Smart-oriented urban development for urban administrative units and smart urban areas in the urbanization context of Vietnam

Nguyen Thi Lan Phuong[1], Dao Thi Nhu[2]*
[1]Urban Management Faculty, Hanoi Architectural University, Vietnam; phuongntl@hau.edu.vn (N.T.L.P.).
[2]Urban Department Agency, Ministry of Construction of Vietnam; nhuxd@yahoo.com (D.T.N.).

Abstract: In the context of rapid urbanization and increasing challenges to urban infrastructure and sustainability in Vietnam, this article aims to propose a context-appropriate, smart-oriented development approach for urban administrative units and urban development areas. Drawing from a comprehensive review of global smart city frameworks and the unique structural characteristics of Vietnamese urban areas, the study adopts a conceptual and policy analysis method to examine the feasibility and adaptation of smart urban models. The findings reveal fragmentation in Vietnam's smart city implementation, where technology-led approaches often overlook local governance capacities, infrastructure readiness, and spatial planning issues. The paper argues for a phased and locally tailored smart development strategy that aligns with the functional roles and growth stages of each urban unit. It emphasizes the need for balanced urban planning that integrates environmental protection, social equity, and economic efficiency. The study concludes that a data-driven, flexible smart urban system, embedded in local realities, can significantly enhance urban resilience and quality of life. Practically, the article offers a roadmap for Vietnamese cities to navigate smart development more effectively and sustainably, supporting evidence-based policymaking and strategic investment planning.

Keywords: *Smart city development, Smart city strategy, Smart urban governance, Sustainable urbanization, Urban administrative units, Urban planning in Vietnam, Vietnam smart cities.*

1. Introduction

The world's population is growing exponentially every year. By 2050, 85% of the world's population is expected to live in cities, which will also pose challenges in solving problems of supply, resources and pollution… It can be said that urban problems in the process of rapid and strong urbanization are becoming more and more complicated, requiring not only superior thinking and creativity but also the ability to grasp more sensitively, scientifically and accurately for urban development managers in the world as well as requiring the self-adaptability of cities through the ability to self-awareness, self-learning, self-adjustment, and self-suggestion of quick and timely solutions. Smart cities are a trend chosen by many countries and cities to meet development needs and join the flow of the 4th industrial revolution. With the advent of big data science, the internet of things connection has allowed to increase the speed and ability to process and analyze hundreds of thousands to millions of data at the same time to support decision-making in the most scientific way, creating conditions for urban solutions to become smarter.

Smart cities are not only a trend but also an expectation to solve complex problems in urban development today. Although it is in the early stages of implementing smart cities, some expectations are given: smart cities help increase resource efficiency, rapid urban recovery, and the ability to increase utilities, improve the quality of life of urban people and fast treatment solutions, etc timely situations in the process of urban development. Therefore, in the context of many changes, accepting the risk of

instability and risks, smart city development is also considered a way to move towards sustainable development.

Despite the potential for development, many experts are still afraid that smart city development can bring many risks, and may even fail to meet expectations if a satisfactory model is not put forward to solve the balance between environment, social justice and economic development. In the face of the risk of "attack" by investors and the trend of providing technological utilities, the orientation of smart city development is not only towards real benefits and welfare for people and the environment but also ensuring the promotion of urban economic development is still a difficult problem for cities and countries.

2. Orientation and Current Status of Smart City Development in Vietnam

In Vietnam, over the past time, the urbanization process has taken place with a rapid speed and strong intensity, creating great changes in socio-economic life in urban areas [1]. However, the evaluation of this process also shows that this is a rapid and hot process in the number and scale of urban land increasing faster than the rate of urban population, widespread urbanization. This situation has led to the consequence of reducing urban population density. In recent years, there has been a downward trend, causing many urban areas to fail to ensure the quality of technical and social infrastructure [1]. Urban development planning is an important tool with a role in guiding development, but many schemes are not keeping up with the volatile development of the market. In many urban areas, urban planning is often adjusted and suspended. This situation has affected the construction investment process, synchronizing construction quality, concentrating investment resources, etc. significantly affecting the quality of the city. Infrastructure in many urban areas has not met the basic needs of urban functions [2]. Not only overloaded in infrastructure and housing, but also overloaded in most other urban services such as transportation, health, education, etc. affecting not only the quality of urban activities but also the quality of life and accessibility of people... This is the context for the application of the smart city model in many Vietnamese cities.

