandemic-resilient cities and the built environment.

3.1   Issues and Challenges

The COVID-19 pandemic exposed cities to new challenges that resulted in challenging their resilience competence, the urban planning system and governance capacity and system (Castro, 2021). Based on the analyses review, this study identifies the issues and challenges corresponding to the ranking and interrelationships within the scope of cities and the built environment. Since its first outbreak in 2019, this infectious disease has shown undesirable economic, social, environmental, infrastructural and urban impacts, leading to significant challenges and threats. Table 3.1 provides the details of the thematic category on the issues and challenges.

Table 12 Thematic category on issues and challenges due to the pandemic COVID-19

Thematic Category	Aspects	Count
v. Socio-economic	Economic impacts, unemployment rate, socio-cultural inequality, food security,	12
vi. Technology and infrastructure	Logistics, transportation, mobility, digital infrastructure and technological services	5
vii. Planning, design and environment	The use of urban spaces, housing design, building spaces, urban design, and environmental quality (air, water and noise quality)	16
viii. Management and governance	Urban management, governance system	6

3.1.1   Socio-economic

The COVID-19 pandemic has significantly challenged the cities both economically and socially. Past lessons learned from the other infectious disease, the vulnerable and minority groups would be severely impacted by the pandemic. They would take a longer time to achieve health and livelihood recovery. Poverty levels and income inequality worsened, with many people facing job losses/payment reductions and business disruptions due to the prolonged lockdowns imposed in most areas to curb infection (Moreno, Allam, Chabaud, Gall, & Pratlong, 2021). Poverty issues during the pandemic lead to chain reactions with other negative impacts on health, education and food security, especially among the underprivileged and vulnerable communities (Martinez and Short, 2021). The poor living in informal settlements such as slum areas are commonly associated with a short supply of basic needs. Poor sanitation and waste management place the inhabitants in a particularly vulnerable position (Sharifi & Khavarian-Garmsir, 2020); Couto, 2021). The lack of access to health facilities eventually made the situation worsen due to the difficulty and limited access to health screening and treatment for positive cases. Issues concerning food security also emerged during the pandemic. According to Castro (2021), the loss of confidence in food security caused by the political crisis has affected the weak supply chain and the weak role of responsible government agencies. Eventually, the price of food spiked during the pandemic. Other economic sectors, mainly tourism activities, were

also severely impacted in areas with high dependency on this sector (Pino et al., 2021). Tourist destinations dependent on the international market suffered the most when most economies imposed a travel ban and closed their borders (Kowalczyk-Anioł, 2021).

On the other hand, informal activities pre-pandemic and during the pandemic bring diverse impacts to the cities. Therefore, the pandemic could potentially become a catalyst to re-evaluate the informal sector to encourage economic revival (Martinez and Short, 2021). The transformations in the economic sector are therefore required to ensure a smooth recovery and improve the overall resiliency post-pandemic (Kowalczyk-Anioł, 2021).

3.1.2   Technology and Infrastructure

The transmission of COVID-19 has forced offices, schools, and businesses to shut down and abruptly changed how people learn, work and generally live their lives. Workers have to work from home, students have to learn virtually, and businesses have to shift online, leading to high digital infrastructure dependency (Fernandes, 2021). Since then, efficient digital infrastructure and internet connection have become necessities to resume life and continue businesses. However, the pandemic exposed the reality of the digital divide. Areas lacking such services are left behind and suffer from isolation and disconnection from the outside world compared to areas with better access to the internet and other digital infrastructure. The rise in the COVID-19 infection rate in some areas was also a result of poor surveillance (Gong et al., 2020). Traditional surveillance systems can no longer cope with the rapid spread. Hence, developing a new innovative solution is in dire need (Gong et al., 2020). The implementation of smart city strategies that advocate the use of ICT and technology advancement in some regions eventually facilitates people to cope with the limitations caused by the pandemic (Fernandes, 2021). The digital transition was reported as an essential measure to expedite the recovery of the post-pandemic cities and built environments.

3.1.3   Planning and Design

Cities are the epicentre during the pandemic due to the high population, dense form and massive concentration of economic activities. Carplo-Pinedo (2021) describe cities as virus-welcoming ground due to the everyday face-to-face interactions and space sharing that can quickly become contagious spaces. The robustness of the city and vast social networks make it challenging to control the spread of the disease (Carplo-Pinedo, 2021). The challenges of the pandemic are not just about managing the virus's transmission but also about managing cities and the built environments to reduce infection within a short period. Most scholars have noted the need to re-evaluate how cities are planned, designed and developed (Marchigiani, Chiarelli, & Garofolo, 2021; Anttiroiko, 2021; Martinez, 2021). People's behaviour in cities has changed tremendously due to the fear of contracting the COVID-19 pandemic. The use of public spaces becomes very limited, especially during the lockdowns and movement restrictions. Public transportation activities also faced a drastic decline, with most workers required to work from home. The reduction in public transport use also resulted from the COVID-19 health advice for the public to avoid crowded, enclosed spaces and the need to maintain social distancing continuously. The roads were no longer busy with traffic since people stayed home most of the time (Sharifi & Khavarian-Garmsir, 2020). The travel restrictions have significantly decreased nitrogen dioxide (NO_2) and carbon dioxide (CO_2), pollutants associated with vehicle use. With only indoor activities taking place, the quality of the environment (quality of air and water) was drastically improved (Gan et al., 2021; Sharifi & Khavarian-Garmsir, 2020). Access to green spaces for recreational activities was also one of the issues due to the poor distribution of green spaces and the closure of such areas due to fear of infection (Mell & Whitten, 2021; Menendez & Garcia, 2020). During the pandemic, aspects of housing, especially the utilisation of indoor spaces, have been challenged. Homes no longer function as a dwelling but as a place to perform various functions, including working spaces, learning spaces, and health facilities (for self-quarantine/isolation) (Idawati, 2021). Office spaces also experienced a reduction in their occupancy rate. Some even had to close down due to the

company's being forced to cease operation or shift to online mode. These issues resulted in a drastic increase in office space vacancy rates, requiring architects and planners to rethink a drastic rise, which requires architects and planners to review how best to address these issues, especially for long-term gain.

3.1.4 Management and Governance

The COVID-19 pandemic requires a government to be agile and swift to respond to the rapid spread of the disease within a short span. During this unprecedented event, governments are expected to take urgent and compelling s to ensure the pandemic is under control and does not trigger public anxiety. However, some economies have evident issues such as disorganised public policies, lack of local coordination, and poor public service delivery (Bento and Couto, 2021). Other issues highlighted are poor collaboration between institutions and people, lack of long term-planning, conflict objectives at different levels of governance, lack of community engagement within the decision-making process and low financial allocation to deal with the pandemic (De Araujo et al., 2020; Sharifi & Khavarian-Garmsir, 2020). These issues and a slow decision-making process may lead to deadly outcomes. Financing the strategies and initiatives to fight the pandemic is, therefore, crucial to promoting and mobilising responses to facilitate the containment of the spread. In addition, economies that have allocated sufficient recovery funds have proven to respond better in coping with the pandemic.

3.2 Exploring the Solutions, Strategies and Best Practices

This section synthesised the potential solutions, strategies and best practices to shape the development of pandemic-resilient cities and built environments within APEC economies. Overall, it is suggested to prioritise the actions to synergise the effort to bridge the gap between health and how cities and built environments are planned and designed (McCartney, Pinto & Liu, 2021; Megahed & Ghoneim, 2020; Salih & Hussein, 2021; Sharifi & Khavarian-Garmsir, 2020). The identification of solutions and strategies are based on four themes; socio-economic, technology and infrastructure, planning and design and governance and management.

Table 13 Identified Challenges/issues and solutions/best practices

Theme	Challenge/ Issue	Solutions/ Best Practices
Socio-economic	Inequality	• Increasing the economic base for responding to the COVID-19 pandemic (Chen & Quan, 2021) • Promote circular economy (Girard & Nocca, 2020) • Diversify the informal economy (Martinez & Short, 2021)
	Job loss, increasing unemployment rate	• Continuously adjust industrial structures by attracting foreign investment to improve economic resilience (Chen & Quan, 2021) • Establish action plans for recovery (tourism sector) (Kowalczyk-Aniol et al., 2021)
	Disruptions in supply chains that have impacted food security	• Industry collaboration and diversification (McCartney et al., 2021).
Technology and Infrastructure	Digital Divide	• Increase investment in digital infrastructure and vulnerable target areas • Digital transformation and promote telecommuting (Megahed & Ghoneim, 2020)
	Traditional infrastructure systems cannot cope with the current demand	• Use of robotics to facilitate healthcare facilities (Hu, Zhong et al., 2020) • Advancements in cloud-based system technologies (Gong et al., 2020) • Invest in artificial intelligence and touchless technologies (Megahed & Ghoneim, 2020)
	Poor coverage of technological services and infrastructure	• Promote digitalisation through incentives and the development of digital skills and capabilities (Amankwah-Amoah et al., 2021)

Planning and Design	Lack of green space to accommodate recreational activities	• Improve financing on green infrastructure at various scales – city, neighbourhood, and site (Mell & Witten, 2021) • Community-led planning for equitable green infrastructure provision (Mell & Witten). • Provision of a diverse mix of urban green space (Ugolini et al., 2020)
	Accessibility and Transportation	• Advocate 15 minutes city, walkability and micro-mobility (Moreno et al., 2021) • Promote telecommuting (Megahed & Ghoneim, 2020)
	Environmental Quality	• Scaling up of existing environmental policy (Jain & Sharma, 2020) • Promote spaces for dual needs – social and environmental purpose (Moore et al., 2022)
	Poor housing design	• Redesign post-pandemic housing (Megahed & Ghoneim, 2020) • Develop guidelines for future housing design (Stoiljković, 2022)
Governance and Management	Inefficient urban governance in dealing with the pandemic	• Need for intermediate confinement policy (Carploe Pinedo, 2021)
	Poor emergency and recovery plans No long-term planning	• The need to establish a long-term recovery plan (Sharifi & Khavarian-Garmsir, 2020)
	Lack of community engagement	• Public and private sector collaboration (McCartney et al., 2021) (Anttiroiko, 2021) • Transformation of governance and urban management (Kowalczyk-Aniol et al., 2021)
	Insufficient recovery funds	• Design an economic stimulus plan (Anttiroiko, 2021; Sharifi & Khavarian-Garmsir, 2020)

4.0 Case Study (Expert Interview)

4.1 Australia

The COVID-19 pandemic highlighted various issues and challenges in Australia, particularly in the health, technology, and construction sectors. Before the pandemic, Australia had been over-reliance on international trade and tourism, and when travel restrictions were imposed. Cross borders were enforced to curb the spread of COVID-19. The cities in Australia were left with complex tasks, especially in controlling the widespread disease of COVID-19 while maintaining the city's function to deliver goods and services to the people. In this light, cities in Australia put more focus on alternative and healthy lifestyles for its citizen by promoting cycling and pedestrian-friendly activities. Thus, the cities have changed in design and build to cater to the locals' needs. Furthermore, they provided a ready-to-use internet of things (IoT) and circular economy approach in public spaces and buildings.

