AVPI Policy Briefing

Smart and Sustainable Cities in Vietnam: Trends, Challenges, and Opportunities

July 2023

Australian Government
Department of Foreign Affairs and Trade

Australia Vietnam
Policy Institute

RMIT
UNIVERSITY

BACKGROUND

Visit from the Centre for Urban Research, RMIT University, to Vietnam

– February 2023

In February 2023 a delegation from RMIT's School of Global Urban and Social Studies visited Vietnam. Members of the delegation were Katharine Johnson, Dean of the School of Global, Urban, and Social Studies (GUSS), Prof Jago Dodson, Director, Centre for Urban Research, Prof Hannah Badland, Director, Centre for Social and Global Studies and Prof Andrew Butt, Associate Dean Sustainability and Urban Planning.

The visit aimed to connect with external partners in Vietnam and in the Asia Pacific on joint research possibilities and to build collaborative links with researchers located at RMIT Vietnam. The visit included a Smart and Sustainable Cities Research Collaboration Workshop for researchers at RMIT's Saigon South campus in Ho Chi Minh City.

The delegation also met with Vietnamese stakeholders in urban planning to understand current urban challenges and opportunities. Stakeholders included the Ho Chi Minh City Institute for Development Studies (HIDS), Ho Chi Minh City Open University; University of Social Sciences and Humanities, Vietnam National University of Ho Chi Minh City, and Can Tho University.

Vietnam Sectoral Dialogues

Roundtables Series

Smart and Sustainable Cities Workshop - May 2023

In May 2023 the Australia Vietnam Policy Institute (AVPI) and RMIT University co-hosted a Smart and Sustainable Cities workshop that brought together researchers from RMIT Australia and RMIT Vietnam, representatives from the Department of Foreign Trade and Affairs (DFAT), the Aurecon Group, the Asia Foundation, and UN-Habitat to discuss current trends and challenges as well as key issues and emerging themes for smart and sustainable cities in Vietnam with the aim to identify future directions for joint Australia-Vietnam collaborative partnerships.

The discussion explored smart and sustainable city frameworks and standards, definitions and understanding of 'smart' and 'sustainable', the need for distinct approaches between differently sized cities, the different roles of private, community and government stakeholders, the approach to data sharing, what could be priorities, the impacts of climate change and the need for adaptation and mitigation, the need for capacity building and education as well as the costs of smart and sustainable development.

Based on the May workshop discussion, the following areas emerged as key opportunities for collaborative joint Australia-Vietnam sustainable and smart cities activities:

- Developing national smart city standards and indicators within a well-defined legal framework
- Developing government competence to plan and manage urbanisation
- Governance structures and increased coordination
- Developing overall smart and sustainable city capability across all sectors
- Understanding and evaluating the impact of current policy and urban development initiatives,
- Connecting initiatives with climate change responses and metropolitan and national urban policy, and,
- Building a sustained program of research to inform smart and sustainable city policy and industry development in Vietnam.

KEY THEMES

PARTICIPANTS IN THE WORKSHOP INCLUDED:

Jago Dodson, Director Centre for Urban Research, RMIT University

Hannah Badland, Director, Centre for Social and Global Studies, RMIT University

Andrew Butt, Associate Dean Sustainability and Urban Planning, RMIT University

Annette Kroen, Research Fellow, Centre for Urban Research, RMIT University

Vinh Thai, Professor Supply Chain and Logistics, RMIT University

Duc Trinh Tran, Research Fellow, The Business School, RMIT Vietnam

Ngoc Pham, Research Fellow, Business School, RMIT Vietnam

Cathy Tan, Project Coordinator, Asia Strategy and Impact, RMIT University / AVPI

Gabe Carter, Managing Director, Thailand and Vietnam, Aurecon Group

Vu Trinh, Technical Director Vietnam Transport, Land and Water, Aurecon Group

Yann Sinclair, Graduate Economist and Policy Officer, DFAT

Michael R. DiGregorio, Country Representative, Vietnam, Asia FoundationUrban Research, RMIT University

Frank D'hondt, Chief Technical Advisor, UN-Habitat Vietnam.

ANALYSIS

Urbanisation

The biggest challenge that lies ahead for countries across the globe, including Vietnam, is to build a future that fosters economic growth which is inclusive and sustainable.

Global urbanisation and its impacts on economy, society and environment

Over half of the world's population now lives in urban settlements, and the share is expected to increase to about two thirds by 2050 (World Bank 2022, UNDESA 2019). The intensity of urbanisation differs across the world. Asia and Africa have the fastest urban growth rates, as they are currently less urbanised than other world regions and have strong population growth and migration into cities.

Increasing urbanisation exacerbates the impact of cities on economic, social and environmental conditions (UN-Habitat 2022). Urbanisation can foster efficiency, innovation and productivity through agglomeration effects and increased trade and exchange. However, unplanned urbanisation can worsen negative tendencies and inequities, leading to issues such as pollution, public health issues, inadequate infrastructure, the proliferation of informal and poor settlements and socio-economic inequality (Vu & Hartley 2018, Van Cuong 2022). Therefore, careful policy development and implementation is crucial to realising urbanisation benefits and opportunities, including responding to climate change impacts, and increasingly disaster resilience.

Many urban planning policies are being embedded within 'smart sustainable city' initiatives, which aim to leverage technologies to respond to urbanisation issues to realise urbanisation benefits.

Economic development in Vietnam

Vietnam, as other comparable countries in Southeast Asia, has experienced rapid urbanisation in the past three decades. While the urbanisation level in Vietnam is still lower than in other middle-income countries, its urban population growth has had important impacts. Before the launch of economic and political reforms under the "Doi Moi" (renovation) policy from 1986 onwards, urbanisation was very slow in Vietnam. Since 1990 Vietnam's urban population has almost doubled, with 38 per cent of the population living in cities in 2021, compared with 20 per cent in 1990 (World Bank 2023a). By 2050, the proportion of urban population is expected to reach 57 per cent (UN 2018, Resolution No. 06-NQ/TW). At the same time the economy transitioned from an agricultural to an industrial and service-led economy with increasing export orientation, experiencing an annual growth rate between 5 per cent and 9 per cent between 1990 and 2019, falling to just under 3 per cent in 2020 and 2021 under the COVID-19 pandemic, and coming back to 8 per cent in 2022 (World Bank 2023a, World Bank 2023b).

Vietnam is now categorised as a lower middle-income country and is aiming to become a high-income country by 2045. In the last 30 years per-capita income has quadrupled and extreme poverty has been nearly eliminated with poverty rates declining to 5 per cent in 2020 (DFAT 2022a). While the COVID-19 pandemic has increased income poverty, in 2022 employment reached pre-COVID-19 levels and poverty rates declined again. While labour market participation and the underemployment rate are still recovering (World Bank 2023b), in 2022 retail sales grew by 17.1 per cent, the service sector by 10 per cent, the industrial sector by 7.8 per cent and the agricultural sector by 3.4 per cent. Electronics, machinery, footwear, and textiles were the main drivers of exports and manufacturing exports grew by 8.1 per cent (World Bank 2023b).