The Prime Minister's Decision 950/QD-TTg on approving the Vietnam Sustainable Smart City Development Project for the period of 2018 - 2025 and orientation to 2030 has proposed 3 pillars and roadmaps for smart city development in Vietnam to 2025: urban area points, networks, and regions. The Decision also sets out a number of smart city development goals across the country: Period to 2020: Build a legal basis for smart city development, conduct investment preparation for pilot implementation at the urban area and urban area levels. Support at least 03 urban centers to approve the overall scheme on smart city development and organize the implementation of infrastructure investment and application development of smart city utilities; Support at least 03 new urban areas to be invested in the construction and pilot application of smart city solutions; Period to 2025: Implement phase 1 of the pilot development of smart cities., Pilot application of the decision-making support system in urban planning and the urban planning information lookup system in at least 3 urban centers of grade II or higher; Support at least 6 urban centers/6 economic regions to approve the overall scheme on smart city development and organize the implementation of smart urban utilities to serve urban residents; Orientation to 2030: Complete the pilot phase 1, gradually deploy replication by field and region, form a network of smart cities, capable of spreading. To form smart city chains in the North, Central, South and the Mekong Delta, taking Hanoi City, Ho Chi Minh City, Da Nang City, and Can Tho City as the nucleus, forming a network of smart cities. Resolution No. 06-NQ/TW dated January 24, 2022 of the Politburo on planning, construction, management and sustainable development of Vietnam's urban areas to 2030, the vision to 2045 has also determined a number of targets: Building a network of national and regional smart cities with international connections and 3-5 branded cities to be recognized at the regional and international level by 2030.

In order to realize these orientations, The Ministry of Construction has issued Official dispatch No. 6862/BXD-PTDT to the People's Committees of provinces and centrally-run cities on guidelines for applying the Smart Sustainable Urban Criteria Set version 1.0 for trial application until December 31,

2026. This set of criteria includes 17 groups of criteria with 60 specific criteria which is divided into 04 maturity levels. The criteria are mainly related to the application of technology in urban fields to increase the provision of urban services and utilities. Cities are required to meet urban quality according to urban type (stipulated in Resolution 1210/2016/UBTVQH13 [3] on urban classification and Resolution 26/2022/UBTVQH15 [4] amending Resolution 1210/2016/UBTVQH13) before refer to this set of criteria to choose smart appropriate direction for application.

Despite the initial policies, up to this point, the way to deploy smart cities is still quite vague, especially when the technology factor is pushed up by the market. Most of the local smart city construction plans are researched and implemented. Large cities have initially identified smart priority pillars. But small cities have not really proven the need for smart city development and offer pillars that are still spread out and even. Some general proposals such as: implementing digital transformation, e-government, establishing smart urban planning, smart integration into urban planning. Many cities have made smart city deployment plans but not shown the smart characteristics of the locality, so most of them choose smart fields... Although in reality they may not necessarily be smart in the "usual/popular" way and resemble other smart cities in particular. Implementing the development of smart cities, most of them are in the stage of building urban databases, digital transformation in industries and fields, including building information control centers and promoting e-government. Projects led by private investors are mainly using the provision of smart city utilities, causing a misunderstanding for many cities that smart cities are only the application of technologies to change, upgrade and improve some urban utilities, etc uphold technology and underestimate the role of urban platforms such as synchronous urban planning and construction, creating good urban infrastructure. This causes a phenomenon of "overreach" or being smart wherever you go. Smart becomes more of a trend/fad than a real contribution to cities and sustainable development.

In above context, we need to consider a smart urban approach and smart orientation proposal that is suitable for Vietnam's urban characteristics.