Table 14 Summary of impacts of the COVID-19 pandemic and solutions/strategies for Australia

Theme	Impacts of the COVID-19	Solutions and Strategies for COVID-19
Socio-Economic	• Cities have become more focused on promoting alternatives/healthy lifestyles,s including cycling and pedestrian-friendly activities in public spaces. • Re-establishing international trade by opening the port's border, stabilising the supply chain and movement of goods and services. • Change in sociological (people do not know how to react to each other due to a touchless environment).	• Re-socialise people's connections and relationships before revitalising the cities • Hand sanitiser and masks have become affordable and acceptable as a habit for people (social stigma disappeared).

Technology and infrastructure	• Ready to use IoT and circular economy approach in public spaces and building management.	• IoT is part of the solution:
		  i. Digital twin technology for model pandemic response.
		  ii. Technology mesh with low-tech solutions.
		  iii. Digital governance for data management.

Planning, design and environment	• The locals visit cities in times of the pandemic.	• Design and build the city primarily for those living there, only attracting people from outside (Economy recovery).

Management and governance	• Different lenses of resilience (pandemic, environment, social and physical) are among the factors that influence a city's resilience.	• Any strategies for a pandemic must go through the cycle of **"Respond – Recover – Re-evaluate"**.

4.2   Indonesia

Many Indonesian cities experienced a significant economic downturn in 2020 due to the Covid-19 pandemic and movement restrictions. In addressing such issues, Indonesia has reviewed its mid-term development policy, i.e., National Medium-Term Development Plan (*Rencana Pembangunan Jangka Menengah Nasional*, RPJMN). It is to strengthen their focus on handling the COVID-19 situation at central and regional levels. While recovering from the pandemic, there are other emerging challenges, such as food security issues in securing food sources for livelihood, supply change disruption during the pandemic and food production waste. Other notable challenges were related to digital economy performances, considering Indonesian's internet concentration and average mobile internet speed still lacking, inadequate internet quality, weak cyber security and consumer data security and lack of digital talent.

Table 15 Summary of impacts of the COVID-19 pandemic and solutions/strategies for Indonesia

Theme	Impacts of the COVID-19	Solutions and Strategies for COVID-19
Socio-Economic	• Increase in the unemployment rate for specific sectors, such as the service sector; more opportunities within the IT and technology sectors. • A decrease in the tourism economy causes the government to level down the restrictions to attract domestic and international tourists. • Food security becomes essential as the difficulty of accessing basic needs during the lockdown.	• Strengthen food security by encouraging participation in urban farming and supporting local businesses.

Technology and infrastructure	• Rapid growth happens in the information and communication sector.
	• The digital economy has made various activities much more efficient, and businesses can be diverse.
	• The infrastructure maintenance work is limited due to the new policy.
		• Development of new programs such as:
		-Digital talent scholarship
		-National Digital Literacy Movement Program
		-1000 Digital Startups Program
		• The Ministry of communication and Informatics targets to provide adequate internet excess to all religions.
		• Prepare a personal data protection law currently being processed with commission 1 of the Indonesian House of Representatives for digital security.
		• The Ministry of Public Housing becomes the leader in determining the policies in terms of infrastructure.
		• Four ways cities fight the spread of COVID-19 in terms of transportation
		  i. Restricted access to the people
		  ii. Fortify the public transport system
		  iii. Looking for alternative public transportation
		  iv. Implemented radical data transparency to the people

Planning, design and environment	• Medical waste becomes a significant challenge for the environment and urban management since many hospitals still lack medical waste facilities/technology.
	• Reduce the use of public space during the pandemic.
	• Changes in buildings functions due to new policies to tackle COID-19:
	  i. Changing hotels and government buildings to becoming COVID-19 quarantine centres
	  ii. Changing community halls to becoming COVID-19 assessment and vaccination centres
	• Air and water quality improved due to decreased visitors and low transportation activities, particularly during the lockdown period.
	• Transportation: Traffic congestion was reduced in major cities during the lockdown. However, now the situation of congestion gets back to before the pandemic
		• The Ministry of Social Affairs controls medical and other waste during COVID-19.

Management and governance	• Food security systems have become the government's priority to ensure people's wellness and resilience facing climate change and pandemics). • Increase awareness of the need to produce a more agile development policy.	• The National Disaster Management Agency plays a vital role as a policymaker, leading the COVID-19 task force. • Policy adaptation and implementation in society (bottom-up system) is the best approach to enhance resilience. • National Medium-Term Development Plan has modified/improved all the strategies for COVID-19 in terms of physical development. • The Ministry of Health leads and determines policies such as implementing vaccination and COVID-19 treatment.

4.3 Japan

Japan also experienced an economic slowdown due to the pandemic of COVID-19, with the tourism sector experiencing a significant decline in tourist arrival, lower bookings, high cancellations of accommodations and a reduction in transportation usage. Similar to other economic sectors, the

situations have affected the citizens' livelihood. However, due to their better awareness and preparedness, Japan responded promptly and was flexible towards the solution needed during the pandemic. As a result, the citizens change their lifestyles and working environment and flex their spaces into multi-use facilities. They rapidly progress in the digitalisation of the cities and increased teleworking environment. The impacts of COVID-19 thus create an agile town development model.

Table 16 Summary of impacts of the COVID-19 pandemic and solutions/strategies for Japan

Theme	Impacts of the COVID-19	Solutions and Strategies for COVID-19
Socio-Economic	• Changes in lifestyle, working environment, flexible spaces • Japan's good culture and characteristics (wearing masks even before the pandemic) and good manners make a good balance in controlling the pandemic and the economy.	• Accurately respond to the diverse needs of every citizen (deepening human-centred and citizen-oriented community development). • Conducting a social experiment in a town, such as a park • Overcome aging issues through natural communication during a pandemic.
Technology and infrastructure	• The rapid progress of digitalisation in cities • Increasing teleworking reduces street and public transport congestion to enhance resilience.	• Simulation and effect verification using data, and new services by digital technology • Demand simulation with urban services and data-driven urban planning (provide mobility services such as buses using autonomous driving technology based on data utilisation and analysis).
Planning, design and environment	• Changes in the function of spaces; cities need to be more accommodating.	• Creating spaces through integrated utilisation of public and private urban assets such as the fusion of work, housing, and amusement • Renovation of urban assets, such as transforming vacant houses into co-working spaces • Variable and flexible utilisation of city settings such as streets and open spaces

Management and governance	• Manage the pandemic experience in the database for the best resilient approach.	• Implement measures promptly and flexible in response to various needs (realisation of agile town development).
		 • Various public, private, and academic stakeholders collaborate to share the city's vision.
		 • The Ministry of Land, Infrastructure, Transport and Tourism promote the "Model Cities for New Town Development" project by selecting 13 cities with six conditions:
		    i. Enhancement of open spaces.
		    ii. The utilisation of idle stock, such as vacant lots and vacant houses
		    iii. Development of telework facilities.
		    iv. Installation of information and communication infrastructure equipment
		    v. Data utilisation
		    vi. Use of technology for providing new services.

4.4 Malaysia

COVID-19 has significantly impacted Malaysia's healthcare sector's capacity, with the prolongation of lockdown and movement control order slowly rippling to other economic and social sectors. In this light, the Malaysian government focuses its policy and guideline on improving the productivity and livelihood of the community. The traditional economy has shifted to embrace the digital economy. This new trend of commercial aspect has been integrated into the Twelfth Malaysia Plan 2021-2025 (*Rancangan Malaysia ke-12*, RMK12) and further investigated by the new planning guideline or the commercial sector. Policy on urban farming has been strengthened to enforce food security by leasing or issuing temporary permits that would apply to urban communities to grow their food. Attention is also given to the new housing design to be multi-function as a place to educate, work and leisure.

Table 17 Summary of impacts of the COVID-19 pandemic and solutions/strategies for Malaysia

Theme	Impacts of the COVID-19	Solutions and Strategies for COVID-19
Socio-Economic	• Traditional economy shifts to the digital economy become a trend to improve productivity and livelihood of the community.	• The new trend of commercial aspects has been integrated into RMK12. Agencies in charge, including PlanMalaysia, will review and investigate new planning guidelines for the retail sector to adopt the latest trend. • Ministry of Housing and Local Government (KPKT) has published *Dasar Kebun Komuniti Bandar* (Urban Community Farming Policy, DKKB) as a food security measure by leasing or temporarily permitting the urban communities to grow their food.
Technology and infrastructure	• Digital economy and online businesses through massive digital technology create a decline in demand for retail spaces, but the logistic demand is increasing. • People shifts from public transport to private or active transportation to embrace social distancing.	• PlanMalaysia is moving toward a smart city agenda by conducting studies and proposing essential criteria for the smart city to the state governments (Melaka as the pilot project). • PlanMalaysia is working with the Malaysia Communications and Multimedia Commission (MCMC) to develop new communication towers. • PlanMalaysia is developing the guidelines for active transportation for the local plan preparation.
Planning, design and environment	• New design/housing model for better cope with the pandemic situation (multi-function housing: school, office, and recreation) • Inadequate living space for migrant workers that cause overcrowded influences the resilience of cities • Build environment design is the factor that influences the resilience of cities, not the density.	• Plan for better-quality housing (for different users). For instance, the government promotes the People's Housing Project (PPR) equipped with the internet for online education. • Plan the city not overcrowded in high density. • PlanMalaysia has translated Act 446 into a new planning guideline specifically to tackle the issue related to the living space for the migrant workers (Central Living Quarter and Temporary Living Quarter). • PlanMalaysia will review the current neighbourhood concept. • PlanMalaysia started to acknowledge and investigate a hybrid planning approach since the change of function in the buildings.
Management and governance	• Planning guidelines in managing active transport due to capacity control of public transportation.	• In Malaysia, the federal government plays its role in preparing the regulations' guidelines and procedures. In contrast, the local authority (in charge at the local level/local-based system) plays its role in implementing the policies.

4.5 Singapore

Singapore was selected because the economy implemented good management and governance in managing the pandemic of COVID-19. Furthermore, Singapore is pandemic ready as the economy has developed a systematic pandemic readiness plan after the SARS outbreak (2002 to 2004). In addition, establishing the Disease Outbreak Response System Condition (DORSCON) framework is an effective planning tool to assist the Homefront Crisis Management System (HCMS) in managing the COVID-19 situation.

