



Sustainable Development of Shophouses in Hanoi's New Urban Areas towards Smart City Criteria

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Abstract: Developing sustainably and becoming a smart city is a long-term and strategic orientation of Hanoi. Shophouses, which are multi-function urban houses, converge many factors that strongly support sustainable development of Hanoi such as providing high quality residential areas; helping create diverse and lively communities, touristic attractiveness, conditions for sustainable management of resources and energy efficiency, etc. With various economic activities, shophouses also have lots of potentials in development towards smart cities such as lively and safe pedestrian zones, abilities to transform, local and supra-local accessibility, reasonable density of construction and population, etc. Analyses and studies show that in order to sustainably develop shophouses in new urban areas of Hanoi, it is necessary to solve existing problems of the constitutional system, the socio-economy, living space quality and management of the shophouse neighbourhoods. Notably, the criteria for smart city development are closely related to the above-mentioned issues. Proposals have been made based on studying the core values of shophouses and historical research of architecture in the Southeast Asia region. In addition to the proposals on improving the constitution and urban design solutions, the proposals on digitization of shophouse projects are submitted for the sustainable development towards smart cities development.

Keywords: Shophouse, sustainable shophouse development, new urban area, Hanoi, pedestrian zone, smart city

1. Introduction

1.1 History

In development history, traditional urban houses in Vietnam in particular, and in the world in general, have been playing an important economic role. They are used for economic activities, which are the activities of producing, buying, or selling products or services. The appearance of houses serving both as a residence and a commercial business in Southeast Asian countries from the 19th century onwards was determined to be related to the business activities of merchants from China (Lee & Distefano, 2016; Logan, 2000; Zwain & Bahauddin, 2017). In various research projects, this type of houses was called in different ways such as Chinese compartments, warehouses, blocks of huts, or shops.

The word 'shophouse' was first used by Cameron, a British Colonizer in Singapore in 1822 (Izumida 1990) (Tohiguchi & Chong, 2018). According to Izumida (1990), shophouses were more similar to European townhouses, rather than the Chinese traditional residences when considering the shape and the area occupied by shophouses.

From the middle of the 19th century, shophouses began to appear in crowded trading places in southern China, especially Hong Kong and some other places in Southeast Asia such as Singapore, Penang (Malaysia), Bangkok (Thailand), Hoi An and Hanoi (Vietnam). The development of commerce and rapid increase in population in those limited area of land have made shophouses become a popular housing type (Lee & Distefano, 2016; Zwain & Bahauddin, 2017).

A typical shophouse is basically a long structure with a narrow street frontage. In the late 19th century, shophouses in Hong Kong and Malay Peninsula normally had two or three floors, whereas until the 20th century, shophouses in Hanoi were rarely with more than two floors (Logan, 2000).

The development of shophouses in Hanoi from the 19th century until World War II was associated with the development of the Old Quarters. In many cases, a shophouse was not only a place to live and do business, but also to produce local special products. Thanks to the robust economic development, the houses have been transformed from “simple ones for middle-income families” into “a more complicated housing structure” for the well-off community with featured cultural life.

1.2 The Development of Shophouse in Hanoi’s New Urban Areas

Since 1986, when Vietnam began its economic reform under the Doi Moi policy, individuals and the private sector have been allowed to take part in resolving housing problems. As a result, a type of incredibly long and narrow townhouses became popular throughout Vietnamese cities. These street townhouses, also known as “tube” houses, had some shophouse’ features when they had both residential and commercial functions. However, those features of townhouses were not typical and not stable due to the following reasons:

- Street townhouses are designed to maximize benefits of their positions, which trigger rapid changing possibilities.
- In many cases, they did not have residential functions (used as commercial or office space).
- The architecture of townhouses in these urban areas is usually not unified.

Since 2005, a new type of shophouses has appeared in some new real estate projects of Hanoi. There are significant differences between new urban areas’ shophouses and Hanoi Old Quarters’ ones.

Table 1 - Comparison between shophouses in the new urban area and the Hanoi Old Quarters

	Shophouses in Hanoi Old Quarters	Shophouses in new urban areas
Similarities	Able to create attractive streets and places.	
	Able to create neighbourhood reputation, attracting many local people and visitors; a variety of outdoor activities can be organized.	
	Able to form communities with a certain connection in both daily life and business.	
	Prices of real estate and the prosperity of the community depend on the results of the business activities.	
Differences	The community and its members participate in management on a consensus basis.	Managed and operated by professional organizations.
	Shophouse streets formed gradually based on business growth.	Shophouse streets formed quickly by real estate development projects.
	Community is often formed concurrently with the formation of the shophouse neighbourhoods.	Community is often formed after the homebuyers’ living and businesses have gradually stabilized.
	The architecture of shophouse streets is often diverse and changes over time. Sometimes construction or renovation may cause the inconvenience.	Due to the regulations, the street architecture is very tidy. The diversity of spaces can be achieved by personalizing of landscapes and facade details.
	The streets are interwoven, connected together in the form of chess boards and formed spontaneously.	Shophouse streets usually are located on central axes, based on the urban design intention of the real estate development projects.
	It is the home of large families, often for many generations.	It is a place for living and doing business of high-income families.
	Lack of investment in infrastructure (It is very expensive for the reconstruction).	The infrastructure systems are fully invested, synchronized, managed and

Shophouses in Hanoi Old Quarters	Shophouses in new urban areas
	operated professionally.
Lack of space for trees and landscapes. However, many initiatives have been put in place to decorate the street spaces. Hanging lanterns is one of the good examples.	Landscape areas are designed and constructed with high quality.
Very high construction and population density lead to many traffic and environmental problems.	Construction and population density are regulated so the living spaces are of high quality.
Local identity is well known for narrow and crowded streets with small but lively shops.	New shophouse streets give luxurious feelings but lack the identity in many cases. Real estate developers have been looking for solutions to this problem.