3. Applying The "Smart City" Model to Smart-Oriented Urban Development in Vietnam (Reconsidering the Concepts of Smart Administrative Units and Smart Urban Areas)

3.1. Characteristics of Vietnamese Urban Areas: Urban Areas and Administrative Urban Units

3.1.1. The Quality of Urban Infrastructure Is Still Limited Due to the Rapid Urbanization Process in Recent Times

Urbanization in Vietnam in recent times has been assessed as a process with many positive points that rapidly change the urban landscape as well as contribute to the development of the urban economy. Urban areas have become the driving force for economic and cultural development of the country and the region. However, rapid and hot urbanization has also left many consequences, including the lack of urban technical infrastructure to complete the urban infrastructure system in a synchronous, systematic and highly connected manner. In urban areas, traffic congestion, local flooding, waste, housing pressure, etc. are very common phenomena, especially in large cities such as Hanoi, Ho Chi Minh City, Hai Phong. Vietnam is also one of the countries heavily affected by climate change, so in recent years the impacts of climate change and unforeseen risks have also aggravated some urban infrastructure works. To guide the construction of better-quality urban areas, Vietnam's urban classification system has set out criteria and standards for urban areas of different sizes and characteristics. However, currently, the need to renovate and improve urban areas to complete urban infrastructure is being set as major national goals [5].

3.1.2. Urban Classification

Vietnam's urban administrative units (hereinafter referred to as urban unit) are classified based on groups of standards and criteria on the role and location of urban centers; population size and density; the rate of non-agricultural labor; the quality of urban infrastructure. Resolution

1210/2016/UBTVQH13 [3] on urban classification and Resolution 26/2022/UBTVQH15 [4] amending Resolution 1210/2016/UBTVQH13 providing a system of urban classification standards and criteria in Vietnam. Resolution 1211/2016/UBTVQH13 [6] on urban administrative units and Resolution No. 27/2022/UBTVQH15 [7] amending Resolution 1211 detailing the classification of urban administrative units. In which, urban areas are divided into 6 types from types V to I and special types. The special urban type is an urban areas with the role of a capital or a national, international general center in terms of economy, large-scale with a population of 5 million while type V is an administrative center or district-level general center or district-level specialized center with a population of about 4,000 people. These cities have different growth opportunities and different requirements to solve the growth problem.

The classified urban characteristic shows that Vietnam's urban development management is focusing on building urban quality on infrastructure, landscape, and urban environment corresponding to different urban roles and scales. The scale of the urban area (population, population density) is one of the important criteria that greatly affects the characteristics of urban roles and infrastructure. However, this classification and characterization process has caused some limitations in current urban development. To meet the conditions for urban classification, many localities have expanded the area of urban areas to meet the requirements for population size, leading to many urban areas being over-expanded, urban areas developing more widely than necessary and manageable, even adjacent urban areas can merge together and change the urban structure, spatial organization and lose the space of green belts, agricultural belts, and the specific structure of Vietnamese urban areas. Therefore, in the perspective on smart cities applied to urban administrative units, it is necessary to raise the issue of controlling urban development areas and urban scale to ensure efficiency, balancing environmental - economic - social benefits.

Table 1.
Some urban indicators according to Resolution 1210/2016/UBTVQH13 [3]

Urban classification		Population size		Population density (person/km2)		Non-farm labor rate	
		Urban-wide	Inner city	Urban-wide	Inner city	Urban-wide	Inner city
Special class		5.000.000	3.000.000	3.000	12.000	70%	90%
Class I	(belongs to centrally - governed city)	1.000.000	500.000	2.000	10.000	65%	85%
	(belongs to Provincial)	500.000	200.000				
Class II		200.000	100.000	1.800	8.000	65%	80%
Class III		100.000	50.000	1.400	7.000	60%	75%
Class IV		50.000	20.000 (if any)	1.200	6.000	55%	70%
Class V		4.000		1.000	5.000	55%	