Table 18 Summary of impacts of the COVID-19 pandemic and solutions/strategies for Singapore

Theme	Impacts of the COVID-19	Solutions and Strategies for COVID-19
Socio-Economic	• Singaporean's culture and behaviour – can be described as a workaholic (still working even though not feeling well) has been practised even before the pandemic. • Some scammers (cyber criminals) take advantage of COVID-19 measures, such as faking financial information. • Safe distancing measures such as remote work, distance learning and avoiding social gatherings have caused significant changes in daily lives.	• Singapore established the financing of the healthcare system by giving funding support such as Medisave, MediSHield, Medifund and ElderSheild. • The government provided several fiscal measures such as Unity Budget to fund the outbreak, the Care and Support Package for households, the stabilisation and Support Package to assist businesses, etc.

	• The mental health of frontline health workers must be concerned and avoid stigma.	• Singaporeans maintain a high level of trust, support cooperation, and have confidence in government actions to manage the pandemic.
Technology and infrastructure	• There is a need for a real-time information-sharing platform from authorities to curb misinformation spreading through digital devices that can cause community panic during COVID-19.	• The Ministry of Health reported clarifications on its website and using social media such as Gov. sg WhatsApp as a platform for COVID-19 updates.
Planning, design and environment	• The packed housing environment of migrant workers promotes the virus's spread and widespread infections.	• A resident lost his Singapore permanent residency and will be banned from re-entering Singapore due to breaching the Stay-Home measure.

Management and governance	• The government reassured the public that Singapore supplies essential items to prevent panic buying.	• After learning from the SARS outbreak, a systematic pandemic readiness and responsiveness plan was developed.
		• The establishment of the Disease Outbreak Response System Condition (DORSCON) framework serves as a planning tool to assist the Homefront Crisis Management System (HCMS) in managing COVID-19:
		  i. Establishment of a network of Public Health Preparedness Clinics (PHPCs) which are primary health clinics established in times of central need
		  ii. Hospitalise and isolate the infected.
		  iii. Trace contacts rigorously.
		  iv. Make social messaging clear.
		• Singapore has not enforced exceptional powers and is transparent.

5.0 Case Study (Cities)

5.1 Sydney, Australia

The city of Sydney was selected based on its agenda for sustaining livelihood and community recovery. During the COVID-19 pandemic, Sydney has taken a big hit, especially in the social aspects. The pandemic has changed the lifestyle and city pattern, such as the disruption to everyday transport choices in Sydney. For instance, people have switched from public transport to cycling, while the lack of safe and secure cycling facilities has become an issue. In addition, with the high arrival of foreigners, public health messaging on COVID-19 has frequently ignored the needs of culturally and linguistically different communities. There is also an increased inequity in food access in Greater Sydney's food system, and the decrease in the informal economy or sharing economy, including the peer-to-peer rental market, affected the community's livelihood. However, Sydney overcomes those challenges with the "Community Recovery Plan: the City of Sydney" to step toward life after the pandemic (the city's future) regarding the economy, social and environment.

Table 19 Summary of impacts of the COVID-19 pandemic and solutions/strategies for Sydney

Theme	Impacts of the COVID-19	Solutions and strategies for the city
Socio-Economic	• Change in work style/culture, such as lower volume of work, loss of employment, reduction of working hours, and work-from-home policy (Hensher et al., 2021). • People in Sydney are happy with work from home policy (Hensher et al., 2021). • Culturally and linguistically diverse communities have endured a disproportionate burden of the COVID-19 pandemic (Ayre et al., 2022). • Human Scape becomes an important consideration to be included in future cities' planning due to changes in movement patterns, social infrastructure and increasing multifunctionality of urban spaces (Cilliers et al., 2021).	• Acknowledged community diversity to create unity –addressing language barriers of different ethnic groups by tailoring public communication efforts via multi-language translation, health literacy and consideration of communication channel accessibility and preferences (Ayre et al., 2022). • Develop a more centralised information network amongst food relief organisations to better identify the community's needs and effectively coordinate relief efforts (Craven and Meyer, 2020).

	• Food security impacts during a pandemic include increased demand for food relief and disruption to pre-existing food chains such as supermarkets (Craven and Meyer, 2020). • Income and financial losses of Airbnb (sharing economy) hosts (Chen et al., 2020)	
Technology and infrastructure	• Reduction of workplace commuting activity by private and public transportation during the lockdown (Hensher et al., 2021) • Significant mobility patterns change from mass public transport to active transport to control the virus's spread (Waitt and Stanes, 2022). • A decline in road traffic incidents as vehicles on the roads decrease during lockdown (Chand et al., 2021).	• Reactivating commuter cycling by providing safe and secure cycling facilities such as dedicated bike lanes (Waitt and Stanes, 2022) • Give priority to planning "active transport" modes in the city (Cilliers et al., 2021).
Planning, design and environment	• The work-from-home policy reduces road congestion and crowding issues at major public transportation hubs (Hensher et al., 2021). • The wildfire/bushfire seasons due to climate change increase the exposure to COVID-19 and air pollution (Cortes-Ramirez, 2022). • Changing trends from 'Urban-Scape to Human Scape" in shaping the city (Cilliers et al., 2021)	• Accommodate flexible space uses, its users and activities as part of the city planning approach. • Plan for temporary spaces to give more choices to urban people (Cilliers et al., 2021). • High-value connection spaces should support accessibility and availability for urban space users (Cilliers et al., 2021). • Urban spaces should be planned to enhance the visiting experience and meaningful encounters (Cilliers et al., 2021). • Healthy environments should be prioritised as part of broader spatial planning approaches (Cilliers et al., 2021). • Creating interactive urban spaces should focus on the more significant deployment of collaboration technologies (Cilliers et al., 2021).

Management and governance	• The government's effectiveness in managing the COVID-19 crisis can provide an enormous opportunity for creating a global reputation as a safe, liveable, well-governed economy by attracting:
	  i. Foreign students
	  ii. Top global talent
	  iii. Business headquarters
	  iv. Global investment
	  v. Visitors
	  vi. Business events
	(Committee for Sydney, 2021)
		• Implementation of Community Recovery Plan: City of Sydney to foster life after the pandemic (the city's future) in terms of economy, society, and environment (Green Global Connected, 2020).
		• Implementing COVID-19 Recovery Strategy 2021 for economic recovery (Committee for Sydney, 2021)
		• Implementation of COVID-19 Recovery Plan from the New South Wales Government to mitigate the pandemic (NSW Government, 2020)
		• Implementation of City-Shaping impacts of COVID-19: Towards a resilient Greater Sydney (Greater Sydney Commission, 2020)
		• Implementation of NSW Street Treatments for COVID Recovery for the transportation measures (NSW Government, 2020)

5.2 Lombok, Indonesia

Lombok was good practice for Indonesian cities in managing the COVID-19 pandemic due to its resilience to climate change and better pandemic preparation efforts. It is better prepared than other cities regarding food security, water, healthcare and finances. The earthquake in 2018 and COVID-19 in early 2020 hit hard and disrupted the livelihood recovery of people in Lombok. The urban community in Lombok suffered from issues and problems such as economic losses, declining food industry production and decreasing income among workers, which later led to increased unemployment and retrenchment for local jobs in Lombok. This experience has become lessons learned for the people; therefore, during the pandemic, they have come out better in preparation and with a better ability to implement emergency measures that occurred almost immediately as they always prepare for climate change in Lombok.

Table 20 Summary of impacts of the COVID-19 pandemic and solutions/strategies for Lombok

Theme	Impacts of the COVID-19	Solutions and strategies for the city
Socio-Economic	• The city of Lombok applied their preparedness in facing natural hazards (eruption of Mount Rinjani) to the context of pandemic management, particularly in food security, access to water, healthcare and finances (World Neighbors, 2020). • Urban communities in Lombok have built a network of local leaders who know their communities' environmental conditions, strengths and weaknesses down to the neighbourhood level. Local knowledge plays a vital role at the local level (World Neighbors, 2020). • The authority needs to consider the local perception, cultural and religious responses, and social factors of the Sasak community during the implementation and development of strategies to mitigate COVID-19 (Andiwijaya et al., 2022). • The household impact includes long-standing credit arrangements with kiosks, informal loans from neighbours and relatives and non-cash savings such as livestock and jewellery, which can be converted into cash when needed (Koirala et al., 2020). • Routine changes in learning and health Schools closed during the lockdown and imposed online/remote teaching, and fewer people visited healthcare facilities (Koirala et al., 2020).	• During the pandemic, Lombok residents prepare and implement emergency measures immediately as they are constantly being ready for the climate change/natural hazards situation: 1) The installation of handwashing stations. 2) The distribution of face masks. 3) The emergency teams quickly ramped up contact tracing to identify citizens who might have travelled in a high-risk area. 4) Disinfectant/spraying in public areas 5) Routine visits with quarantined people to provide support during isolation. 6) Collecting data involving vulnerable households (highly likely to fall into poverty; for assistance for basic food and non-food items) 7) The government provides people's daily health and temperature checks in quarantine centres (World Neighbors, 2020).
Technology and infrastructure	• N/A, *as the island residents do not rely on technology or engineering solutions in their preparations, at least for now.* (World Neighbors, 2020)	• N/A
Planning, design and environment	• Climate change is related to the pandemic in terms of resilience (World Neighbors, 2020).	• N/A
Management and governance	• N/A	• The government has implemented multi-purpose cash assistance (MPCA) programme in Lombok for the people's well-being (Koirala et al., 2020).

5.3 Kashiwanoha, Japan

The city of Kashiwanoha was selected based on the Kashiwanoha Smart City Plan implementation, which incorporated the usage of advanced technology (information and communication) to cater for the "new normal" before the COVID-19 pandemic. The Smart City Plan improves the convenience of mobility within the city by introducing self-driving buses and visualising and monitoring traffic around the stations. The plan also provides environmental-friendly living toward a decarbonised society by using a cloud computing system for the energy management service (AEMS) and solar power generation management platform.