Vietnam's strong economic trajectory attracts large domestic and foreign investment flows and its embrace of free trade agreements as well as the rapid industrialisation and proximity to other growing economies, has made it one of the most trade intensive economies in the world (DFAT 2021). In the World Economic Forum's Global Competitive Index 2019 Vietnam moved to 67th place out of 141 countries, a gain from 77th place in 2018. While much of the past 50 years has seen the public sector play a dominant role in national development, increasingly Vietnam's capital development is driven by the private sector. In 2022, private domestic and foreign direct investment (FDI) were the main drivers of gross capital formation in Vietnam, with 2022 FDI disbursement reaching over US$22.4 billion (Ministry of Planning and Investment, World Bank 2023b).

Urbanisation in Vietnam

Cities and urban settlements have become important sites of economic development and growth. A significant proportion of Vietnam's recent economic growth has been driven by urban development that has produced increased demand for capital intensive infrastructure and basic services (UK Department for International Trade 2021). This is also acknowledged in Decision No. 143/QD-BXD on planning, construction, management, and sustainable development of urban areas in Vietnam until 2030, with a vision to 2045. It states the goal that "the urban sector's contribution to the national GDP is expected to be around 75% by 2025 and approximately 85% by 2030".

Cities have become sites of greater relative affluence compared to rural areas. Poverty rates declined by almost 80 per cent in urban areas in Vietnam between 2010 and 2016 compared to rural areas where poverty rates declined by 57 per cent (Do et al; Table 1). Cities are thus important sites of poverty reduction in Vietnam, reflecting similar patterns found in other developing and middle-income countries.

Table 1. Proportion of poor house holds in Vietnam by urban—rural areas in the period 2010—2016.

Year	2010	2012	2014	2016
Total	14.2	11.1	8.4	5.8
Urban areas	6.9	4.3	3	2
Rural Areas	17.4	14.1	10.8	7.5

Source: General Statistics Office of Vietnam, presented in Do et al (2021)

While urbanisation has supported economic growth, challenges have also arisen, such as infrastructure capacity limits and environmental degradation. Economic and demographic pressure has been put on essential infrastructure, including urban water supply and management, storm water drainage, wastewater treatment, solid waste management, energy generation and supply networks, transport networks and land use (Van Cuong 2022). Greenhouse gas emissions and air pollution have become important environmental concerns with Hanoi being reported as the second most polluted city in Southeast Asia (IQ Air 2022).

Vietnam is vulnerable to climate change impacts, such as sea-level rise and extreme weather events and disasters, with many low-lying cities and river delta regions, and a subsiding Mekong Delta zone (UK Department for International Trade 2021, OECD 2018). The 2021 Global Climate Risk Index ranked Vietnam as the 13th most affected country by climate change from 2000-2019 (Eckstein et al. 2021). Climate change is already affecting Vietnam, with estimates that in 2020 the country lost 3.2 per cent of GDP to climate change impacts. Without proper adaptation and mitigation measures this could increase to about 13 per cent per year by 2050 (World Bank 2022b). Riverine, flash, and coastal flooding is a severe threat, particularly to urban areas and vulnerable communities such as the poor, women, ethnic minority groups, and the elders.

Vietnam has pledged to achieve net-zero greenhouse gas emissions by 2050 and the country's 2021-2030 Socioeconomic Development Strategy recognises that the country's economic transformation will greatly depend on better management of natural capital. These commitments will be necessary for Vietnam to respond to climate change challenges, while increasing quality of life and strengthening industry and trade partnerships, including in cities.

Global strategies and frameworks towards sustainable urban development

The UN Sustainable Development Goals

In 2015, the United Nations General Assembly adopted the 17 Sustainable Development Goals (SDGs) (see Figure 1). SDG 11 is the most relevant to the topic of urbanisation and smart cities, however other SDGs are also highly relevant for the Vietnam context, including SDG 17 – partnerships for the goals. The importance of the SDGs is underscored in Vietnam's "National Action Plan for Implementation of the 2030 Agenda for Sustainable Development" from 2019 which establishes 17 general goals and 119 specific indicators specifically for Vietnam based on the country's development context and priorities.

Figure 1: UN Sustainable Development Goals

Source: United Nations 2023

The New Urban Agenda

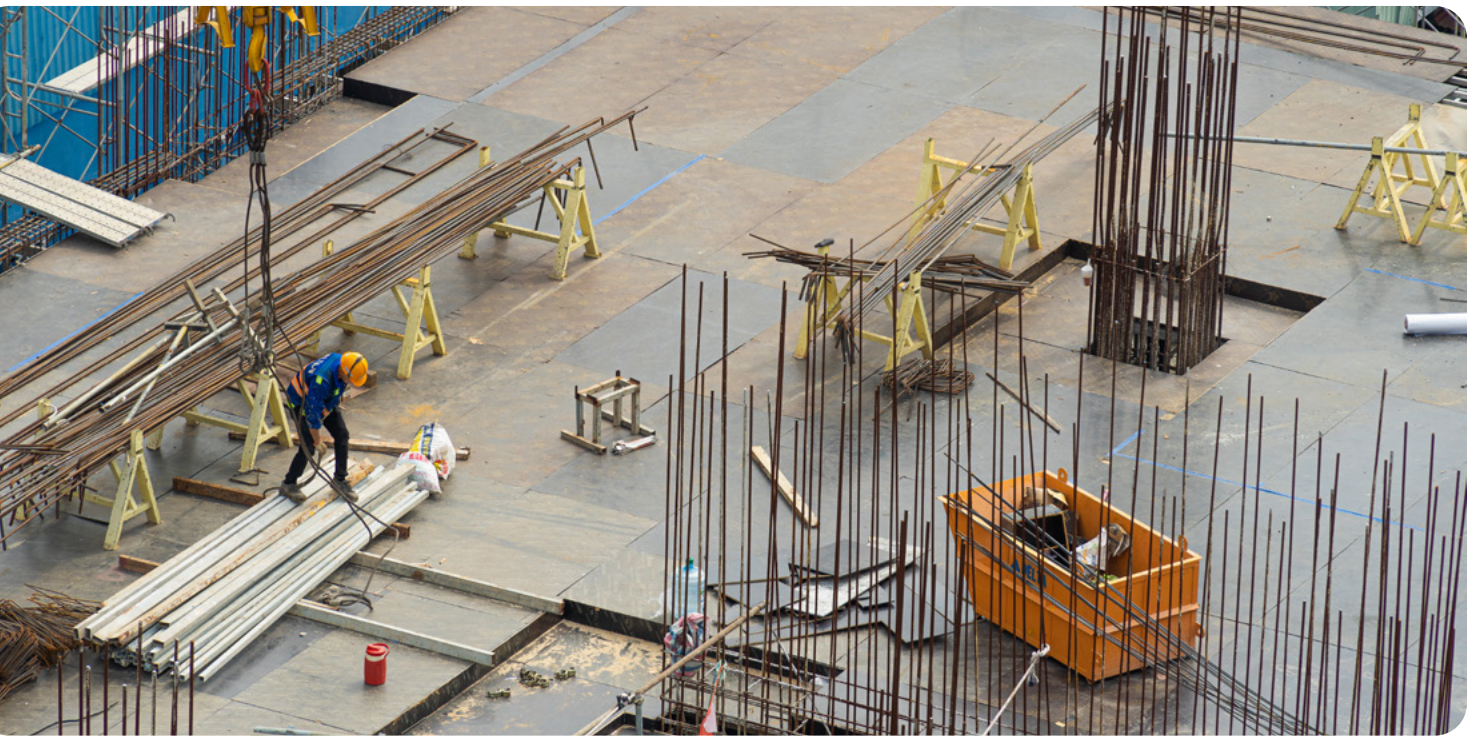
The New Urban Agenda (NUA), adopted by the United Nations Conference on Housing and Sustainable Urban Development (Habitat III) in 2016, is an action-oriented road map that mobilises Member States and other key stakeholders to locally deliver sustainable urban development. It provides guidance for achieving the SDGs and provides the underpinning for actions to address climate change. The New Urban Agenda emphasises the importance of National Urban Policies (NUPs) for sustainable urbanisation and refers to the smart city approach as one opportunity to achieve sustainable urban development.