3.1.3. Core-Suburban Structure Within In Urban Administrative Unit

One of the difficulties in applying the smart city model in Vietnam is the difference in understanding the nature of urban areas. In fact, different terms exist "smart city" and "smart urban areas". Cities in the world are often created from 100% urbanized areas. However, in Vietnam, urban administrative units (centrally-run cities, provincial cities, and towns) do not have a 100% urbanization rate. According to regulations (Resolution 1211/2016/UBTVQH13 of the National Assembly Standing Committee [6] on administrative unit standards and classification of administrative units), centrally-run cities have an inner-city area (100% urbanized) of over 60% of district-level administrative units (including rural and urban administrative area); for cities directly under centrally-run cities and provincial cities, the urbanization rate is about over 65%, for towns it is over 50%. This means that there is a rural part in the urban administrative unit. Regarding spatial organization, in an urban administrative unit there are both inner city (urban core - high population density) and outer city (peripheral area - low density),

these two components create the typical urban structure of Vietnam. Therefore, when talking about the orientation of smart city development for urban administrative units with distinct characteristics, it is necessary to consider the overall smartness for the administrative unit and the partial smartness for urban development areas (high density and typical urban characteristics).

3.2. Building an Approach to Smart-Oriented Urban Development
* Approaching the nature and goals of smart city model in the world, apply for smart urban units and and smart urban areas

There is no formal concept of smart cities, and the concepts are constantly being adjusted and considered in the local context over time, we can study the general ideas of smart cities as follows:

Giffinger, et al. [8] built a smart city perspective based on a number of urban characteristics, which identified 6 areas of concern for smart cities: governance, economy, mobility, people, environment and life. Leydesdorff and Deakin [9] looked at the Triple-Helix model of smart cities that promote local government collaboration, academic leadership, and industry wealth. Lombardi, et al. [10] describes smart cities using the Triple-Helix model with an emphasis on the role of universities and research centers in creating innovation and patents. There is a consensus that smart cities are focused on improving/restoring the quality of urban life and using technology to solve the problems associated with population growth [11-13].

* Approaching the goals of smart cities

It can be seen that, although there are many views on smart cities, "smart city" concept is associated with the new capacity of urban areas with 100% urbanization to solve practical problems in response to the inevitable continuous growth and development of cities, meeting smart goals such as towards sustainability, in which special attention is paid to improving energy efficiency, reducing CO_2 emissions and responding to climate change (climate change), improving people's welfare. The smart city perspective is also related to the ability to connect different sectors of the city to create a synchronous and efficient operating system through interconnection and sharing of data such as management, economy, mobility, environment, energy, etc supply, health, security, among others, and thus allow to operate more efficiently and provide new and better services. In addition, cities with sufficient intellectual and institutional resources as well as well-developed infrastructure are called smart cities. Although there are many views on smart cities, the recommended application should be based on local characteristics and adjust the content accordingly.

* Approach to smart cities for administrative units and urban development areas in Vietnam

Based on the goals of smart cities and the nature of urban areas in Vietnam, it can be seen that the problem of smart-oriented urban development in Vietnam needs to study solutions to achieve the common goal of urban development that balances economic - social - environmental benefits while solving challenges in the process of urban development (building and constructing infrastructure, and meeting urban services and utilities). It is necessary to operate an effective integrated urban physical and non-physical urban system to increase urban capacity (depending on the requirements of scale, structure, urban model) to solve challenges in existing development and future growth development. Cities need systems that not only ensure urban infrastructure capacity (connectivity, resilience, circulation, efficient functionality) but also ensure the capacity to flexibly self-adjust in real time (sensing, self-learning, self-analysis, self-decision).

The smart unit/ urban areas can achieve its planned goals and roles, including (i) the ability to solve the problems that the existing city is facing and have the facilities in place or have a roadmap to ensure the capacity for the further development of the city; (ii) is equipped with new and flexible capacities such as the ability to learn and transform in some parts or the whole to adapt to changes at different scales (small scale is the ability to adapt to changing requirements in the daily activities of the city and large scale is the ability to adapt to major changes on an overall scale, with the ability to recover from risks); (ii) has the ability to build and construct a solid functional linkage system of physical and intangible objects. Accordingly, it ensures that urban areas, urban-related fields, and urban development-related

people (urban players, urban managers, urban people) will be coherently connected to each other to support information, data, and solutions that are systematic and comprehensive; Accordingly, it can be seen that urban data and technology applications will play a fundamental role in promoting and supplementing these functions for smart cities and smart urban areas.