Table 21 Summary of impacts of the COVID-19 pandemic and solutions/strategies for Kashiwanoha

Theme	Impacts of the COVID-19	Solutions and strategies for the city
Socio-Economic	• Loss of jobs and business (reduce the operation scale or forced to cease operation) • Mental health due to exposure to the COVID-19	• The Kashiwanoha Smart City Plan provides all generations with high quality of living and good health with vitality by promoting: i. Personal healthcare service (Kashiwa-No-Ha Passport). ii. Improving patient services by grasping the flow of people in the hospital.
Technology and infrastructure	• N/A	• Implementation of the Kashiwanoha Smart City Plan with advances in technology (information and communication) for the "new normal" of COVID-19 (Deloitte Tohmatsu Group, 2021) • The Kashiwanoha IoT Business Co-creation Lab is aimed at private companies, government agencies, and research institutions

		• Uses IoT communication infrastructure to create IoT-related business opportunities and support collaboration, contributing to new business creation (Deloitte Tohmatsu Group, 2021).
		• The Kashiwanoha Smart City Plan improves the convenience of mobility within the region with the station at the centre by:
		i. Introducing self-driving buses.
		ii. Visualising and monitoring traffic around the station.
Planning, design and environment	• Inability to travel	• The Kashiwanoha Smart City Plan provides environment-friendly living toward a decarbonised society by:
		i. Using a cloud computing system for area energy management service (AEMS) improves demand forecasting accuracy
		ii. Maintaining a management platform for solar power generation.
		• The Kashiwanoha Smart City Plan creates urban spaces that attract people and support their lives by:
		i. Using monitoring data from AI cameras and sensors.
		ii. Preventive maintenance management by sensing and AI analysis.
Management and governance	• Top-down approach	• Kashiwanoha smart city development project involved collaboration between stakeholders (Urban Design Center Kashiwanoha Town Management, UDCK) and public-private-academia partnership, including real estate company Mitsui Fudosan. (Deloitte Tohmatsu Group, 2021)

5.4 Subang Jaya, Malaysia

Subang Jaya City was selected as a representative for Malaysian cities because the city implements sustainable city initiatives focusing on the microplanning approach during the pandemic of COVID-19.

Table 22 Summary of impacts of the COVID-19 pandemic and solutions/strategies for Subang Jaya

Theme	Impacts of the COVID-19	Solutions and strategies for COVID-19
Socio-Economic	• Stopped operation or reduced production by firms causes laid-off workers as they cannot bear the operation costs. • The global economic crisis contributed to declining oil prices, thus triggering the oil supply shortage. • Social support through subsidy dispersants and loan repayment rescheduled to lower-income groups was initiated. • The government's fiscal policies promote the demand for consumption and investment. • General prohibition of mass movements and gatherings across the economy, including religious, sports, social and cultural activities	• Subang Jaya City Council (SJCC) distribute food basket and COVID-19 disinfecting solutions to poor households (face masks, hand sanitisers etc.), e-hailers, food handlers, and dispatchers, and provides emergency assistance such as flash floods.
Technology and infrastructure	• N/A	• SJCC has set up an Operational Room for COVID-19, with the primary task being to collect and display data on daily and cumulative COVID-19 cases across their jurisdiction. • SJCC supports the contact tracing program by assisting the Health Department and ensures that all the latest information is disseminated to the public via social media. • Technological solutions by implementing a customer-friendly approach such as sending notifications via email, increasing awareness of online transactions, and creating mobile apps for checking and payment platforms

Planning, design and environment	• Closure of all kindergartens, government and private schools, and all public and private higher education institutions and training institutes	• SJCC constantly monitors public places and ensures that essential services are available by regulating operating hours and enforcing social distancing among visitors. • SJCC ensures that garbage collection and general area cleaning continue to function, that all infrastructure is in good/working condition, that markets and bus stops are disinfected and that operators disinfect their premises. • Leverage existing assets to create new business opportunities, such as transforming a library into a short-term workspace for rental and imposing a direct debit payment system.
Management and governance	• The government delivered stimulus packages during the early stages of the lockdown, such as PRE 2020 and PRIHATIN, to protect the welfare of the people and strengthen the economy. However, allowing for a series of stimulus packages caused the central's fiscal position to worsen. • Closure of all government and private premises except those involved in providing/supplying essential services.	• Good collaboration not only within the various departments in the City Council but also with other external departments such as the Fire and Rescue Department Petaling and Health Office in contact tracing of positive COVID-19 cases • SJCC aids traders and residents through the vertical collaboration for budget 2021, focused on recovery measures for the grass-root level. • SJCC developed a Financial Back-Up Plan as one of its Disaster Risk Management strategies to involve sustaining cash flow by finding new income sources and reducing administration costs.

6.0 Conclusion

This Systematic Literature Review report was a foundation for developing strategic recommendations and approaches for the APEC Cities and Built Environments (BE) Strategy: Building Back Better in the Post COVID-19. This report explores the various issues and challenges faced by APEC economies. In addition, the report identifies lessons learned and best practices from different cities on the strategies for strengthening cities and building resilience towards the pandemic. This review also shows that the evidence for a resilient city is mainly related to socio-economic, technology and infrastructure, planning, design and environment, management, and good governance. Therefore, the issues about socio-economics, technology and infrastructure dominate the discussions. This situation occurred because of the enforcement of movement control orders and travel restrictions that hindered inter and intra-travel, changing people's daily routine to stay at home and limiting physical contact. Some common patterns have been observed in the literature; however, impacts and responses to the pandemic differed from one context. Thus, the recommendations might not be in the form of "one size fits all" solutions or identical from one city to another.

Nevertheless, COVID-19 provided valuable lessons for building back better. The pandemic is expected to change the management and governance of cities and built environments. In this light, city planning, design, and environmental management are also likely to be revitalised to recover from the pandemic. Actions should be taken within the next few years to determine the development of the cities and whether post-COVID cities will be managed sustainably. However, there are some limitations to the research. Firstly, it should be acknowledged that the list of co-sponsoring economies is much desirable in selecting the experts and case studies. However, within time constraints, this research can only be done with selected experts and case studies. Secondly, the themes and factors are not entirely conclusive. Considering the evolving situation during the pandemic, new or different findings may emerge, which would require further research.

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APEC Cities and Built Environments (BE) Strategy: Building Back Better in the Post-COVID-19

WORKSHOP REPORT

APEC Project: EPWG 02 2021A

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Contents

1. Overview of the Virtual Workshop

Organising the virtual workshop for multidisciplinary action strategy is the second milestone of the APEC Project: EPWG 02 2021A, APEC Cities and Built Environment (BE) Strategy: Building Back Better in the Post -COVID-19. The content and schedule for the virtual workshop were designed upon completion of the first milestone, i.e., developing the Systematic Literature Review and Scenario Planning report focusing on lessons learned and the way forward for the new normal post-pandemic. This workshop was organised by the Institut Sultan Iskandar (ISI), Universiti Teknologi Malaysia, in collaboration with the Construction Research Institute of Malaysia (CREAM) and supported by Emergency Preparedness Working Group (EPWG). It was held virtually via Microsoft Teams on the 15 and 16 of August 2021. Thirty-five government /public, private and academic participants from six APEC member economies attended the virtual workshop.

1.1. Project and Workshop Objectives

This project aims to develop APEC Cities and Built Environments (BE) Strategy: Building Back Better in the Post COVID-19. The objectives are:

i) To develop a strategic recommendations approach that will shape urban management and built environments based on an in-depth understanding of cities' issues and challenges during the COVID-19 pandemic.
ii) To discuss and refine a detailed strategy on "pandemic-resilient cities and built environments" based on lessons learned or best practices captured from relevant stakeholders (from different APEC economies).
iii) To formulate APEC strategy in creating a multi-stakeholder implementation approach for "pandemic-resilient cities and built environments".

The workshop aims to meet the project objectives (ii) and (iii). The 2-day virtual event was participated by expert consultants who delivered a tailored program for building a comprehensive strategy for dealing with pandemic risk among APEC economies. The workshop includes several sessions with varying dynamics to maximise learning and retention, such as expert presentations, case study discussions, workshops, and more.

1.2. Workshop Agenda

All activities during the virtual workshop aimed to broaden the participant's knowledge of relevant issues and challenges, lessons learned, and best practices during COVID-19 in cities and built environments, as well as the strategy toward pandemic-resilient cities and built environments.

The workshop is organised for two (2) days. The first day includes presentations by the keynote speakers and two forum discussions by four panellists who are experts in their respective fields. The second day comprises workshop sessions to identify and develop scenarios for future cities and built environments. Refer to the Annex for the Workshop Agenda.

1.2.1. Day 1, 15 August 2022

Day 1 of the event began with the Opening Remarks by *Dato' Ts. Dr Gerald Sundaraj, Chief Executive Officer of Construction Research Institute of Malaysia,* followed by Welcoming Remarks by *Professor Dr Syed Ahmad*

Iskandar Syed Ariffin, Executive Director, Institute Sultan Iskandar. The event continued with Forum 1. These sessions delivered information and discussed the strategies developed and implemented in diverse APEC economies. After that, the participants have their 15 minutes break. After the break, the event continued with a speech by Keynote Speaker 1. Then, the participants have their lunch early at noon as Keynote Speaker 2 is still not ready online. After the lunch break, the event commenced with a speech by Keynote Speaker 2. Then, the event continued with Forum 2.

Talk Session

There were two keynote speakers in this session. The first Keynote Speaker was Mr Mohd Faizal Abd Hamid representing Malaysia from the National Disaster Management of Malaysia. He delivered a keynote speech entitled "Pandemic and Planning for Resilient Cities". The second keynote speaker was Ms Gita Yulianti Suwandi, representing Indonesia from the Indonesian Disaster Management Agency (BNPB). She delivered a keynote speech entitled "Building More Resilient Cities to Endure COVID-19 and Future Pandemic Risk". The speakers presented the topics based on their APEC member economy experiences.

Forum Session

The virtual workshop successfully organised two forum sessions focused on resilient cities and the coronavirus pandemic. Each forum session was panelled by four panellists and facilitated by a moderator. The title of the first forum was "Multi-stakeholders Collaboration Towards Pandemic-resilient cities and built environments." The forum's panellists were Dr Chee Ping Ngang (PLANMalaysia), Dr Mohd Ramzi Mohd Hussain (International Islamic University Malaysia, IIUM), Dr Khairul Hisyam Kamarudin (Universiti Teknologi Malaysia, UTM) and Mr Ahmad Farhan Roslan (Construction Research Institute of Malaysia, CREAM). The session was moderated by Prof. Dr Shuhana Shamsuddin (President of the Malaysia Urban Design Association).

The second forum was entitled "Best Practices and Lessons of Coronavirus". The panellists for this session were Ms Alexandra O'Mara (Australia), Dr -Ing Santy Paulla Dewi (Indonesia), Dr Mohd Rizal Osman (URBANICE Malaysia) and Dr Wan Nurul Mardiah Wan Mohd Rani (Institut Sultan Iskandar, Malaysia). The session was moderated by Assoc. Prof. Dr Hacharanjit Singh (Universiti Teknologi Malaysia, Malaysia). The panellists discussed the topics and shared information between economies.