National Urban Policy

A National Urban Policy (NUP) is a tool for governments to manage rapid urbanisation, and to leverage the positive effects while minimising the negative impacts. National Urban Policy is defined as:

> "A coherent set of decisions derived through a deliberate, government-led process of coordinating and rallying various actors for a common vision and goal that will promote more transformative, productive, inclusive and resilient urban development for the long term." (UN-Habitat & Cities Alliance 2014, p. iii)

UN-Habitat facilitates and advocates for the development and implementation of NUPs through the National Urban Policy Programme. Recently, smart cities have been considered as one important element of NUPs, such as through the project 'National Urban Policy Programme: Developing NUPs and Smart City Strategies in three selected countries (I.R. Iran, Myanmar and Nigeria)' (World Urban Forum 2022).



The Smart and Sustainable Cities Agenda

The Smart and Sustainable Cities concept is an increasingly recognised way to respond to the challenges of urbanisation while leveraging the opportunities of digitisation.

The evolution of the smart city concept

The notion of the 'smart city' has been used since the 1990s as a description of how advances in technology and data could be used to plan and improve cities in support of economic productivity and social development. The term had its breakthrough with IBM's 'Smarter City Challenge' where the company aimed to offer their technology to city governments (Catapult Future Cities 2017). Consequently, the smart city concept was first promoted by technology companies, however, local and national government have also begun developing smart city strategies. Over time the term 'smart' has shifted from a focus on technology to a wider embrace of productivity, efficiency and good governance and planning, with a broader set of objectives around quality of life (people-centred smart cities, e.g., UN-Habitat 2021) and sustainability (smart and sustainable cities, e.g., UNECE 2021) (Damian & Phan 2022).

Multiple definitions with a common denominator

There are multiple definitions of what a smart city is, and smart city initiatives are very diverse. One common element is that smart cities combine the use of information and communication technology (ICT) with well governed policy and investment planning to address urban, economic and social issues, problems and priorities.

The International Telecommunications Union (ITU) and the United Nations Economic Commission for Europe (UNECE) define a smart sustainable city as (UNECE 2021):

> "an innovative city that uses ICTs and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social, environmental as well as cultural aspects."

The Association of Southeast Asian Nations (ASEAN) Smart Cities Framework (ASEAN 2018) proposes that sustainability, and implicitly poverty alleviation, be incorporated into smart city approaches:

> **"a smart city in ASEAN harnesses technological and digital solutions as well as innovative non-technological means to address urban challenges,** continuously improving people's lives and creating new opportunities. A smart city is also equivalent to a "smart sustainable city", promoting economic and social development alongside environmental protection through effective mechanisms to meet the current and future challenges of its people, while leaving no one behind."

Having a clear definition or framework on a national, as well as metropolitan or local level, of what 'smart' and what 'sustainable' means for smart and sustainable cities is a central element for achieving a strategic development of initiatives and for defining desired objectives and outcomes. Definitions and standards are also important for the private sector to ensure alignment of development with expected performance directions.

Six key principles of smart and sustainable cities

(Albino et al. 2015; Vu & Hartley 2018):

Smart economy
Industry and services

Smart people
Human capital, teaching and learning

Smart governance
Citizen participation, access to services

Smart infrastructure and mobility
Transport networks, logistics

Smart environment
Sustainability, responsible management of natural resources

Smart living
Quality of life, security

Limitations and challenges

While technologies can assist in addressing urban challenges, there are also limitations and challenges to the smart city concept and its implementation. For example, regulatory, legal and ethical challenges may limit the benefits of smart cities. Particularly, the collection of personal and behavioural data can be problematic if the data is not adequately protected (World Economic Forum 2020, Courtney Doaggoo 2022), while a lack of strategic vision or integration into an overarching (urban) policy leads to ad-hoc approaches and may limit the benefits that can be achieved (Vu & Hartley 2018). The complexity of working across different urban issues and topic areas is also challenging to coordinate and respond to. Additionally, in some countries and some cities, the capability and capacity for utilising smart city technology might not be sufficiently well established to be effective, so that education and training need to be supported, and also more urgent issues, such as poverty or housing precarity, may need to be improved first.

Promotion of smart city initiatives

Smart city initiatives can be initiated and implemented through city governments, private companies and national governments, as well as through public-private partnerships. Citizens can also be included. In Asia, national governments are often the main actor in promoting and planning smart cities, however private companies and foreign investors are also increasingly involved in leading these initiatives (Joo and Tan 2020).

Local context:

Smart and Sustainable Cities in Vietnam

Vietnam's economic transformation, increasing urbanisation and the rapid growth in ICT penetration (e.g. an increase in internet use from 13 per cent in 2005 to 74 per cent in 2021 (World Bank 2023a)) have led to a favourable environment for smart and sustainable city initiatives and there is an increasing number of 'smart city projects' being implemented in the country (UK Department for International Trade 2021, VU & Hartley 2018). **National, as well as local leaders, alongside public-private partnerships, have initiated and championed this development.**

As the first step towards smart cities, the national government has pursued the distribution of ICT since the early 2000s (UK Department for International Trade 2021). In 2009, the Prime Minister of Vietnam issued Decision 445/QD-TTg approving the adjustment of the overall development direction of the urban system in Vietnam until 2025, with a vision to 2050. Its objective is to gradually build a comprehensive urban system in Vietnam following the model of a network of cities with appropriate and synchronised technical and social infrastructure, modern and environmentally friendly urban living conditions, and advanced and culturally rich urban architectural foundations.