* Approach to sustainable and effective balance of smart urban unit/urban areas

In the long term, urban areas (both urban administrative units and urban areas) should be ensured requirements of creating a living space that balances the benefits between environment - society – economy before is recognized as smart the balance in these aspects is shown as follows:

+ *Environment:* An efficient and balanced urban environment with natural resources, reflected in the organization of urban space and urban infrastructure system in balance with the requirement of maintaining green and natural spaces in the city (natural resources). Urban areas need to have enough green space and a developed infrastructure system to to meet the needs of residents and protect the environment. Cities need to use resources and energy efficiently to minimize negative impacts on the environment. This includes the development of urban models that are efficient in terms of land use such as compact cities, ecological cities, etc. encouraging works to use renewable energy, managing waste and emissions in urban areas, etc.

+ *Society:* Urban areas need to ensure sufficient space for community and social development activities in order to build community relations in urban areas, maintain urban vitality and civilized culture as well as ensure quality of life, ensure fair access in society to technical infrastructure works, etc social and urban services.

+ *Economy*: Assessed through the ability to control the planning and the process of effective construction investment in urban areas according to the plan to overcome the consequences caused by spread and non-planned investment. The balance between planning and investment implementation, as well as the link between planning and allocating resources to implement urban development will be the foundation for bringing economic efficiency in urban development.

Many studies show that, when urban size is moderate, above balance requirement can be achieved. Because at that time, the needs of the urban population are under control, the size of the space is moderate, it is very convenient to move from one place to another, there is no need to increase the number of motorized vehicles and therefore there will not be a need to use much fossil energy, harmful to the environment: With a moderate population size, people do not have too much dispute about living space as well as limit traffic jams, do not have to deal with large volumes of fast traffic, the road system does not need to be too wide, and people do not have much stress in living space as well as traffic and ect., However, in an appropriated space, the local economy will develop at a sufficient level to ensure mutual exchange, not expand too much to harm the environment with industrial production spaces... People living in these urban spaces are more socially attached to each other due to more interaction in living and traveling spaces. Human living space does not invade too much of nature's space and thus ensures balance with nature. The economy develops moderately so that there is no disparity between rich and poor and welfare is more equitable.

In the process of development, urban areas will continuously increase in size and load along with the process of urbanization of population and land, except in the case of war, the risk of urban growth stopping. Urbanization is inevitable [1]. If the process of urbanization occurs hot and uncontrollably, which can lead to the expansion of cities and create large cities, large metropolitan areas or large urban areas beyond administrative boundaries as well as beyond the ability to control and manage. The theory of urban economy holds that urban areas that take advantage of the concentration of population size, infrastructure conditions, construction, and production will have more advantages in investment, use and effective management [2]. However, if the concentration scale is too large, this advantage may gradually disappear and give way to damage. Cities that are too large are often more difficult to manage and are less considered a smart development model if they have to consume a lot of energy, increase investment and increase the cost of mobility as well as increase the problem of solving many problems that arise, especially the environment, and have many potential uncontrollable risks beyond capacity the

city's power. In addition, this urban area is also ineffective in management due to the increasing complexity of coordination between stakeholders to create a system of co-management and synchronous operation, taking a lot of costs and time to create compatible operating mechanisms. From there, it can make the city unable to promote its ability to solve the problem of coordination and build a synchronous system. Therefore, the current trend is to focus on cities that are more efficient in size (small, compact) to increase the advantage of fairness and balance between environment - society - economy.