1.2.2.   Day 2, 16 August 2022

On Day 2, the virtual workshop was conducted based on a discussion format. The session aimed at developing resilience strategies based on the plausible future of APEC member economies through scenario planning and analysis. Before the discussion began, Dr Wan Nurul Mardiah Wan Mohd Rani, the project leader, gave an overview of the scenario planning and analysis processes. For scenario planning, participants' data attainment process was divided into two main exercises/sessions: "Track and Analyse the Critical Factors Influencing the Pandemic Resilient Cities" and "Imagine and Decide on

the Future " Scenarios of Cities and Built Environments". Two facilitators and rapporteurs managed the virtual discussion room throughout these sessions.

Workshop Session 1

Realising "What will APEC cities and built environments look like post-COVID-19 pandemic?"

The facilitators delivered information on the studies, the definition of certainties and uncertainties and trend spotting. The participants then discussed the focal question, "What will APEC cities and built environments look like post-COVID-19 pandemic?". After discussing the focal question, they defined the scope of analysis, focusing on long-range consequences. Finally, the participants identified critical factors through trend-spotting activities and brainstormed to choose the key strategic influencing factors.

Workshop Session 2

"Visualising the APEC cities and built environments post-COVID-19 pandemic."

The facilitators delivered information on scenario building with scenario axes (2x2 matrix approach), example scenarios, and storytelling. After identifying the key strategic influencing factors, the outcome of each element was discussed and defined. The participants then imagine the plausible scenario from different results of the selected factors. Afterwards, the participants created, reviewed, and analysed each scenario description.

The participants interacted with the facilitators using Google's Jamboard apps throughout these two sessions. After both sessions, the participants were requested to present and discuss their findings. Furthermore, the participants were encouraged to share the scenarios with the whole group through storytelling. The groups then shall assess and evaluate each other's different scenarios. However, on the day, the participant's responses were deficient. Therefore, the facilitators suggested that the workshop could not continue with online presentations and discussions. Subsequently, the workshop continued with an offline discussion session through the Jamboard platform. By doing so, the organiser can capture any new and additional comments and inputs from the participants.

1.3. Workshop Participants

The virtual workshop was participated by EPWG members from diverse APEC Economies. Each economy was requested to nominate at least 2 participants. In addition, the invitation forms were sent to APEC EPWG members to seek suitable candidates from the EPWG Fora and experts in the field from academic, industry and government backgrounds. Even after the organiser completed all the requirements for the invitation and nomination of participants, in the end, only 35 participants attended the workshop. Among them are the keynote speakers, panellists, moderators, facilitators, and rapporteurs. In this light, the attendance rate was lower than the expected number of 50 people. However, the participants are equal in gender, with the total male being 18 and the total female being 17.

Local organisations: PLANMalaysia, National Disaster Management (NADMA), URBANICE, Universiti Teknologi Malaysia (UTM), International Islamic University of Malaysia (IIUM), Construction Research Institute of Malaysia (CREAM), and Institut Sultan Iskandar (ISI)

International organisations: EPWG Fora from Canada, Peru, Chile, Indonesia, Australia, and New Zealand

2. Summary of Presentations

2.1. Talk Session: Keynote Speech

2.1.1. *"Building More Resilient Cities to Endure COVID-19 and Future Pandemic Risk."*

Keynote Speaker:	**Ms Gita Yulianti Suwandi (Indonesian Disaster Management Agency)**
Speech Content:	• Improvement of Jakarta's air quality during the pandemic • She shared a graph of active cases of COVID-19 in Jakarta. • Further issues, challenges, and opportunities to develop pandemic-resilient cities and development • She ended her presentation with a conclusion about the crisis in Jakarta. • A case study in Lombok

2.1.2. *"Pandemic and Planning for Resilient Cities."*

Keynote Speaker:	**Mr Mohd Faizal Abd Hamid (National Disaster Management of Malaysia)**
Speech Content:	• Multi-Agency Coordination (Policy, Technical, and Implementation) • Three catalysts for government approach: 1) Policies are not to issue but to understanding, 2) Enforcement coordination, and 3) Smart collaboration • Encourage agile leadership • Six challenges in addressing the pandemic for resilient cities: 1) Leadership, 2) Decision making (lack of data), 3) Communication (federal, state, and local should be uniform), 4) Technology, 5) Adoption, and 6) Engagement
Q & A:	1) How to address the gap between the collaboration of different stakeholders? • Focus on certain place operations (local level first)

2.2. Forum Session

2.2.1. *"Multi-stakeholders Collaboration Towards Pandemic-resilient cities and built environments."*

| Panel 1: Dr Chee Ping Ngang (PLANMalaysia) | **Presentation Content:**
• **Cities are defined based on the people/population (Natural, Unnatural, and People)**
• **Urban planning is about geographical across multi-stakeholders collaboration**
• **Cities are the issues and also the solution by good city planning**
• **Three trends in shaping city: 1) Industrial revolution (Big data), 2) Climate change (carbon), and 3) the COVID-19 pandemic**
• **Challenges of urbanisation**
• **Public, Private, and People Partnership (Priority, Goal setting, Planning, Implementation)**
• **The history of pandemics gives lessons learned for spatial planning intervention**
• **Ten aspects of re-imagine cities in post-COVID-19**
• **What is the best practice? What can be sustained?**
• **Short-term alternatives:**
   1) Reuse adaptive space, building, and zoning
   2) New trends, new developing
• **Long-term alternatives:**
   1) Neighbourhood planning |

	2) **Data and information**
	• **Economy-wide-Regional-Local Implementation**
	• **Cities of Tomorrow: Data-driven planning (Respond to the urban challenges)**
	• **MUO, Smart city, SDGs**
	• **Multi-stakeholder partnerships are the solution for the recovery in terms of economy, green, social, and COVID-19**
	
	Q & A:
	1) What are the main challenges of urban planning in Malaysia?
	    • **Agencies or departments work in a silo system**
	    • **Overlapped job scope**
	2) What are the solutions from PLANMalaysia?
	    • **The policies or strategies should be implemented and focused at the local level**
	    • **Community-based planning**
	    • **Hear the society, let the community plan while the government guide**

Panel 2: Associate Prof. Dr Mohd Ramzi Mohd Hussain (IIUM)	Presentation Content:
	• Green space as an index for the sustainable mental-health policy during a pandemic outbreak
	• Evaluation of pandemic: The interaction between environment, animal, and human
	• Impact of pandemics on the history
	• Urban green space and mental health (How to build back?)
	• Design and plan for urban green space as:
	    1) Community resilient
	    2) Recreational space
	    3) Good health and well-being
	    4) Wildlife and nature habitat
	    5) Healthy city and Green City
	    6) People spend more time in the park after COVID-19
	    7) Increase the quality of life
	• SDGs 3 and 11
	
	Q & A:
	1) What are the challenges to promoting our public parks?

Panel 3: Dr Khairul Hisyam Kamarudin (UTM)	Presentation Content: • Resilient is an ability capable of thinking followed by taking actions (Basic thought) • Concepts of self-help, mutual assistance, and public assistance • Eight factors of community resilience • Community ability: 1) Absorb, 2) Try and the best, 3) Adapt • Stakeholder action and strategies at different levels for COVID-19 risk management • Multi-stakeholder collaborations were needed to infuse a sense of togetherness in finding suitable strategies or solutions to specific challenges or exploit opportunities to achieve a more significant impact. Q & A: 1) What are the real solutions that need to be taken to translate related policies for the benefit of the community? • Public participation (Top-down, Bottom-up)

	• At the local level, the government must allow for public participation and empowerment, and local authorities and governments need to enable the spaces and avenues.

Panel 4: Mr Ahmad Farhan Roslan (CREAM)	Presentation Content:
	• Multi-stakeholder collaboration:
	  1) Shared responsibility
	  2) Interactive process
	  3) Stakeholders from various sector
	  4) Diverse viewpoint
	  5) Cooperatively plan and implement actions
	  6) Share resources and risks
	• Barriers:
	  1) Trade-offs (Limited stakeholders)
	  2) Duplicate in government sectors (Improper system)
	  3) Fragmentation and silo
	  4) Capacity
	  5) Data (Lack of raw data)
	  6) Funding (Inadequate finances)
	• Recommendation:
	  1) Create a mutual vision, goal, and idea
	  2) Managing trade-offs (Negotiate in and transparent manner, evidence-based decision)
	  3) Robust governance (Expert, Data)
	  4) Learning and action alliances (Benchmark, Education)
	  5) Digital Transformation (Participatory, Mapping, Dashboard)
	
	Q & A:
	1) How to promote multi-stakeholder collaboration?
	  • Co-benefits for everyone
	  • Shared interest among agencies in collaboration

2.2.2. "Best Practices and Lessons of Coronavirus."

Panel 1: Ms Alexandra O'Mara (Australia)	Presentation Content: ● Introduction to COVID-19 alongside with covid cases in Australia. ● Nine focus areas in city-shaping impacts of COVID-19.
Panel 2: Dr -Ing Santy Paulla Dewi (Indonesia)	Presentation Content: ● Semarang case study ● COVID-19 pandemic influences the tourism at Semarang Old Town (heritage area) ● COVID-19 pandemic caused shops lot to shut down, limiting tourism activities, decreasing the property value ● Reduces the visitors, collapse of the buildings ● Businesses lose the retail rental ● Gentrification ● Quantitative method, Data collection, Analysis Method ● The COVID-19 pandemic is an essential milestone in developing gentrification in the Old Town. ● Gentrification may also finish because this area is re-abandoned by investors who could not afford to cope with the high rents and building maintenance costs. ● Selling an ancient building is a complex process that requires various administrative procedures.

	● During this period, the building will be vacant and re-occupied illegally or inhabited for such informal activities. Hence, de-gentrification will start the episode in the Old Town.
Panel 3: Dr Mohd Rizal Osman (URBANICE)	Presentation Content: ● Transform our Malaysian Cities to be Sustainable ● Growth continues in Malaysian Cities ● Urban areas and air quality during the pandemic ● Subang Jaya case study
Panel 4: Dr Wan Nurul Mardhiah Wan Mohd Rani (ISI)	Presentation Content: ● Presents the issues, challenges, impacts, and solutions from the research findings of the Systematic Literature Review base on four themes, 1) Socio-economic 2) Technology and infrastructure 3) Planning, design, and environment 4) Management and governance

2.3.   Workshop Session

2.3.1.   *Understanding Scenario Planning: Track and Analyse the Critical Factors Influencing the Pandemic Resilient Cities and Built Environments*

Speaker:	**Dr Wan Nurul Mardiah Wan Mohd Rani**

Content:	● Understanding the objectives of scenario planning is to make sense of the confusing or puzzling situation, develop strategy, anticipate future events, and facilitate organisational learning.
	● Focal question: "What will APEC Cities and Built Environment look like post-COVID-19 Pandemic?"
	● Method for Scenario Planning: TAIDA Method (Tracking, Analysing, Imaging, Deciding and Acting)
	
	Workshop Session 1: "What will APEC Cities and Built Environments look like post-COVID-19 Pandemic?"
	● Track and Analyse:
	  ● Understanding the issues and challenges in the APEC cities and built environment during the COVID-19 pandemic.
	  ● Discuss the focal question.
	  ● Identify critical factors.
	  ● Rank the key critical factors.

