

Policy on the Application of Information Technology in Management and Operating Smart Urban Areas in Ho Chi Minh City

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ABSTRACT

Ho Chi Minh City (HCMC) has pursued a smart-city agenda since 2017 anchored in shared urban data, an Intelligent Operation Center (IOC), open data, and digital public services. This article systematizes Vietnam's national policy stack that enables smart-city IT (digital government strategy, data-sharing and personal-data regulations, cybersecurity, electronic transactions, telecommunications) and maps it to HCMC's institutional architecture and flagship platforms. Using a policy-analysis framework that combines Technology–Organization–Environment (TOE) with international smart-city indicators (ITU/ISO), we assess progress, surface gaps (interoperability, data governance, privacy-by-design, capability and vendor lock-in risks), and propose a sequenced roadmap for HCMC to move from projectized pilots to an integrated, standards-based urban digital operating model. Contributions include (i) a consolidated view of Vietnam's enabling regulations for urban IT, (ii) a structured assessment of HCMC's smart-city instruments, and (iii) actionable policy and implementation guidance consistent with global benchmarks.

Keywords: Smart city; digital government; data governance; Smart urban; Ho Chi Minh City.

1. INTRODUCTION

Rapid urbanization and complex service demands have pushed HCMC to adopt information technology (IT) as a lever for urban management traffic, environment, planning, safety, and citizen services. The city's 2017–2020 plan (vision 2025) emphasized a shared data warehouse, open data, a simulation/forecasting center, and an IOC integrating multi-agency operations and citizen hotlines. This paper evaluates that policy architecture, aligns it with Vietnam's national digital-transformation policies, and proposes a pragmatic, standards-aligned roadmap for the next stage. In the process of building Ho Chi Minh City "to become a smart and creative urban area; have a good quality of life, civilization - modernity - love; rapid and sustainable development", on October 22, 2021, the People's Committee of Ho Chi Minh city issued Decision No. 6101/QĐ-UBND on approving the Project "Building smart urban areas, digital transformation in Ho Chi Minh city from 2021 to 2025", proactively coordinating and receiving enthusiastic support and guidance from units under Ho Chi Minh City departments and branches during the implementation of projects, information technology programs and projects, data connection, application of AI information technology solutions in management and operations, and combined with the development of regulations on management, connection, and data sharing Ho Chi Minh city's shared data warehouse (spatial and non-spatial) to ensure complete and accurate data for operations and decision-making for each department, and optimize the data retrieval process. data and speed up information processing, internal connection, serving the people, and forming a unified whole with the people as the "core" of smart urban development.

Ho Chi Minh city will focus resources on developing 08 urban areas :