In the world, there is the concept of "effective scale" of a city as a measure of calculation of the size of an urban area that is said to be effective. Accordingly, the effective scale of a city is the result of a trade-off between economic efficiency through urban agglomeration and urban population density [14-18]. City size can be considered inefficient when it makes people pay more for travel than they can afford to make. However, the scale of efficiency needs to be fully calculated in the overall problem with controlled aggregate incremental profits rather than just one target. Cities on scale efficiently - cities that grow their populations strongly beyond scale effectively tend to further reduce the overall efficiency of urban development. Figure 1 shows the relationship between urban population size and urban efficiency according to scale growth. Accordingly, the greatest effect corresponds to a certain and reasonable scale. When that level of scale is exceeded, urban efficiency decreases.
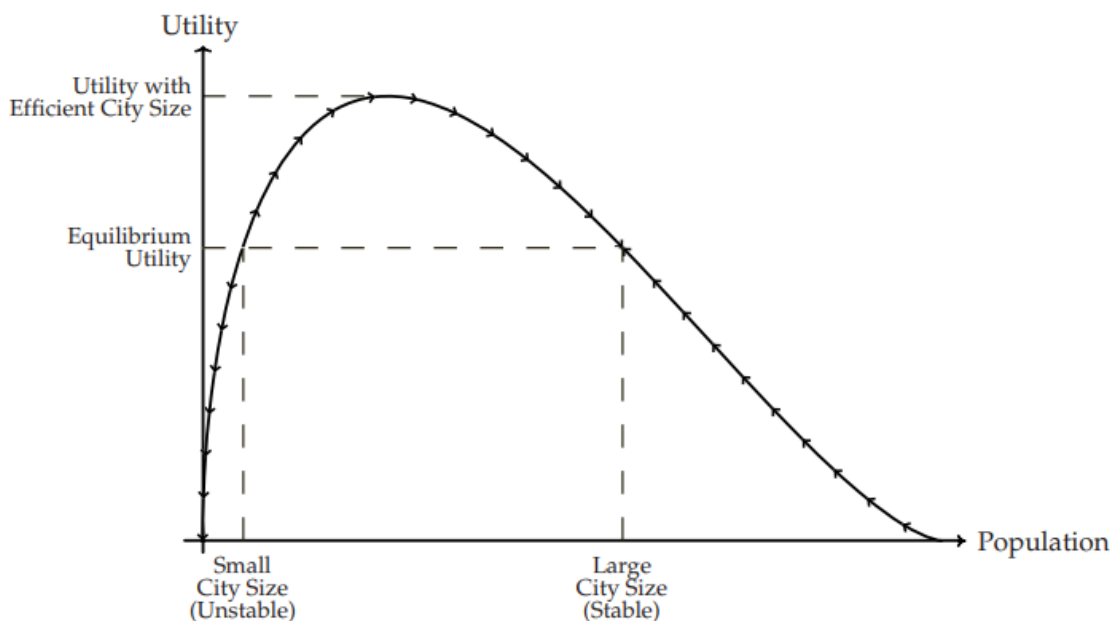

Figure-1.
Relationship between effective urban scale and population size.
Source: Duranton and Puga [14].

It is necessary to have a monitoring assessment of urban economic efficiency, social justice efficiency, environmental protection with the increase of urban size and urban population in order to make appropriate adjustments to the population size and spatial scale of urban areas, especially for urban centers that are the locomotive of economic development, playing the role of sub-regional, regional, and national centers... to be able to reasonably orient in the process of growth, increase load, pressure on urban areas.

4. Proposal on Smart-Oriented Urban Development for Urban Administrative Units and Smart Urban Areas Development in the Context of Vietnam

According to the characteristics of Vietnamese urban areas and the goals of global smart cities, the following proposals are made for smart-oriented urban development (both administrative units and urban development areas) in Vietnam.

* Proposal on the stages of smart-oriented urban development

The above Resolutions show that Vietnamese urban administrative units are classified and oriented to achieve development levels in accordance with their roles, positions, potentials and capabilities. This also needs to be inherited in the orientation of smart unit development. Accordingly, a smart unit must first of all be an operating city that ensures its functions according to its vision and mission, in accordance with its position in the system, advantages, needs and capabilities, and socio-economic conditions according to urban classification. Then, along with the growth and development of that unit, it is necessary to invest to create outstanding advantages on the basis of the available infrastructure to help the city strengthen its ability to manage and control complex problems along with the growth of the city. If the unit and its urban area do not have much changes (especially big changes that afect the urban nature), the unit and urban area can solve the functional problems with experiences of a stable cyclical nature. But when unit and urban areas develop to a certain extent with a lot of unpredictable fluctuations, traditional (which are caused by the pressure of population growth, population density complicates urban problems and) but simple experience cannot help much in the process of forecasting and orienting solutions with a longer vision and greater challenges. At that time, unit and urban areas need to be equipped with new capabilities, including the ability to self-regulate, self-learn, and self-make decisions on common problems or potential risks. These capabilities can be accelerated by the integration of data and technology in to their available physical system to increase the ability to "sense" "analyze data" "simulate" and "make decisions".