While the term 'smart city' was mentioned in Vietnam's national policy for the first time in 2016, the central document for the national vision of smart sustainable cities is Decision No. 950, issued in 2018 by the Prime Minister). It approved a national plan for development of smart sustainable cities from 2018 to 2025, with a vision towards 2030, while also setting a target to turn the four biggest cities in Vietnam (Hanoi, Ho Chi Minh City, Da Nang, and Can Tho) into smart cities by 2025 or 2030 (Van Cuong 2022). As can be seen below, the focus of the Decision No. 950 was largely on technology, while the focus on sustainability is lower.

Decision 950/QĐ-TTg - Development of smart sustainable cities in Vietnam 2018-2025

Key elements of Decision 950 include:

- Addressing the 4th Industrial Revolution through ICT and other facilities to enhance competitiveness, innovation, effective urban management, and improved efficiency and quality in land use, energy and resource development
- Ensuring a people-centred development
- Establishment of legal grounds for the development of smart cities
- Preparations for piloting smart city models
- Formulation and application of a smart city ICT reference framework
- Developing spatial urban data infrastructure and the national urban database
- Reviewing, researching and improving policies
- Improving the system of national standards and regulations
- Establishing a database system
- Applying smart technology in urban planning and management
- Developing smart urban infrastructure
- Developing smart utilities
- Developing capacity for smart city
- Increasing mobilisation of resources
- Promoting international cooperation and technology transfer
- Raising awareness

(ASEAN 2022, Van Cuong 2022, UK Department for International Trade 2021)

While Decision No. 950 does not entail a definition of what a smart sustainable city is or should be, the ICT Reference Framework for development of smart cities from May 2019 (Decision No. 829/QĐ-BTTTT) adopts the definition of ITU and UNECE. This document also incorporated 12 key principles for the development and implementation of smart cities in Vietnam (Van Cuong 2022) (see info box). To implement Decision No. 950, Ministries and provinces have established Intelligent Operation Centres (IOC) as central hubs for aggregating urban data across all sectors to enable effective monitoring, control, support, and management of urban services. The Ministry of Information and Communications has issued guidelines on the functional requirements of IOCs.

Key principles for the development and implementation of smart cities in Vietnam (ICT Reference Framework May 2019)

1. Follow a people-centred approach
2. Ensure sufficient ICT infrastructure capacity and enhance the sharing of ICT infrastructure and open data
3. Ensure the neutrality of technology
4. Ensure information safety and security
5. Ensure that smart city projects are consistent with current local planning and development strategies
6. Set priority for overall missions or interdisciplinary tasks, such as ICT structure for smart cities, information safety, and broadband
7. Prefer reuse to purchase or new construction
8. Manage data to ensure its correctness and quality
9. Properly manage and share data
10. Ensure accessibility of data
11. Pilot new services or applications
12. Use open standards or open sources

(Based on Van Cuong 2022)

Sustainable cities in Vietnam

The most recent high-level policy document advancing the sustainable development of urban areas in Vietnam is Resolution No. 06-NQ/TW from January 2022 complemented by Resolution n°148/NQ-CP which establishes the government's program to implement Resolution No. 06. The resolution focuses on planning, construction, management, and sustainable development of urban areas in Vietnam until 2030, with a vision toward 2045. The main objective of this Resolution is to:

> "promote the speed and improve the quality of urbanisation, develop urban areas according to the network, and form smart urban areas and chains of smart and motivational urban areas connecting with the region and the world." (Lawnet 2022, n.p.)

The vision for 2045 includes that:

> "The urban system is connected to a synchronous, unified, and balanced network among regions, capable of fighting against, adapting to climate change, preventing and controlling natural disasters, and epidemics, protecting the environment, and typical architecture that is identity-rich, green, modern, and smart." (Lawnet 2022, n.p.)

1. Most of the Resolution is published in English on https://lawnet.vn/. To ensure full understanding of the resolution, the Vietnamese original was translated with Google Translate to understand the content of missing sections in the published English translation.

Further national policies aiming at sustainable urban development include the National Climate Change Strategy, the National Green Growth Strategy, the National Waste Management Strategy and the 5-Year Socio-Economic Development Plan.

The National Green Growth Strategy for the 2021-2030 period, with a vision towards 2050, emphasises efforts to restructure the economy, innovate the growth model, and reduce greenhouse gas emissions. It promotes the efficient utilisation of energy and resources based on scientific and technological foundations. Decision 749/QD-TTg for the National Digital Transformation Program until 2025, with a vision towards 2030, highlights how digital transformation can support sustainable development, by identifying eight priority areas which include healthcare, education, finance-banking, agriculture, transportation, logistics, energy, environmental resources, and industrial production.

Stakeholders for smart and sustainable cities in Vietnam

Smart and sustainable cities are not solely declarations by central agencies, they rely on a range of sub-national and local actors, including government authorities as well as private and civic actors. Important contributors to smart and sustainable city initiatives in Vietnam are:

- The Ministry of Construction (MOC) and the Ministry of Information and Communications (MIC), plus other ministries and agencies, on the national level, formulating policies, regulation and frameworks, implementing pilot programs and supporting ICT development;
- People Committees and departments (e.g., the local planning department) on the local level, formulating, sourcing and implementing smart city projects;
- Operators, such as private companies (e.g., technology companies, real estate developers) and state-owned enterprises (e.g., Viettel a telecommunications enterprise), providing technology and services and leading private smart city projects;
- Academia and associations, and to some extent non-government organisations (NGOs), such as universities, national research centres, the Association of Cities in Vietnam, building systematic knowledge, sharing best practices and fostering coordination;
- Foreign and domestic investors and government organisations such as the World Bank, Vingroup, UN-Habitat, Global Future Cities Programme (UK), Korea International Cooperation Agency (UK Department for International Trade 2021, Van Cuong 2022, Leducq & Scarwell 2018, OECD 2018).

Partnerships that include a major partner (e.g., the World Bank) can generate momentum and investment, as the inclusion of a major stakeholder assists in building trust and the confidence in achieving deliverables and thus de-risks the investment. There is opportunity to develop more Public Private Partnerships (PPP) once a proof-of-concept has been established and confidence in the model is established.

Local initiatives for smart and sustainable cities

Local governments in Vietnam began smart city projects and strategies as early as 2009 (see case study Da Nang). These projects mostly include partnerships with information and technology companies and are thus more ad hoc than strategic and do not build on a definition of what a smart city is (Leducq & Scarwell 2018), particularly as there was no national guiding definition until 2019. Some of the projects are completely new urban developments, such as the North Hanoi Smart City initiative. These projects provide the opportunity to implement a smart and sustainable cities framework from the beginning, but often do not provide answers to issues in existing urban areas. Overall, the projects are often focused on operational management, funding, and foreign development investment, rather than institution-building, vision and government competence (Vu & Hartley 2018). Examples include digital infrastructure development, mobility and e-government. This focus on projects which can be undertaken with foreign investors, entails the risk that some urgent problems are ignored, as they are not deemed interesting or profitable for those investors. An evaluation of those projects could be beneficial to understand their outcomes and benefits, including non-financial benefits for investors, and how they could be transferred to other Vietnamese cities.