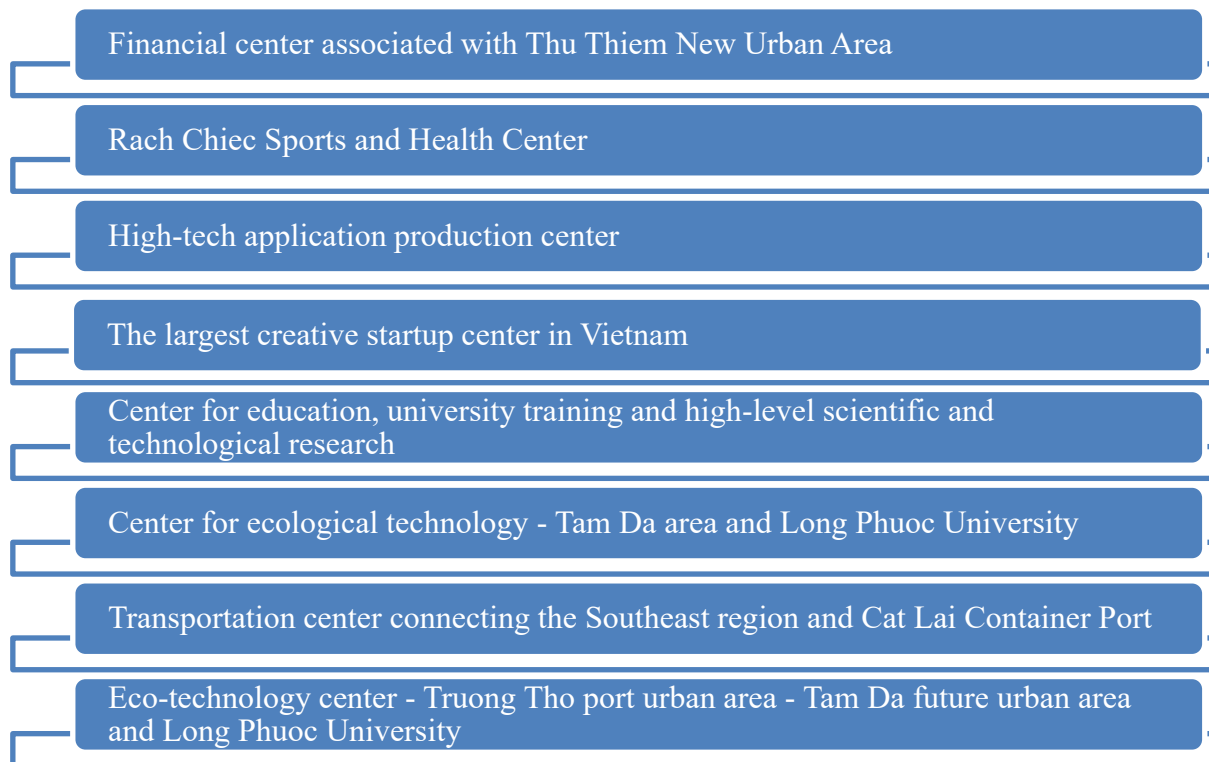


Figure 1: Current urban areas of Ho Chi Minh city

(Source: Ho Chi Minh city People's Committee, 2025)

2. CURRENT STATUS OF SMART URBAN CONSTRUCTION POLICY IN HO CHI MINH CITY

2.1. Overview of Ho Chi Minh city

Geographical location. Ho Chi Minh City has a natural area of about 2,095 km², with an estimated population of about 9.5 million people (in 2024). Administrative boundaries: North borders Binh Duong; Northwest borders Long An (Tay Ninh); East and Northeast borders Dong Nai; Southeast borders East Sea (Ba Ria-Vung Tau); West and Southwest borders Long An (Tien Giang); South borders the East Sea (Can Gio area).

Organizational structure. Ho Chi Minh City People's Committee currently has 15 specialized agencies according to the resolution of the City People's Council passed on July 1, 2025: Office of Ho Chi Minh City People's Committee; Department of Home Affairs; Department of Justice; Department of Finance; Department of Industry and Trade; Department of Health; Department of Food Safety; City Inspectorate; Department of Science & Technology; Department of Agriculture and Environment; Department of Construction; Department of Education & Training; Department of Tourism; Department of Culture & Sports; Department of Ethnic Minorities & Religions.

2.2. Steps to build a smart urban area in Ho Chi Minh city

Based on the smart urban architecture framework model, the components of Ho Chi Minh city's smart urban area are prioritized including: (1) IT infrastructure of the smart city; (2) E-government guides the formation of digital government; (3) Smart Urban Operations Center (IOC); (4) Shared data warehouse; (5) A system of smart software and applications across fields built on the infrastructure of smart cities.

Contributing to the National digital transformation and Ho Chi Minh City's digital transformation is the development of digital government, digital economy, and digital society. Continue to promote e-Government towards digital Government; Expanding the provision of smart online public services, helping to automate and shorten processing

time based on the application of big data technology, open data, artificial intelligence, and cloud computing. cloud and take advantage of social network channels to provide smart public services to people and businesses.

After 2 years of establishment, Ho Chi Minh city has built a smart urban framework with preliminary results such as:

** Smart urban infrastructure:*

Multi-service broadband telecommunications network (optical cable, 3G/4G/5G, urban Wifi...).

Internet of Things System: Traffic cameras, security cameras; Sensor systems, probes of control systems, monitoring urban and environmental activities...

IT infrastructure ensures the operations of IT systems including Data Centers; Integrated platforms, Big Data; WAN/LAN networks, and system to ensure information security and internal information portal;

Ho Chi Minh city currently has 14 servers that are regularly maintained and upgraded;

Ho Chi Minh city currently has 01 storage device with a capacity of more than 10TB (SAN) with the ability to store and restore data;

Centrally managed wifi system for the entire City People's Committee.

** Electronic government:*

Electronic office software combines a module to create a storage database, weekly calendar, and monitor instructions.

100% of officials and civil servants handle paperless documents.

1,661 digital signatures were issued to civil servants and public employees.

Administrative record software, specialized operational software, providing electronic licenses in the fields of urban areas, construction, business household registration, food safety, etc.

Use 100% electronic receipts, online payments, and official postage

100% of people install and use the "Ho Chi Minh city" application, an interactive channel between the city government and people and businesses, assigning tasks to officials and civil servants.