- Phase 1: To consolidate the foundations of urban functions by type of urban areas. Focus on completing and perfecting standards to ensure urban quality in a defined scale, ensuring a balance between environment - society - economy.

An urban area operates effectively when it has a harmonious guarantee of urban functions, balancing the protection and development needs of environmental-social-economic factors. Urban areas in this period need to periodically assess and review urban classification (according to Resolution 26/2022/UBTVQH15 [4]) to identify problems in development urban areas, detecting that the urban development criteria are still weak and lacking to make investment plans to improve and ensure standards.

During this period, urban areas/urban regions also need to prepare technology platforms in parallel, or "integrated technology systems" to not only support the improvement of service quality and urban utilities but also aim to build a scientific "system" of the city - a place to connect and implement links for sectors, fields and partners participating in urban development, as a basis to promote smart urban development in the growth stage. Urban areas also encourage the development of "basic smart components" such as smart buildings and smart urban areas to have practical lessons, preparing for appropriate replication throughout the administrative urban area, as follow:

+ Smart building: A smart building is a small-scale smart unit in a smart city/city. However, smart buildings can make a big difference, helping to control some of the city's problems to enhance amenities: Climate (ensuring comfortable temperatures in residential spaces); lighting (there is enough light to work and control to ensure light quality, save energy); energy (the ability to regulate and save energy during the day, which needs to be equal to consumption and costs); the ability to supply water to the room and water the plants; charging stations; data collection... In addition, by analyzing the historical data collected by the building, it can help the process of predicting the increase in demand for energy, the demand for equipment used, etc. in accordance with the living characteristics of residents

+ Development of smart new urban areas: The smart city development roadmap also determines from pilot to replication. From small to large-scale. Therefore, the application of smart urban areas is a

trend in Vietnam and many countries. In Vietnam, smart new urban area development projects have many advantages, but they often take place on the outskirts of cities. Developing a smart urban area model in this area can have advantages in applying smart solutions from the beginning, from the planning stage, to the application of 4.0 technology techniques to urban infrastructure systems, management, etc. to develop into a unified and complete smart urban area. However, it should be noted that this is a border area with specific characteristics: this area takes place an extremely rapid transition in space and time and often has little preparation, leading to a "chaotic" situation in development. The characteristics of the suburban area reflect the instability between the two areas - rural and urban, while this is an area that strongly attracts the working population to live and work to serve the inner city, changing land use, livelihood activities, use of resources and services while the area has not had a commensurate development investment in the rapid urban development. This area also does not have enough ecosystem of rural areas, as well as insufficient infrastructure ecosystem of urban areas. These gaps lead to a significant decline in community well-being (e.g., sanitation services). Therefore, in this context, it is necessary to consider to ensure the development of a smart urban development model in this area not only to solve high-quality urban accommodation but also to contribute to solving the harmonious relationship between the inner city and the suburban space.

- Phase 2: Supplementing outstanding advantages for existing functions and renewal functions of the city - Optimally solving the problem of urban growth

According to the development process, urban areas will continue to grow. Countries with strong urbanization show that they have gone through many different stages of urbanization, in which the period of accelerated urbanization has witnessed urban development in the direction of expansion, expansion and expansion due to strong urban development needs and limited development control. This is also a common period in countries that are in the process of strong urbanization such as Vietnam, especially in large cities where there is strong attraction and attraction, usually the functional center of the region, sub-region, and country, especially playing a role as a driving force for economic development. With great status and opportunities, these cities attract more population, export and investment activities in urban development are higher and stronger, so they also face more complex problems. Accompanying this phenomenon are limitations in urban quality, degradation in terms of infrastructure, lack of synchronous connectivity, low investment efficiency, intensive use of land resources, inefficiency in urban economic development due to sprawl and disco centration in investment, exploitation of urban resources... In particular, these cities also have to solve the problem of great challenges in ensuring a balance between economic factors - social security - environmental protection. Because economic interests always have a conflict with the other two interests. Economic interests are often driven by one group of people rather than the community as a whole, and it will be at odds with the welfare interests of the other group as well as that of the environment.