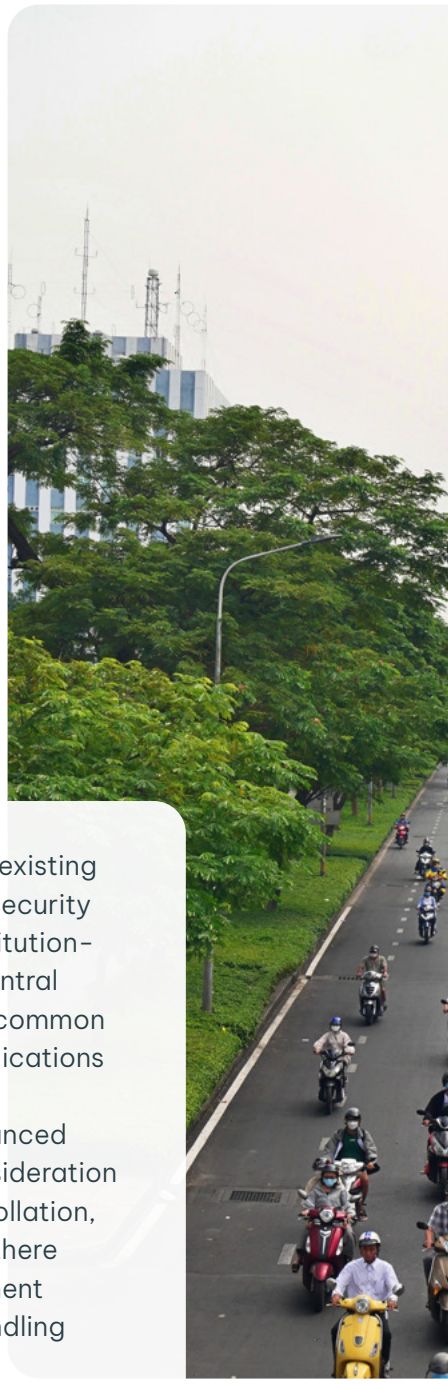
Most of Vietnam's smart city projects have been implemented in the largest two urban areas of Hanoi and Ho Chi Minh City. Reasons for this include that they are Vietnam's largest cities, have a global standing, particularly for trade and investment, and Hanoi is Vietnam's national government capital. However, the number of projects in smaller cities is growing quickly, with about 30 cities and provinces having formulated ambitious plans for smart city projects in 2021 (Van Cuong 2022, UK Department for International Trade 2021). Smart tourism is a priority topic for these smaller cities and provinces.

Smaller cities have the advantage that governance structures are less complex and that they have lower population growth pressure which offers good opportunities for developing a strategic approach towards smart and sustainable cities. Both, larger and smaller cities can and need to be smart and sustainable but warrant a different approach to smart and sustainable cities responses. An important step towards realising the capabilities of these smart cities is through developing or strengthening the legal framework that defines rules about ICT application and protection of personal data and urban governance issues (Van Cuong 2022). Frameworks also need to support capability development in these smaller cities, while ensuring masterplans and smart and sustainable city strategies translate the national frameworks to the local level and leverage existing and potential opportunities.

Key issues and emerging themes for smart and sustainable cities in Vietnam

Key urban development issues for Vietnam with smart city responses include:

- Air pollution (from manufacturing, power supply and cars)
- Waste (collection, recycling)
- Water supply
- Wastewater treatment
- Power supply (responding to demand and moving to renewable sources)
- Transport (congestion, public transport improvement)
- Housing (quality and living standards, affordability)
- Resource management
- Food safety
- Urban planning and land use
- Extreme weather events
- Risk of flooding and sea level rise
- Tourism
- Education (spatial access and affordability of education)
- Health care (spatial access and affordability of health care)
- Governance (efficiency, less duplication, decentralisation)



Digital infrastructure needs, financial sustainability and the need for improved coordination

Smart city challenges include deploying new digital infrastructure and improving existing capacity to meet the demand for technical connectivity, while mitigating cyber security concerns and legal issues within a financially sustainable model. Focusing on institution-building, investment in capability, and vision and government competence are central steps in smart and sustainable city development for Vietnam, as opposed to the common focus of the 'hardware' (Vu & Hartley 2018). Beyond hardware is the need for applications that can support improved urban efficiency and productivity, whether through coordination of urban infrastructure provision by the government or through enhanced private sector services for businesses. In addition to hardware and software consideration needs to be given to the role of data in cities, from its generation, transmission, collation, sharing and manipulation and application, as well as storage and privacy. While there is a willingness to create and share open-source data between Vietnam government departments, and to some extent with external stakeholders, their usage and handling require development and implementation of processes and governance.

Strengthen smart city sustainability & coordination

Many of the above issues are being tackled through Vietnam's smart city projects, such as investment in renewable energy, air pollution monitoring and control, transport management, flood prevention and management systems and providing education. However, better coordination, driven by agreement for what sustainability means in the context of smart cities and how experiences and approaches could be transferred to other cities is needed. A successful example of effective coordination of a smart city project is from the province Binh Duong. To respond to challenges identified in its smart city plan (the Smart City Navigator) the province has established a three-sided cooperation model between the Eastern International University, industrial parks and a business accelerator, focussing on high-tech and environmentally friendly policies (UK Department for International Trade 2021, ICF 2023). Binh Duong Smart City is the largest project developed from the smart city plan that is planned and implemented via intersectoral cooperation.

Education and workforce training

Improving education and focusing on training needs could improve Vietnam's response to its urban key challenges. Linking back to SDGs #1, #4, #8, #9, and #10, such an approach will likely improve access to education and workforce training to achieve a higher share of a skilled labour force, which will improve job security and wage disparity. Regarding domestic higher degrees offerings, important areas for improved capabilities are urban planning and design, IT skills, and e-government and governance.

CASE STUDY

Da Nang

The city of Da Nang is the fourth largest city in Vietnam with 1.1 million residents. Da Nang is located in central Vietnam, 750 km south of Hanoi and about 960 km north of Ho Chi Minh City. It is a port-city and tourism centre. The city aims to become a domestic and international transport hub, and a telecommunications, post and banking center.

Da Nang started its smart city development in 2009. In 2012 it won an IBM Smarter Cities Challenge grant worth $400,00 to deploy smart technology for transport and water systems (Leducq & Scarwell 2018, Vu & Hartley 2018). This led to implementing technologies that collect and distribute real-time data about public transport, as well as technologies that monitor water quality and service levels (Vu & Hartley 2018). Another project which was implemented with the assistance of South Korea's national information society agency was the e-government platform 'egov Danang' which was later transferred to 16 cities and provinces across Vietnam (Leducq & Scarwell 2018, UK Department for International Trade 2021).