2.3.2.   *Understanding Scenario Planning: Imagine and Decide on the Future Scenarios of Cities and Built Environments*

Speaker:	**Dr Wan Nurul Mardiah Wan Mohd Rani**

Content:	Workshop Session 2: Visualising the APEC Cities and Built Environments Post-COVID-19 Pandemic
	● Imagine and Decide:
	  ● Scenario building with scenario axes (2x2 matrix approach) based on the identified critical factors
	  ● Discuss factors in groups and imagine different outcomes of the selected factors for each scenario.
	  ● Review scenarios created based on scenario axes and provide feedback.
	  ● What will cities, and built environments within APEC economies look like post-COVID-19 pandemic?

- Develop scenario descriptions by group and share them with the whole group through storytelling.

Way Forward: After the workshop, the researchers will re-iterate and act

- Acting:
  - The researchers will document the workshop at different stages of scenario planning activities.
  - Finalised the scenario established in the workshop
  - Establish strategies and initiatives based on the scenarios

3. Summary of Discussions

3.1. Talk session

3.1.1. *"Building More Resilient Cities to Endure COVID-19 and Future Pandemic Risk."*

Talk session one was on building more resilient cities. In enduring COVID-19 and future pandemic risks, building more resilient cities will enable an effective response to prevent future attacks and life loss. Ms Gita identified the issues, challenges, and opportunities to develop pandemic-resilient cities. She further elaborates on resilient cities, such as Lombok Island in Indonesia, as this island survived not only the COVID-19 pandemic but also the disaster that struck the island.

3.1.2. *"Pandemic and Planning for Resilient Cities."*

Talk session two was on planning for pandemic-resilient cities. In addition, this session discussed the government approach to mitigating pandemic attacks, which focuses on understanding the policies, coordinating the enforcement, and smart collaboration between agencies. Mr Faizal also elaborated on the challenges of pandemic resilience, such as leadership, decision-making, consistent communication, technology, adaptation, and engagement.

3.2. Forum Session

3.2.1. *"Multi-stakeholders Collaboration Towards Pandemic-resilient cities and built environments."*

The forum one theme acknowledges the impact of the pandemic on multiple stakeholders and thus seeks multiple stakeholders' collaboration towards developing pandemic-resilient cities. Each panel discussed the capacity-building and simulation process of the stakeholders involved. They also identified the issues of working in silos, overlapping job scope between agencies, and the importance of community-based planning.

3.2.2. *"Best Practices and Lessons of Coronavirus."*

The forum two themes bring out the best practices and lessons learned from the COVID-19 pandemic in the cities. The discussion is diverse in culture, as the panels are from Malaysia, Australia, and Indonesia. The panels deliver their cities' experiences during COVID-19 and how they overcome the issues and challenges. They also discussed the best practices implemented and the adaptation of community resilience throughout the pandemic. This session gives the panellist and the participants opportunities to learn from others' experiences on their way to developing resilience towards pandemics.

3.3. Workshop Session: Scenario Planning and Analysis

The workshop aims to gather more information and gain in-depth knowledge to develop scenarios of a plausible future for APEC Cities and Built Environments. The workshop consists of one big group of participants facilitated by two facilitators and two rapporteurs. The first activity for the participants was to rank the impact and uncertainty factors influencing the future of APEC Cities and Built Environments post-pandemic. In addition, the participants are encouraged to add more factors and provide feedback on any dimensions that require improvement. Then, the participants enter Workshop 1, followed by Workshop 2. The details of the workshop are as below.

3.3.1. *Realising "What will APEC cities and built environments look like post-COVID-19 pandemic?"*

Workshop one (1) tracks and analyses the factors influencing resilience while realising what APEC cities and built environments will look like post-pandemic. Dr Wan Nurul Mardiah provided the scene setting. The previously ranked factors were shared and reviewed with the participants. The primary purpose of this activity was to track and analyse the factors that have a very high impact and uncertainty on developing future resilience.

The participants were given the following questions:
- a) What factors influence APEC cities' and built environments' future scenarios and post-pandemic?
- b) What factors give the highest impact and provide the most heightened uncertainty about the future?

Overall, the participants have agreed that:
- a) Education, training, and skills,
- b) Health and healthcare and
- c) Technological services,

are the highest factors impacting future APEC cities' resilience and built environments.

The uncertainty factor that is critical for the future of APEC cities and built environments are:
- a) Social and cultural behaviour,
- b) GDP or general economy, and
- c) Healthcare.

3.3.2. *Visualising the APEC cities and built environments post-COVID-19 pandemic*

Workshop two (2) is imagining and deciding on the future of APEC cities, and built environments based on the factors tracked and analysed in the previous sessions. Dr Wan Nurul Mardiah once again defined the scene setting.

The participants were given the following guidance questions:
- a) What are the different outcomes of the selected factors for each scenario?
- b) What will APEC cities look like post-pandemic?

The participants were requested to imagine and record their imagination into four possible scenarios. The scenarios were organised into several dimensions/grids.

Having identified the dimensions, the next activity is continually applying the scenario matrix to develop the plans further.

Four scenarios were developed by factoring all the answers into a more positive and negative development depending on the participants' perspectives in the workshop. From the example in the workshop, the "GDP/general economy" was referred to as "Rapid recovery in economy and livelihood," i.e., from the positive dimension grid. On the other hand, the negative development is "Slow/moderate recovery in economy and livelihood". Another example was related to the "Technological services", whereby the positive development was referred to as "Rapid adaptation in digital technology", and the negative development was referred to as "slow/moderate adaptation in digital technology". The next step was to create new labels/names that symbolise the various development within the identified scenario (Refer to annex for scenarios developed in Jamboard). The scenarios are:

a) Scenario 1 – New Transformation of Living
b) Scenario 2 – Leading Digitalisation
c) Scenario 3 – Economic Acceleration
d) Scenario 4 – Engagement Decline

These scenarios lay the foundation from which strategic options for APEC cities and built environments can be derived.

4. Summary of Policy Interventions Developed in Workshop

Throughout the 2-day workshop, the presentation and discussion topics analyse the drivers and implications of policy interventions that foster the transition towards pandemic resilience cities and built environments within the APEC economies. The interventions address a variety of measures, including socio-economy, technological, infrastructural and governance.

These topics are selected to have the vision to effectively develop the **APEC Cities and Built Environments (BE) Strategy to Build Back Better in the Post COVID-19.** Furthermore, understanding these topics delivered by diverse APEC Economy experiences encourages collaborative learning between APEC economies towards pandemic-resilience cities and built environments. Thus, offer strategies designed to produce a human-centred approach (using human perspectives in all steps of the process) in improving pandemic resilience for APEC economies' city's future.

Five main themes were presented, and several interventions arose.

The interventions for APEC Pandemic-resilience cities and built environments are listed below:

Response

- The implementation of the smart and resilient city design and policies to identify disease transmission as well as build more resilient cities be an effective response to prevent future attacks and life loss.

Mitigation

- New technological approaches adopted for better management of present and future pandemics
- The physical (urban access, infrastructure, environmental factors, and land use patterns) and non-physical (socio-cultural, governance, and economic factors) aspects of resilient urban strategies have been focused on, which may help to develop an understanding of health- and disaster-related risks in pandemics.

Preparedness

- Proactive measures such as capacity building toward any outbreak and different simulation processes (models of transmission pattern) may efficiently manage future pandemics.
- Enhancing urban resiliency in housing, public spaces, and cities may bring effective outcomes to combat the pandemic.

PROGRAM AGENDA
DEVELOPING APEC CITIES AND BUILT ENVIRONMENTS STRATEGY:
BUILD BACK BETTER POST- COVID 19 PANDEMICS WORKSHOP
EPWG 02 2021A

Program Day 1

Date and time: 15 August 2022, 9.00 am – 4.00 pm (MYT/UTC+8)
Online Platform: Microsoft Teams

Time	Activity
8.30 am – 9.00 am	Registration/Log in
9.00 am – 9.15 am	Opening session
9.15 am – 9.25 am	Opening remarks By Dato' Ts. Dr Gerald Sundaraj, Chief Executive Officer, CREAM
9.25 am – 9.30 am	Welcoming remarks By Prof. Syed Ahmad Iskandar, Executive Director, ISI
9.30 am – 11.00 am	Forum 1: "Multi-stakeholders Collaboration Towards Pandemic-resilient cities and built environments." Panel 1: Dr Chee Ping Ngang (PLANMalaysia) Panel 2: Dr Mohd Ramzi Mohd Hussain (IIUM) Panel 3: Dr Khairul Hisyam Kamarudin (UTM) Panel 4: Mr Ahmad Farhan Roslan (CREAM) Moderator: Prof. Dr Shuhana Shamsuddin, President, Malaysia Urban Design Association Q&A session
11.00 am – 11.15 am	Conclusion of key messages from the forum by Prof Shuhana Shamsuddin
11.15 am – 11.30 am	Break
11.30 am – 12.00 pm	Keynote Speaker 1: "Pandemic and Planning for Resilient Cities" By Mr Mohd Faizal Abd Hamid, NADMA, Malaysia Q&A session
12.00 pm – 12.30 pm	Keynote Speaker 2: "Building More Resilient Cities to Endure COVID-19 and Future Pandemic Risk" By Miss Gita Yulianti Suwandi, BPNB, Indonesia Q&A session
12.30 pm – 12.45 pm	Video Presentation
12.45 pm – 2.00 pm	Lunch Break
2.00 pm – 3.30 pm	Forum 2: "Best Practices and Lessons of Coronavirus" Panel 1: Miss Alexandra O'Mara (Australia) Panel 2: Mrs Santy Paulla Dewi (Indonesia) Panel 3: Dr Mohd Rizal Osman (Malaysia) Panel 4: Dr Wan Nurul Mardiah Wan Mohd Rani (Malaysia) Moderator: Assoc. Prof. Dr Harcharanjit Singh, Associate Professor

| Time	Activity
	Azman Hashim International Business School, UTM Q&A session
3.30 pm – 3.45 pm	Conclusion of key messages from the forum By Assoc. Prof Dr Harcharanjit Singh
3.45 pm – 4.00 pm	Video Presentation
4.00 pm	Program end