Online meeting system;

One-stop, interconnected software.

** IOC Smart Urban Operation Center:*

Building a Dashboard to display general information across fields, serving the direction and administration of the City People's Committee Leaders in 10 fields.

Integrate and set up security and traffic camera systems with smart recognition and warning features with pilot features: Face recognition, blacklist warning; Capture license plates, count vehicle traffic; Trace vehicle license plates; Detect red light violations and trace; Identifying crowds, identifying fights, entering restricted areas.

** System of basic smart software and applications meets some management needs in Ho Chi Minh city:*

Application group serving the activities of the Propaganda Department of Ho Chi Minh city Party Committee

Application of e-Handbook "Studying and Following Ho Chi Minh's Ideology, ethics, and Style": 100% of party members (24,000 party members of Ho Chi Minh city Party Committee).

Common system group for all fields:

Geographic information system (GIS): has 73 main data layer groups and 300 detailed data layers that create a background data frame for data integration and sharing.

Group of application systems related to urban areas and resources

Ho Chi Minh city online construction permit application: 100% electronic construction permits.

Construction permit planning map: 100% of people view planning information, and 100% provide planning information online.

Issuing house numbers and road digging permits 100% online services provided.

Building technical infrastructure software: created a database on 10 data layers; With a total object mass of 1,034, the total number of attribute information fields is 13,628.

Station software automatically measures water levels and forecasts weather in Ho Chi Minh city (app "Saigon Weather"): real-time warnings at 21 locations installed in Ho Chi Minh city with Features: high tide forecast, rain forecast, AI flood forecast; forecast newsletter statistics.

Compensation management system, land recovery, project implementation: more than 600 projects.

Group of application systems in the field of culture and society:

Religious digital map: 284 religious establishments and 154 belief establishments.

Related applications to build smart education: Integrating primary school database: 67 schools; preschool: 530 schools; Secondary school: 44 schools; Building a digital learning resource warehouse that allows teachers to issue and publishers to post academic badges to support parents and students in the learning process.

Private medical management application: 14 general clinics; 430 specialized clinics; 952 pharmacies; 46 traditional medicine clinics; 05 medical service facilities.

Ho Chi Minh city tourism portal: set up tours, discovery itineraries, tourist attractions...

Digital maps, 3D data in tourism, religion, beliefs: 45 tourist destinations, religions, beliefs.

Initiative management application: track 03 innovation awards, initiatives from the authority of Ho Chi Minh City, the authority of Ho Chi Minh city People's Committee with several 5,000 (each year about nearly 1,700 initiatives), Manage initiatives proposed for recognition at the Ho Chi Minh City level, from the Ho Chi Minh city initiative to annually select outstanding creative models to participate in the Ho Chi Minh city innovation award.

Group of applications serving the security, order, and internal affairs:

Smart Camera: 58 smart cameras and 3,523 surveillance cameras

Administrative sentence management application: 800 Administrative judgments.

Application for sanctioning administrative violations: 11,598 decisions issued (Central, Ho Chi Minh City, and Ho Chi Minh city).

** Shared data warehouse:*

Digitize records and documents.

The urban database is focused on the GIS platform and expanded to the remaining fields (spatial and non-spatial).

Database of people, civil status, tax, and business registration.

Integrate specialized databases from Ho Chi Minh City departments and branches

Open database.

Ho Chi Minh city is building an information data system framework in the area, identified as a key, necessary, and useful task, bringing many benefits to the government, businesses, and people in improving the quality of information. improve the efficiency of urban management and governance, provide and share management information to agencies, organizations, businesses, and people who need to use it, creating a foundation for management agencies, Businesses can develop applications, provide services, create an interactive environment, connecting the government with people and businesses. Resolves several limitations and inadequacies such as data of industries and fields being built, stored separately, scattered in management agencies, data in different formats, and inconsistent in content. Structurally, there is duplication of data information, the databases are not complete with relevant information and do not ensure quality and uniqueness for effective use.

The data system framework is integrated with Ho Chi Minh City's shared data warehouse to provide accurate and timely information to serve state management and connect specialized departments.

Data in Ho Chi Minh city is managed by specialized agencies, each department will be designed with its own repository and data system within the city's shared database system.

The information data system framework in Ho Chi Minh city is the foundation for building system theory, a model for forming a legal framework for related component projects to follow for effective support. for leaders and managers at all levels to view information, statistics, and reports to make quick and accurate decisions. Shorten the time to process documents, and provide quick information to people and businesses.