Building from those projects, in 2014 the city of Da Nang adopted a connected city program, focusing on technological solutions for transport, water supply, drainage and food security, and in 2016 established a smart city pilot committee to advise on potential smart city policies and solutions (Leducq & Scarwell 2018). In 2019 it issued Decision 1950 for a Smart City Plan 2018-2025 with a Vision towards 2030. This plan entails the vision of being a smart, liveable and sustainable city by 2030, while ensuring growth and competitiveness. Focus areas of the plan are governance, mobility, environment, citizens, economy, safety and security (ASEAN 2022). The plan also aims to improve data collection, process and sharing; upgrade the e-government system, build an urban spatial database; and environmental monitoring.

Smart City initiatives in Da Nang include:

- Da Nang e-government and public service platform with online civic engagement platform and mobile application
- Electronic healthcare system with an electric health record
- Smart environment management system with Smart Sensors, IoT, Smart Surveillance System
- Smart Water Management, including water quality monitoring
- Solar energy use and database of solar power capacity, plan to build a solar farm
- Intelligent traffic system with violation monitoring system, parking management technology, transport fee collection system
- Natural disaster management system
- 5G Telecom infrastructure system
- IT facility for school and medical facility
- Energy efficient street lighting (ASEAN 2022, UK Department for International Trade 2021)

CASE STUDY

Ho Chi Minh City

Geographic Information System (GIS) Drainage System

Ho Chi Minh City is the largest city in Vietnam with about 9.2 million residents (Statista 2023). As with other cities in Vietnam, it has developed a smart city plan, "Building Ho Chi Minh City into a Smart City for 2017-2020, a vision toward 2025". Lying on the Saigon River the city has a dense network of rivers and canals. It is exposed to floods as nearly half of the city lies less than 1 metre above sea level (Woetzel et al. 2020); lower income households are disproportionately impacted by flooding (47 per cent of the poor, and 22 per cent of the city's overall population) (La Huong et al. 2022). Canals and drains were built to allow water drainage and alleviate flooding. However, they were established a long time ago with incremental expansion so that the current system does not meet the demand of the current population (Global Future Cities Programme 2018).

As data about the drainage system is not reliable and sometimes not existent, as documents have been lost or damaged, its management is a challenging task. The status of drains – such as the width and altitude and sometimes location – is sometimes not known (Global Future Cities Programme 2018). Urban growth has also impacted on the quality and capacity of canals which is not always documented. Therefore, a database of the current system is urgently needed to understand current capacity, and to plan for the expansion of the drainage system.

To respond to these issues Ho Chi Minh City is implementing a project to establish a digital database of the drainage system based on GIS software (Geographic Information System) (UK Department for International Trade 2021). Project stakeholders for the GIS database include: the HCMC Department of Construction, the FCDO Global Future Cities Programme, the Department of Transport, the Department of Rural Development, the Steering Centre for Flood Control, the Department of Natural Resources and Environment, and the Central Committee for Flood and Storm Control (UK Department for International Trade 2021).

Having a database for the whole city will provide a basis for expanding its drainage network and will also enable coordination and sharing of information across city departments and other stakeholders. This digitalised inventory allows to understand maintenance requirements and can also serve as a base to develop further responses to flooding and the increased risk of flooding due to climate change, e.g. through retaining or developing green areas as retention areas. The increased knowledge can furthermore result in better land-use policies to mitigate the impact of flooding on the city

Smart and sustainable city opportunities:

Smart and sustainable cities respond to the challenges of rapid urbanisation and impacts of climate change. With the significance and ongoing development of technologies, the need for sustainable development and continuing urbanisation, adopting smart city approaches is a strategic need.

Vietnam has made good progress in this area, starting with Decision 950, supported by further resolutions and frameworks, and with many local initiatives. While the definition of what a smart and sustainable city is has become clearer in recent years with the adoption of the ITU definition in 2019, there is still a need for a clearer framework and vision at both national and local levels. This will allow smart city strategies to be utilised and leveraged for improving quality of life and respond to the SDGs urbanisation challenges and priorities, as well as climate change impacts and risks.

Structural opportunities include: focusing on overarching strategic priorities rather than immediate operational and financial gains (Vu & Hartley 2018), new governance models (including intersectoral collaborations between government, industry, academia, civil society), utilising multi-disciplinary, coordinated and scalable approaches, and moving beyond the 'quick and easy' implementation of some technologies without broader, long-term vision towards ongoing benefits, including capability and capital development.

There is a need for Vietnam specific standards and indicators for sustainable and smart cities

The opportunities listed above need to be underpinned by a system of national smart city standards and indicators, similar to standards that have been discussed in an Australian and international context (Standards Australia 2020; Cities Today 1017, BSI Group 2014), but also based on a contextual perspective relevant for Vietnam. Developing standards and indicators supported by guidelines for cities will assist in achieving practical, efficient, and contextually appropriate investments that align with the capital balance and conditions of each locality. This approach will also assist in decreasing the risk for corruption by preventing speculative investments. Furthermore, for private sector actors, standards and indicators provide guidance and certainty as to what is expected. An institutional mechanism for validating or evaluating smart and sustainable city outcomes would also be advantageous.

Understanding the benefits and impact of current smart and sustainable city initiatives is key for future development

To understand the impact of smart and sustainable city initiatives to date and their contribution to responding to urbanisation challenges and climate change risks, an evaluation of recent progress could be undertaken in Vietnam. Apart from understanding the achieved outcomes, this could also include lessons learned, the potential for transfer to other cities, and understanding and communicating benefits to potential investors that go beyond financial profit. So far, such a review has not been done, largely because most of Vietnam's smart city projects are quite recent. The evaluation could be undertaken by or in cooperation with universities and research institutes. This would assist in defining further standards for smart and sustainable cities and how their objectives and implementation can be improved so that they contribute to solving urban problems in Vietnam.

There is a need for a closer connection between smart and sustainable city initiatives, climate change responses and metropolitan and national urban policy

There is an opportunity to integrate smart and sustainable city policies more closely with Vietnam's National Climate Change Strategy and work towards SDG 11 "Sustainable Cities and Communities". Future smart and sustainable cities should focus on climate change resilience and mitigation. This includes risk prevention and mitigation strategies, such as storm-resistant housing, smart monitoring systems, and weather resilient infrastructure, as well as health care, transport coordination and modal shift, solar power, food safety, wastewater, open data, digital infrastructure and smart services for education. This could be brought together under the broader framework of a national urban policy (NUP). A focus area for responses to climate change impacts could be the Mekong Delta as it is impacted by rising sea levels and experiences issues with flooding and water supply. This has been acknowledged by the Vietnamese Government with Resolution 120/NP-CP on Sustainable and Climate-Resilient Development of the Mekong Delta in Vietnam in 2017.

In relation to national urban policy, the United Nations Habitat Program, which has a presence in Vietnam, has operated an extensive international programme of support for countries wishing to develop and enhance national-level urban policy. This includes extensive guidance documentation, capacity development and direct support with policy development (UN Habitat 2023).