The Smart city model for cities in this period of strong growth needs to focus on solving more optimal problems in new development and redevelopment on the basis of existing land use, ensuring the growth capacity of the city in tandem with the balanced development of economic-environmental-social factors; consider the scale of urban expansion in accordance with infrastructure and management capacity. For urban areas with a strong urbanization process to form urbanized areas, it is necessary to study solutions to develop multi-polar models and apply TOD.

For urban areas in the growth phase, In-depth urbanization solutions need to be focused on. Cities need to have a proactive smart urban development strategy with smart pillars and corresponding smart criteria as a basis for investment and construction. This means that some basic urban indicators specified according to the corresponding urban type will be invested in and built by the city to reach the prescribed threshold and exceed the maximum prescribed threshold and add some specialized quality criteria to promote the selected smart pillars.

Proposals for smart integration compatible with urban structural components

As mentioned above, the spatial structure and management structure of Vietnam's urban administrative units often have two components: inner city and outer city (except towns), so when

considering the inclusion of smart elements in urban administrative units, it should be considered to separate areas as follows:

+ The entire smart administrative unit (this content is equivalent to smart city): it is necessary to consider the smartness in the overall development of the urban administrative unit, accordingly, this administrative unit needs to ensure land use, spatial structures and control the encroachment of urban development in restricted areas such as flood drainage zones, green belts, peripheral areas, rural areas within the urban administrative scope. The intelligence of urban administrative units must ensure effective scale for urban operation, with a development vision in a growth direction suitable to the cultural, economic and social characteristics of the locality.

+ Smart urban areas: are areas with clear urban characteristics.

In cases where existing urban areas still have many bottlenecks that hinder effective urban development such as traffic jams, flooding, lack of housing, green space, etc., the intelligence applied to this area is to complete the infrastructure conditions, develop appropriate urban renovation and beautification projects while integrating smart elements into the planning, construction and operation of the project.

In the case of an existing urban area that already has complete urban infrastructure that meets the quality requirements of the ward or district administrative unit specified in Resolution 1210 and Resolution 26: smart development for this area can focus on building and strengthening the smart system for urban fields (transportation infrastructure, education, health) in both physical aspects, connecting and integrating technological elements to increase the quality of urban services and utilities.

* Proposals on building urban physical systems and capacity systems "capable of flexible adjustment in real time".

A unit or a smart urban area can be a territory that does not necessarily based on or apply technology for the need to address challenges systematically when they themself always have stable development and stable control ability. At that time, if using much more equipment inappropriately, it can be a waste when these large investments are not really commensurate with the benefits, contribution to the urban available management system. However, for these kinds of urban areas, technology can be integrated into some areas or fields to enhance the ability to provide urban services and amenities. For the case of moderate-sized urban units, urban problems are not too stressful, these urban units should be equipped with a technical infrastructure platform capable of meeting the required unique functions (e.g., for tourist city: the transportation system, accommodation, restaurants, entertainment; for ecological city: the friendly transportation system, green residential spaces and open space networks...). The application of additional technology should be required only when the urban area has a large-scale growth in population and land development that exceeds the available infrastructure capacity. The application of technology is only necessary when there is a need to solve more complex urban problems and requires the calculation of large fluctuations.

5. Conclusions

In the context of development with many fluctuations and high risks today, smart urban development is expected to be the solution to be able to quickly respond to the needs of growth, develop towards sustainability as well as recover from shocks. However, it is necessary to consider the scope of application of smart cities in accordance with urban characteristics in Vietnam. The coming context is an opportunity for smart cities not only to be a new urban development model but also to become a solution that contributes to the change and strengthens the capacity of cities and urban systems, solving problems that are still ineffective. In order to promote the trend of smart cities, Vietnam's cities need to follow appropriate roadmaps and stages as well as need to be equipped with the necessary platforms to be ready to increase capacity in terms of both material and equipment, in which the capacity to handle urban problems is based on databases, multi-sectoral and multi-field work capacity to jointly make decisions for the common development goals of the city, for the welfare of the community, smart planning and smart urban development management.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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