Program Day 2

Date and time: 16 August 2022, 9.00 am – 4.00 pm (MYT/UTC+8)

Online Platform: Microsoft Teams

Time	Activity
8.30 am – 9.00 pm	Registration/Log in
9.00 am – 9.10 am	Opening session
9.10 am – 9.20 am	Introduction to the Workshop by Sr. Yusrin Faiz Abd Wahab Project Overseer EPWG 02 2022A
9.20 am – 9.30 am	Understanding Scenario Planning: Track and Analyse the Critical Factors Influencing the Pandemic Resilient by Dr Wan Nurul Mardiah Wan Mohd Rani, Project Leader EPWG 02 2021A
9.30 am – 11.00 am	Workshop Session 1: Realising "*What will APEC cities and built environments look like post-COVID-19 pandemic?*" Facilitator 1: Dr Khairul Hisyam Kamarudin Rapporteur 1: Kelly Ng Pui Yee Facilitator 2: Dr Wan Nurul Mardiah Wan Mohd Rani Rapporteur 2: Nur Najwa Ariena Mohd Nazeli
11.00 am – 11.15 am	Break
11.15 am – 11.30 am	Understanding Scenario Planning: Imagine and Decide on the Future Scenarios of Cities and Built Environments by Dr Wan Nurul Mardiah Wan Mohd Rani, Project Leader EPWG 02 2021A
11.30 am – 1.00 pm	Workshop Session 2: Visualising the APEC cities and built environments post-COVID-19 pandemic
1.00 pm – 2.00 pm	Lunch Break
2.00 pm – 3.30 pm	Presentation and Discussion • Share the scenarios with the whole group in the form of storytelling. • Assess and evaluate the different scenarios from the other groups
3.30 pm – 4.00 pm	Conclusion of key messages from the workshop session by Dr Wan Nurul Mardiah Wan Mohd Rani, Project Leader EPWG 02 2021A
4.00 pm	Program end
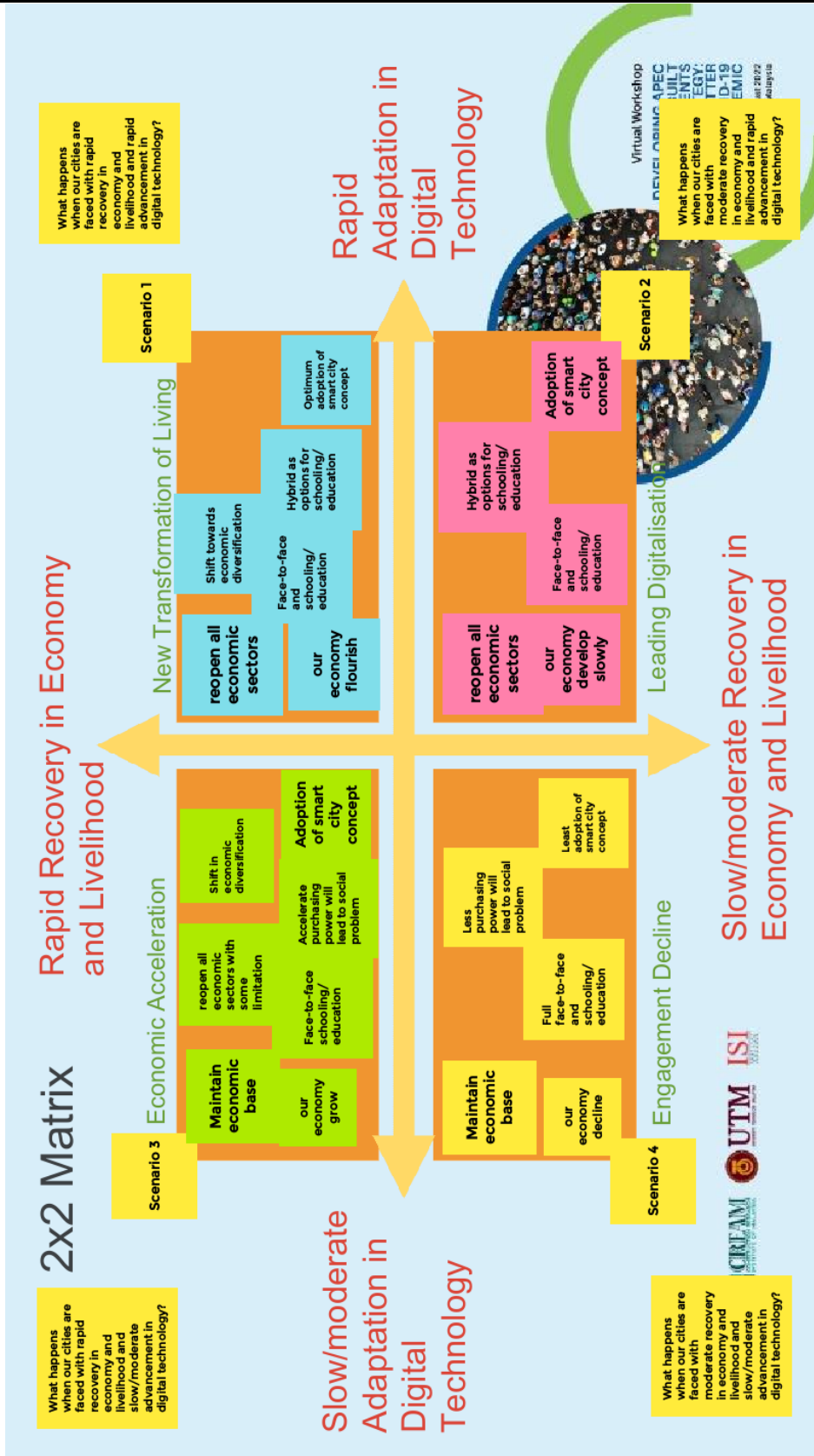
APEC Cities and Built Environments (BE) Strategy: Building Back Better in the Post COVID-19

PRE- AND POST-EVENT EVALUATION REPORT

APEC Project: EPWG 02 2021A

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Contents

1. Pre-workshop survey

The survey was given to the participants at the beginning of the workshop. The questions were divided into two (2) sections. Questions 1 to 3 are generally on the workshop. In contrast, question 4 focused on their perception of factors influencing the future of APEC cities and built environments which were later analysed in the scenario planning and analysis session. The feedback is listed in the following sections.

Q1. What are your expectations of this workshop? What do you hope to gain by participating in it?

To learn about building back better.
knowing different experiences
Experience from other participants
Share experiences
To gain knowledge and insights
To gather new insights about solutions and best practices that can be implemented for future preparedness.
A better understanding of post-disaster efforts to rebuild better
To gain more knowledge about scenario planning during the pandemic

Q2. What is the one thing that you would most like to learn during the workshop?

Perspectives on how to build back better in recovery from COVID-19.
Public politics in building
Best Practices and Lesson of Coronavirus
The importance of urban planning
Challenges in implementing solutions
Implementable solutions on the ground, with communities.
New ideas and new tools
Critical factors that influenced the pandemic resilient cities
To gain more knowledge about scenario planning during the pandemic

Q3. What kind of experiences have you had in building back better cities and built environments post-COVID-19 pandemic? For example, have you researched the topic, given a public speech, developed relationships with local journalists, created a campaign message, or been involved in other ways (please specify)?

I have co-written a journal article on a similar topic.
No
Get our building ready for any disaster and pandemic
Participation in design criteria for health facilities
Focused Group Discussion
Conducted focused-group discussions, reached out to our communities, and awareness posters.
None
No, I haven't

Q4. The table below shows the influencing factors related to the resilience of APEC cities and built environments post-COVID-19 pandemic. Please rate the following factors from 1(low/weak) to 10 (high/strong). (The answers given are the average score of all respondents)

FACTORS	IMPACT	UNCERTAINTY
Social factors		
a. Social and cultural behaviour	7.5	7.125
b. Working pattern and labour market (unemployment)	8.625	6.875
c. Education, training, and skills	9	6.375
d. Health	9.375	6.875
Economic factors		
e. GDP/ General economy	8.125	7.5
f. Healthcare	9.125	7.25
Technological factors		
g. Internet of things	8.375	6.25
h. Digital engagement	8.75	5.875
i. Technological services	9.125	5.5
Infrastructural factors		
j. Logistics	8.25	5.75
k. Transportation	8.125	5.625
l. Mobility	8.25	6
m. Digital infrastructure	8.625	6.375
Planning and design factors		
n. Urban spaces	8.5	5.375
o. Building spaces	7.75	5.5

p.	Smart city	7.5	6.5
q.	Access to nature and green spaces	8.25	5.875
Environmental factors			
r.	Air, water, soil, and noise quality	8.125	5.625
s.	Natural resources	7.75	5.75
t.	Effect of climate change	7.625	5.75
u.	Waste disposal	6.875	6.125
Management			
v.	Urban management	8	5.75
w.	Planning process and policy	8.25	5.25
Governance			
x.	Governance system	8.375	5.875

From the response, the highest impact factor on the future of APEC cities and built environments post-COVID-19 pandemics is Health (9.375), followed by Healthcare (9.125), Technological Services (9.125), and Education, Training and Skills (9.0). The highest uncertainty factor for the future of APEC cities and built environments post-COVID-19 pandemics is GDP/General Economy (7.5), followed by Healthcare and Social (7.25) and Cultural Behaviour (7.125). These factors were further analysed to develop future scenarios in the workshop's Scenario Planning and Analysis Session.