The path forward will require development of government competence, governance structures and increased coordination

While foreign direct investment (FDI) drives some smart city initiatives, it's important to increase government competence in coordinating initiatives and stakeholders, citizen participation, e-government and urban planning. Improved governance and government transparency alongside increased engagement of citizens and NGOs will assist in further leveraging the opportunities of smart cities. While industry-led smart city initiatives will still play an important role in Vietnam, improved government competence and a strategic vision will provide a clearer framework for their development and implementation. Australian stakeholders could support this development of government competences through collaboration and supporting higher education and training pathways through university courses or the Vietnam-Australia Centre (VAC). Another opportunity is scenario and vision building with stakeholders to understand local situations and desired outcomes, as each city has different strengths and perspectives.

A well-defined legal framework is important to build trust in smart city technologies

The legal framework underpinning smart city projects is important. The Vietnam government is in the early stages of working on this, e.g., through laws on cyber information safety and cybersecurity (passed in 2015 and 2018, respectively) and clarifying the definition of what a smart city is. For example, official criteria or a smart city definition are not published in a legal normative document, and laws on personal data protection have not been published yet (Van Cuong 2022). A well-considered legal framework will be able to effectively respond to data privacy and cyber security concerns and breaches and increase trust in smart city technologies.

Bilateral university and research initiatives could assist in building capacity for future smart and sustainable city programs.

Vietnam has many universities and research institutions that can contribute to new and enhanced knowledge of smart and sustainable cities in Vietnam. There is value in developing a national overview of university and research institution capacity in smart and sustainable cities to identify current strengths and capacity building opportunities. This could include collaboration between Vietnamese and Australian institutions on joint research and capability development initiatives, options for undergraduate and postgraduate engagement and the development of a higher degree research training program. A detailed assessment of joint smart and sustainable cities research capacity could valuably inform future programs of engagement between Australia and Vietnam.

Conclusions and directions

Smart and sustainable city policies are likely to continue and amplify as prominent features of government efforts to manage and optimise urbanisation, and to respond to climate change risks and impacts, including in cities in Vietnam.

When carefully applied in both strategic and programmatic ways smart and sustainable city policies have potential to enhance the benefits of urbanisation while reducing the disadvantages of large populations in constrained urban settings. Given the breadth of what smart and sustainable city policies have encompassed there remains potential for further policy and program development about their application in policy priority areas, such as climate change response, infrastructure delivery, waste, water and energy management, transport planning and urban inclusion and participation. Thus, smart city policies can provide a framing for further planning and policy effort to achieve better urban outcomes.

There is value in understanding the potential linkages between smart and sustainable cities policies and programs in Vietnam and efforts in Australia. The Australian government has recently operated a Smart Cities and Suburbs program that has supported efforts to improve the application of digital technologies in urban management and to accelerate the digital transformation of urban systems and services. Some of this effort has involved the many private sector firms that are supplying such technologies to governments and other urban actors. Many of these projects have incorporated energy efficiency and sustainability dimensions, though have largely been at the local technological scale rather than systemically applied at metropolitan levels. Another relevant program could be the 'Vietnam Aus4Skills' program led by the Australian Federal Government, which provides finance and further resources (DFAT 2022b).

Further scope is possible to consider the contribution that international collaborators can make to smart and sustainable cities in Vietnam. This could include capacity building for citizens, government leaders, NGOs, and academics, focusing on areas such as awareness, leadership, strategy, resource management skills, and digital competences, as well as providing expertise and support to government leaders in their journey towards developing smart and sustainable cities. RMIT University is a leading international university in Vietnam with extensive capability in smart and sustainable cities technology, design and social science across research and training. In mid-2023 RMIT launched a new Hanoi Industry and Innovation Hub that could serve as convener and space to collaborate on new initiatives. As an AVPI Founding Partner the University is well positioned to support local research and policy development that can inform Vietnam's approach to smart and sustainable cities implementation. Building linkages between RMIT researchers and colleagues in Australia and Vietnam. other Vietnamese universities, and the government and private sectors could support strengthened capacity for smart and sustainable city knowledge and action.

References

Albino, V.; Berardi, U., Dangelico, R.M. (2015) 'Smart cities: Definitions, dimensions, and performance. Journal of Urban Technology, 22(1), 1723-1738

ASEAN (2022) Smart City Planning Guidebook. ASEAN, Jakarta. Available: https://asean.org/wp-content/uploads/2022/06/ASEAN_SmartCityPlanningGuidebook_en_WEBSITE.pdf

ASEAN (2018) ASEAN Smart Cities Framework. ASEAN, Jakarta. Available: https://asean.org/asean-smart-cities-framework/

ASEAN Smart Cities Network https://asean.org/our-communities/asean-smart-cities-network/

BSI Group (2014) The Role of Standards in Smart Cities. BSI Group. Available at: https://www.bsigroup.com/LocalFiles/en-GB/smart-cities/resources/The-Role-of-Standards-in-Smart-Cities-Issue-2-August-2014.pdf

Catapult Future Cities (2017) Smart City Strategies – A global review. Catapult, London. Available: https://cp.catapult.org.uk/case-study/the-global-view-of-smart-city-strategies/

Cities Today (2017) How standards can assist the development of smart cities. Available at: https://cities-today.com/how-standards-can-assist-the-development-of-smart-cities/

Courtney Doagoo, B. (2022) Smart Cities in Asia: An Introductory Note. In: Phan, T., Damian, D. (eds) Smart Cities in Asia – Regulations, Problems, and Development. Springer, Singapore. https://doi.org/10.1007/978-981-19-1701-1_2

Damian, D. & Phan, T. (2022) Introduction to Smart Cities in Asia: Regulations, Problems, and Development In: Phan, T., Damian, D. (eds) Smart Cities in Asia – Regulations, Problems, and Development. Springer, Singapore. https://doi.org/10.1007/978-981-19-1701-1_1

DFAT (2021) Australia-Vietnam Enhanced Economic Engagement Strategy. Available at: https://www.dfat.gov.au/australia-vietnam/eees/en/strategy/overview.html

DFAT (2022a) 2021-22 Vietnam Development Program Progress Report. Available at: https://www.dfat.gov.au/publications/development/2021-22-vietnam-development-program-progress-report

DFAT (2022b) Vietnam Aus4Skills Fact Sheet. Available at: https://www.dfat.gov.au/about-us/publications/Pages/vietnam-aus4skills-fact-sheet

Do, Q. A.; Le, Q. H.; Nguyen, T. D.; Vu, V. A.; Tran, L. H.; Nguyen, C. T. T. (2021) Spatial Impact of Foreign Direct Investment on Poverty Reduction in Vietnam. Journal of Risk and Financial Management, 14(7), 292 https://doi.org/10.3390/jrfm14070292

Eckstein, D.; Künzel, V.; Schäfer, L. (2021) Global Climate Risk Index 2021. Germanwatch, Bonn. https://www.germanwatch.org/en/19777

Global Future Cities Programme (2018) Ho Chi Minh City - City Context Report. UN-Habitat, Nairobi, Kenya

Lan Huong, T. T.; Van Anh, D. T.; Dat, T. T.; Truong, D. D.; Tam, D. D. (2022) Disaster risk management system in Vietnam: progress and challenges. Heliyon, 8(10), e10701-e10701. https://doi.org/10.1016/j.heliyon.2022.e10701