3. SMART URBAN OPERATION POLICY THROUGH THE APPLICATION OF AI CAMERA SYSTEMS TO MONITOR SECURITY AND ORDER

Cameras in Ho Chi Minh city are currently compiled from many camera sources with a large number of 3,523, however, the number of cameras lost connection is quite large, the existing cameras only have normal monitoring functions and there are still a few cameras with Applying smart technologies (AI) to serve management and administration. The types of cameras invested are not synchronized, of many different types, and only connected to the Ward Police headquarters. There is no centralized connection system to synchronize and share data to serve management and public works. direction and administration.

After Ho Chi Minh city was established, the natural area and population increased significantly to 211.56 km², with a population of more than 1.2 million people in many bordering areas such as District 1, District 1, Ho Chi Minh City. 4, District 7, District 12, Binh Thanh District; Binh Duong Province and Dong Nai Province. Ho Chi Minh city is identified as a key area where criminals from other localities blend into the city to hide and operate, and social evils arise and become increasingly complex. Regarding traffic order, with the rapid rate of urbanization, the flow of immigrants to the city to work, produce, and live is large, the traffic infrastructure has not been able to keep up, and the awareness of traffic participants is still low. Restrictions cause traffic order and safety in the city to always face congestion, local traffic jams, and traffic accidents. The use of conventional surveillance camera systems seems to be ineffective compared to the development of actual social needs of Ho Chi Minh city today. Instead, it is necessary to combine achievements and applications of artificial intelligence technology into surveillance camera systems, converting conventional surveillance camera systems into intelligent surveillance camera systems (AI cameras) that Analyze image and sound data, real-time monitoring, and situation forecasting to serve state management and direction in all fields.

The People's Committee of Ho Chi Minh city has gradually built an implementation roadmap to ensure that by 2027, there will be at least 780 cameras with AI information technology applications: The synthetic identification system is a processing system. Process and analyze data from video sources. The system supports processing thousands of video streams at the same time, analyzing, identifying, and understanding information in each video frame.

The system supports real-time processing and customization according to the different needs of each organization, allowing for immediate intervention and application of different measures depending on the specific situation for identification. license plates.

In 2022, to promote the application of science and technology in state administrative management, the People's Committee of Ho Chi Minh city has issued camera technical standards, and at the same time, deployed trial operations. 20 smart cameras; In 2025, the People's Committee of Tam Binh ward will be equipped with 35 smart cameras and the People's Committee of Hiep Binh Phuoc ward will be equipped with 03 smart cameras with the function of measuring traffic, recognizing license plates of vehicles moving on the route and Perform tracing on digital maps. By using and evaluating the basic system's effectiveness at the expected level, the model can be deployed and replicated.

Ho Chi Minh city People's Committee continues to improve the system in 3 phases, equipping 780 smart cameras to be installed at key locations for security and order, traffic safety, and gateways. in and out, bordering areas of Ho Chi Minh city, operating synchronously, data is centralized to the Intelligent Operation Center (IOC) and Ho Chi Minh city Police Image Monitoring Center; For the ward system, wards will be decentralized to monitor and process images of smart cameras in the ward area under their management. Implementation funding: Budget funding (phase 1: 17 billion, phase 2: 43 billion VND, phase 3: 45 billion VND and socialization funding).

- *Period 2023 - 2025*: install 80 smart cameras, of which 50 are newly installed cameras, 30 cameras are refurbished, converted into AI cameras from existing camera sources; Installed 250 cameras in the ward.

- *Period 2024 - 2026*: continue to invest in connection infrastructure and expand the capacity of the smart image analysis system to ensure data reception and analysis of about 430 smart cameras, of which: 80 smart cameras will be invested in by 2025 - 2025, receive an additional 250 standard cameras that the wards have equipped in the period 2025 - 2025 and 100 cameras invested in the period 2024 - 2026 invested by the People's Committee of Ho Chi Minh city (new investment of 60 cameras and 40 existing cameras to meet smart camera standards). Wards continue to mobilize to equip smart cameras to ensure 50% coverage on key local roads with 250 new cameras installed. The connection to the intelligent image analysis system will be carried out in the period 2025 - 2027.

- *Period 2025 - 2027*: continue to invest in connection infrastructure and expand the capacity of the Smart Image Analysis System to ensure data reception and analysis of about 780 smart cameras, including:

- + 430 cameras invested in the period 2024 - 2026. Receiving an additional 250 standard cameras that the wards have equipped in the period 2024 - 2026

- + Ho Chi Minh city People's Committee added 100 smart cameras (of which 50 new cameras were invested and connected about 50 cameras from other camera monitoring centers in the area such as the Hi-Tech Park camera monitoring center). , Saigon River Crossing Tunnel...)