Factors Related to the Resilience of APEC Cities and Built Environments
Post-COVID-19 Pandemic
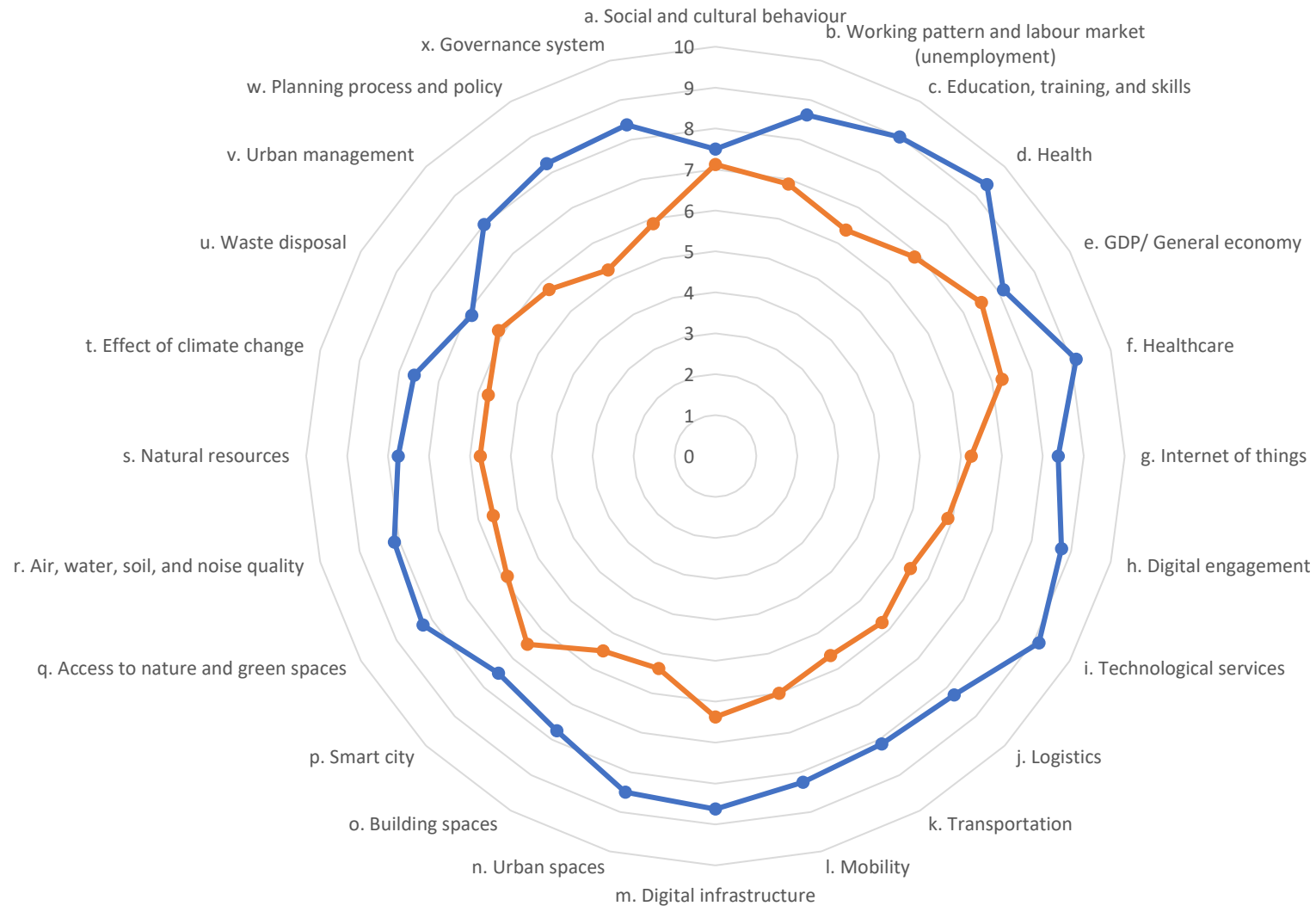
2. Post Workshop questionnaire

The post-workshop questionnaire was given to the participants at the end of the workshop. The purpose of the post-workshop questionnaire is to provide participants feedback and help determine areas of improvement and loopholes in the virtual workshop. Due to low participation at the end of the workshop session, the response rate of the questionnaire is low. However, the responses correlate with the pre-workshop survey, which identifies the participant's prior knowledge and understanding of the topic and determines their expectations to learn through the sessions in the virtual workshop.

Please √ the following categories on a scale of 1 to 3.

(1= disagree, 2=agree, 3=strongly agree)

Q1. Workshop Content

      a. *I was well-informed about the objectives of this workshop*
This shows that 50% of the participants are well informed on the purposes of the workshop, while the other 50% of the respondents are well informed about the workshop's goals.
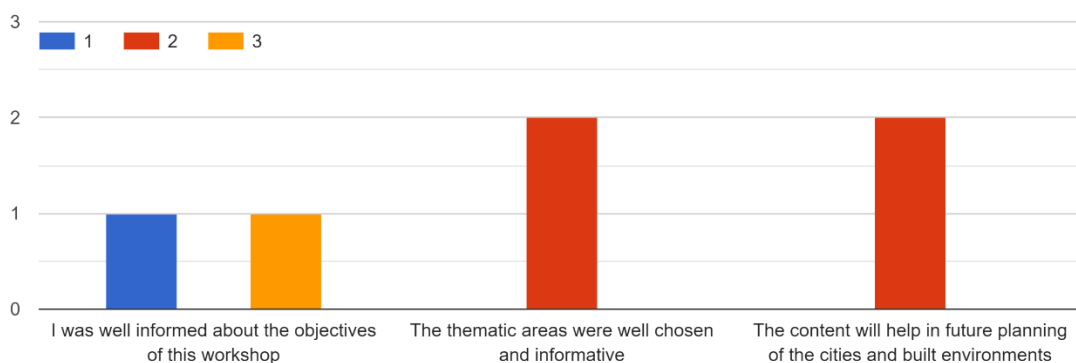
      b. *The thematic areas were well chosen and informative*
The participants agree that the thematic areas were well-selected and informative.

      c. *The content will help in the future planning of the cities and built environments.*
The participants agree that the workshop's content will help the future planning of the cities and built environments.

1. Workshop Content

Q2. Workshop Design

      a) *The workshop objectives were clearly defined.*

The participants agreed that the objectives were clearly defined.

b) *The workshop activities were beneficial.*
Some of the participants disagree that the workshop activities were beneficial.

c) *The activities in this workshop gave me a sufficient understanding of developing the strategy.*
Some participants disagree that the workshop activities gave them sufficient understanding of developing the strategy.
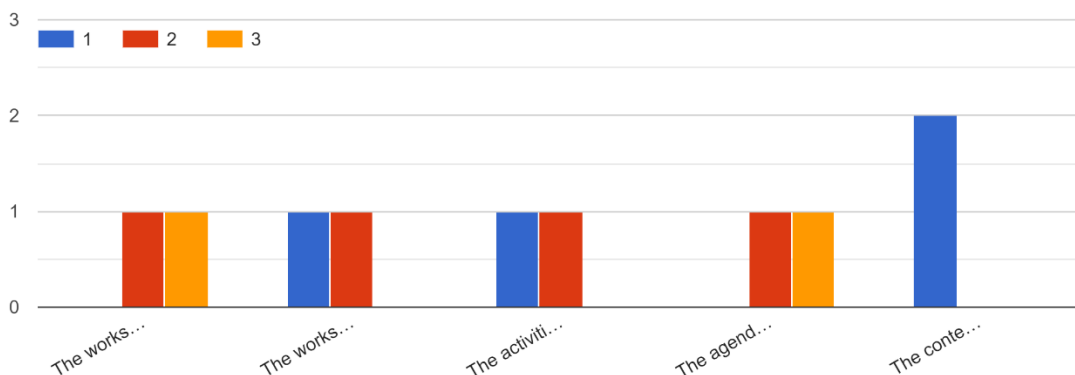
d) *The agenda items and topics covered were relevant.*
All participants agreed that the topics covered were relevant.

e) *The content was well-organised and easy to follow.*
However, they all disagreed that the content was well-organised and easy to follow.

2. Workshop Design

Q3. *Workshop Speakers and Facilitators*

a) *Overall, the presentations were well-prepared and informative*
b) *Overall, the presenters spoke knowledgeably about the content*
c) *The facilitators played a vital role in guiding the team through the planning process*
d) *The facilitators were well prepared and provided knowledgeable insight*
Overall, the participants agreed that the workshop speakers and facilitators were well-prepared and knowledgeable in delivering their presentations.

e) *The pace of this workshop was appropriate.*
However, some of the participants disagree with the workshop's pace.

3. Workshop Speakers and Facilitators
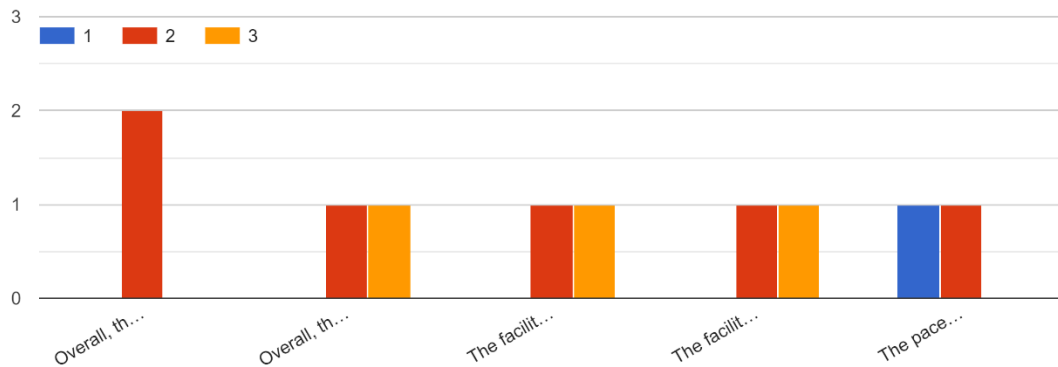
Q4. What is the essential thing that you have learned? What information will be the most useful to you?

It is a topic that APEC members are learning.
Green spaces as a much-needed evident-based solution for urban resilience. To gain more knowledge about scenario planning during the pandemic.

Q5. Overall, rate your level of knowledge and skills in the topic presented and discussed after participating in the event.

It was difficult to generate participation and discussion
The presentations were new knowledge and informative, however, it does not translate to tangible increase in my own knowledge or skills. Not in the short time.

Q6. What needs to be done next by APEC? Are there plans to link the project's outcomes to subsequent collective or individual actions by economies?

Deepen this topic further. Still, only generalities are reached
I think a physical workshop needs to be done for better interaction and better output for a successful outcome. Engage the right audience and level. I'm afraid I don't have the required knowledge, information, or expertise to be a part of this project.

Q7. Please provide comments on how to improve the project (EPWG 02 2021A)

Send material before the activity and Raise proposals that provoke discussion

3. Conclusion

Overall, the participants found the workshop valuable and relevant in targeting to develop strategies for future APEC cities and built environments post-COVID-19. The participants highlighted several workshop expectations in the pre-workshop survey, including gaining knowledge and insights from other APEC economies and understanding aspects of building better post-pandemic. Subsequently, the post-workshop survey revealed that the workshop provided a good platform for knowledge sharing and the contents of the presentations were informative. They were satisfied with the speakers and the topic covered. The participants have specific recommendations for improving future workshops by providing information on the activities and documentation for more explicit content of assignments that would be easy to follow. In addition, there is also a suggestion to present the workshop in physical form for better interaction and discussion.