IQ Air (2022) World Air Quality Report – Region and City PM 2.5 Ranking

Joo, Y-M; Tan, T-B (2020) Smart cities in Asia: an introduction. In Joo, Y-M; Tan, T-B (eds) Smart cities in Asia: governing development in the era of hyper-connectivity. Edward Elgar Publishing, Toronto

Lawnet (2022) Resolution No. 06-NQ/TW dated January 24, 2022 on planning, construction, management, and sustainable development of urban areas in Vietnam til 2030, with a vision toward 2045 [Translation from original Vietnamese]. Available: https://lawnet.vn/en/vb/Resolution-06-NQ-TW-2022-planning-and-construction-of-urban-areas-in-Vietnam-til-2030-7D46F.html

Leducq, D.; Scarwell, H-J. (2018) Smart cities in Vietnam: Between national implementation and metropolitan strengthening of Hanoi. Translated from French, L'Espace géographique Volume 47, Issue 4, 2018, 305-322

Ministry of Planning and Investment (2022) Report on foreign direct investment in 2022. Available at: https://www.mpi.gov.vn/en/Pages/tinbai.aspx?idTin=56367&idcm=122

OECD (2018) OECD Urban Policy Reviews: Viet Nam, OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264286191-en

Standards Australia (2020) Smart Cities Standards Roadmap. Standards Australia

Statista (2023) Number of inhabitants in Ho Chi Minh City in Vietnam from 2010 to 2021. Available at: https://www.statista.com/statistics/910960/vietnam-population-in-ho-chi-minh-city/

UK Department for International Trade (2021) Handbook: Vietnam Smart City - How technology and data are shaping the future of Vietnamese cities. Developed by Arup

UNDESA – United Nations, Department of Economic and Social Affairs, Population Division (2019). World Urbanization Prospects: The 2018 Revision (ST/ESA/SER.A/420). New York: United Nations.

UN-Habitat (2022) World Cities Report 2022 – Envisaging the Future of Cities. Nairobi: United Nations Human Settlements Programme.

UN-Habitat (2021) People-centered smart cities. Nairobi: United Nations Human Settlements Programme. Available: https://unhabitat.org/programme/people-centered-smart-cities.

UN-Habitat & Cities Alliance (2014). The Evolution of National Urban Policies: A Global Overview. Nairobi: United Nations Human Settlements Programme.

UN-Habitat (2018) Country Case Study: Viet Nam, Mainstreaming Climate Change into Urban-Related Policies - Background of Climate Change and Urbanization in Viet Nam. https://fukuoka.unhabitat.org/en/programme-articles/2836/

UN Habitat (2023) National Urban Policy Platform; Available under: https://urbanpolicyplatform.org/national-urban-policy/; Last accessed 31 May 2023.

United Nations (2023) Sustainable Development Goals. Available under: https://www.un.org/sustainabledevelopment/ . Last accessed 28/03/2023.

United Nations (2018) World Urbanization Prospects: The 2018 Revision. United Nations: Department of Economic and Social Affairs, Population Division.

United Nations Economic Commission for Europe (2021) Sustainable smart cities. Available: https://unece.org/housing/sustainable-smart-cities.

Van Cuong, N. (2022) The Emerging Legal Framework for Smart Cities in Vietnam in Phan, T. & Damian, D. (eds) Smart Cities in Asia - Regulations, Problems, and Development. Springer, Singapore. https://doi.org/10.1007/978-981-19-1701-1_7

Vu, K.; Hartley, K. (2018) Promoting smart cities in developing countries: Policy insights from Vietnam. Telecommunications Policy 42 (2018) 845–859.

Woetzel, J.; Pinner, D.; Samandari, H.; Engel, H.; Krishnan, M.; Boland, B.; Cooper, P. (2020) Can coastal cities turn the tide on rising flood risk, Case study. McKinsey Global Institute.

World Urban Forum (2022) Implementation of National Urban Policy (NUP) with smart city strategies: country experiences and innovative demonstration projects. https://wuf.unhabitat.org/event/implementation-national-urban-policynup-smart-city-strategies-country-experiences-and

World Bank (2022a): Urban development. https://www.worldbank.org/en/topic/urbandevelopment/overview#:~:text=With%20more%20than%2080%25%20of,and%20new%20ideas%20to%20emerge

World Bank (2022b) Vietnam – Country and Climate Development Report. Available at: https://www.worldbank.org/en/country/vietnam/brief/key-highlights-country-climate-and-development-report-for-vietnam

World Bank (2023a) World Bank Open data. Available at: https://data.worldbank.org/

World Bank (2023b) Taking Stock March 2023 – Harnessing the potential of the services sector for growth. Available at: https://www.worldbank.org/en/country/vietnam/publication/taking-stock-vietnam-economic-update-march-2023

Images

Aldarinho, Ho Chi Minh, Vietnam - January 31, 2018: View of street as people pass by in the night city. Photograph. Shutterstock. Wed 14 June 2023.

CravenA, Ho Chi Minh city, Vietnam - 17 Dec 2021: Worker working on a construction site in Saigon, Vietnam.

Photograph. Shutterstock. Wed 14 June 2023.

Jet de la Cruz/Unsplash, Tony Pham/Unsplash, Andrew Hoang/Unsplash, Suzie Kim/Unsplash, Tuan Nguy N Minh/Unsplash, Zibik/Unsplash, Chou Vu/Unsplash, Miquel Henriques/Unsplash, Ngan Huynh/Unsplash,

Maples Images, Vietnam, Da Nang, December 23, 2020: Eco architecture. Green cafe with hydroponic plants on the facade. Ecology and green living in city, urban environment concept. Modern building covered green plant. Photograph. Shutterstock. Wed 14 June 2023.

Paul Evan Green, Aerial map panorama of Phu My Hung district of Ho Chi Minh City, Vietnam featuring canal and tennis courts on sunny clear day. Can be horizontal or vertical. Photograph. Shutterstock. Wed 14 June 2023.

RMIT Vietnam, Innovation Hub. Photograph. Shutterstock. Wed 14 June 2023.

Vietnam Stock Images, Smart city and wireless communication. Photograph. Shutterstock. Wed 14 June 2023.

Yulia Rozanova/Pexels, Le n Thien/Pexels, Hong Son/Pexels

Acknowledgements

The Australia Vietnam Policy Institute acknowledges the support of the Australian Department of Foreign Affairs and Trade (DFAT).

Creative Commons Licence:

RAPPORTEUR

WRITERS:

Dr Annette Kroen

Research Fellow, Centre for Urban Research, School of Global, Urban and Social Studies, RMIT University

Hannah Badland

Director Social and Global Studies Centre, School of Global Urban and Social Studies, RMIT University

Professor Jago Dodson

Director, Centre for Urban Research, School of Global, Urban and Social Studies, RMIT University

Professor Andrew Butt

Associate Dean, Sustainabilty and Urban Planning Program, School of Global Urban and Social Studies, RMIT University