Analytical data is centrally managed at the Ho Chi Minh city Intelligent Operations Center (IOC) and shared with the Ho Chi Minh city Police image monitoring center.

With pilot posting features, the following functions will also be combined and developed:

Complete license plate recognition function; Expand the information function of each identified object such as vehicle type, color, and license plate.

Crowd identification;

Identifying traffic violators; Character re-identification.

Find your way to the detection location (or from the detection location to another location on the map);

Search around the detection location (find combinations of different data types).

4. POLICY IMPLICATIONS FOR APPLYING INFORMATION TECHNOLOGY IN SMART URBAN MANAGEMENT AND OPERATION IN HO CHI MINH CITY

The People's Committees of 34 wards socialize cameras according to the recommended technical standards issued by the People's Committee of Ho Chi Minh city; Ho Chi Minh city People's Committee is equipped with software to integrate and analyze appropriate AI forms, serving the needs not only of security and order for the Police sector but also to meet the management of all agencies. the agency under Ho Chi Minh city. Research ways to install camera systems to increasingly ensure urban aesthetics through combining with technical infrastructure decentralized to the People's Committee of Ho Chi Minh city to manage; At the same time, combined with the use of unmanned aerial

vehicles (drones) to assist in catching criminals, digital data in all fields... gradually build a digital urban copy (digital twin).

To unify command, the People's Committee of Ho Chi Minh city established the Intelligent Operations Center (IOC) located at the headquarters of the People's Committee of Ho Chi Minh city with the highest level of authority, access all camera images in the system, regardless of security cameras, traffic monitoring cameras or social cameras with full features; For data retrieval from professional cameras under the management of Ho Chi Minh city Police, ensure compliance with regulations of the Ministry of Public Security and separate regulations prescribed by the City People's Committee.

Ho Chi Minh city Smart Urban Operating Center includes 10 components: General information; Economic - Social synthesis; Operating expenditure system; Executive document information; Social network information; Security and traffic cameras; Water level measuring station information; Geospatial data; Information reflects the scene; The system of socio-economic indicators is shared.

The Smart Urban Operations Center together with the Image Surveillance Center of Ho Chi Minh city Police implements decentralization, access rights, and control over the entire centralized surveillance camera system of the system... In case of necessity, for matters of an important nature, beyond the authority of specialized operating centers, city leaders at IOC can have full command and issue executive orders for all specialized operating centers to ensure the unified direction of the city. The smart urban operations center is also considered the brain of the smart surveillance camera system. In addition, the People's Committee of Ho Chi Minh city focuses on building a shared data framework and developing Ho Chi Minh city's open data ecosystem to have sufficient data to serve guidance, administer, and make decisions for the Leaders of the People's Committee of Ho Chi Minh city and help the Leaders of the units promptly grasp information for implementation.

5. CONCLUSION

Based on the overall ICT architecture framework to orient synchronization and sustainability in implementing smart urban construction to meet the special development needs of Ho Chi Minh city, ensuring active participation and initiative of all levels and local sectors, not the sole responsibility of any specific sector or agency.

Continuing efforts to improve and have many solutions to the current data problem which is quite fragmented and asynchronous, with each locality building inconsistently, the People's Committee of Ho Chi Minh city is researching the construction of a Warehouse. shared data for Ho Chi Minh city with the goal of 2030, forming a Data Warehouse integrating all data in Ho Chi Minh city, connecting Ho Chi Minh City's shared data warehouse, and sharing an Open data warehouse to serve people and businesses in Ho Chi Minh city and collect data from people and businesses to promptly have new, accurate data, promptly make decisions, and direct regulations. onion. Actively research and apply AI to access, extract, process, and create value for data, and support the construction of complete data warehouses, AI will make a major contribution to the development of smart urban areas in the Ho Chi Minh city.

The desire for Ho Chi Minh city to grow strongly, contribute more to Ho Chi Minh City and the whole country, and become an attractive destination for investors, is not only the desire of the Party and government. city rights but also the great wishes and expectations of all the people of the City as well as the whole country. Ho Chi Minh city hopes to continue to receive the attention and support from ministries, Ho Chi Minh city leaders, departments, branches, science and technology organizations, and experts in the construction process. Building and developing Ho Chi Minh city, especially the process of digital transformation, building digital government, and applying artificial intelligence towards improving the efficiency of public administration to serve people and businesses more and more. better./.

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