Similar characteristics show that the new types of shophouses improve and promote the advantages of shophouses. At the same time, they have adapted to nowadays urban conditions in several aspects, distinguishing them from shophouses in Hanoi’s Old Quarters. That means the new type of shophouses can become one of the solutions to Hanoi’s sustainable urban development.

1.3 International Experience in Sustainable Shophouse Development

In Southeast Asia, this is a popular housing type, which has potential for development and it is seen as a model for sustainable urban environments because (Aranha, 2013):

- It is one type of traditional urban dwellings
- Shophouse streets help to reduce the disadvantages of large-scale and high-rise housing projects which are impersonal, monotonous and boring, lack of spaces for individual expressions, expansions or personalization.
- In Southeast Asia where mixed-use urban settlements have been the tradition for generations, commercial and residential activities usually coexist together in the same building—the shophouse.
- Shophouse neighbourhoods are lively communities that present distinctive characters of the cities.

The fact that, many shophouse neighbourhoods have existed and have been developed for hundreds of years in many Southeast Asian cities, is a convincing testament to the sustainability of this type of housing. There have been many studies to learn about the advantages of the shophouses in its history to find ways to inherit those values.

Analyses of the traditional courtyard architecture of eclectic style shophouses in George Town, Penang, Malaysia showed that the spatial organizations and linkages should be preserved (Zwain & Bahauddin, 2017).

Researches on the reuse of shophouse architectural heritages by converting them into hotels in Singapore have shown how the shophouse vernaculars can provide a platform for the honor of Singaporean identity by new boutique hoteliers (Chang & Teo, 2009).

Shophouses also play an active role in the formation of residential areas in the cities and in urban planning. Researches on shophouses in Southeast Asia have shown that they share the universality of mix-use housings in urban dwellings and they have also developed their own characteristics over time in specific situations. Any future planning of urban housing in this region therefore should take the traditions of shophouses into consideration (Tohiguchi & Chong, 2018).

2. Problems in Shophouse Development

2.1 Legal Aspect

Up to now, there has not been a term “shophouse” in Vietnam’s laws. Shophouses and shophouse streets have been regulated as townhouses, ignoring significant differences in their functions and roles in urban planning. Therefore, real estate projects on shophouses are applying laws and regulations with many unclear and inconsistent points (Huong, 2018). The points, where the laws have not properly regulated, and its possible problems are summarized in Table 2.

Table 2 - Lack of regulations and possible risks

No specific provisions in the law	Current practices with potential problems	Legal risks for buyers
Definition of shophouses	Applying for 1 st floor of some apartment buildings.	- Been licensed for 50 years (usually permanent for shophouses). - Unable to be used as residences with permanent registration.
	The name on the marketing information does not match the name on the project legal documents.	- The ambiguities of legal and actual values of real estate products. - Risks to the future values of real estate products when new law provisions are provided.
Two functions at the same time are residence and business, including accommodation services	Only residential function (to reduce infrastructure requirements for the project).	- Accommodation services and some other businesses are not allowed. - Infrastructure of the urban areas, including entrance and parking, is incomplete to serve as real shophouse streets.
	Business function only (to reduce population density for the project)	- Unable to be used as residences with permanent registration. - Lack of facilities for residence.
Minimum area, minimum width	There are cases where the area is less than 75 sqm or the house's width is less than 5m	Reduce quality of spatial organizing and design of shophouses.
Allow businesses in accommodation services	In some projects, investors commit to partially or fully sub-lease shophouses as accommodation services.	- The risk of being banned from accommodation services while this is one of the significant values of the shophouses.

On one hand, the shophouse development in new urban areas of Hanoi is based on real estate projects. On the other hand, in order to sustainably develop economy and culture, many new urban projects need this type of housing, considering shophouses as an attractive value. Therefore, the completion of laws and regulations for shophouses should be seriously taken into account.

2.2. Cultural and Social-Economic Aspects

If technical infrastructure systems and architectural buildings can be considered as hardware, then cultural life, habits and community awareness of the residents are regarded as software. The compatibility of software and hardware is an indispensable condition for sustainable development of the new urban area and its residential community. As mentioned above, in the new urban areas, the formation of cultural life takes place quickly, not gradually accumulated as in the Old Quarters of Hanoi.

To ensure good cultural life, habits and community awareness for residential communities, the regulations on new urban areas must be agreed and published. Dialogue mechanisms, monitoring measures and appropriate sanctions are needed for the effective implementation of these laws and regulations. The aforementioned measures can be developed on technology and security platform, which is part of a smart city.

Socio-economic problems, attached with culture, also required consideration. Shophouses in new urban areas have a very clear economic characteristic when clients always have expectations for the business efficiency of these “dual-function” houses. At the same time, the price of shophouses is often very high due to the convergence of such factors as: street front, prime location and convenient traffic, synchronous landscape and infrastructure. These factors create economic pressures for individual homeowners as well as for the whole community. It is a pressure to create a flexible and diverse community in providing the most attractive products and services and in building and preserving the reputation of the neighbourhoods. On the contrary, it is also the economic pressure that requires shophouse neighbourhoods to accept diversified services and attract most customers.

2.3. Living Space Quality and Facilities Aspects

Shophouse is usually arranged along to the main composition axes, main connecting axis of the new urban area for the following reasons:

- Creating open and lively commercial spaces to attract visitors (not only local residents but also those of nearby urban areas).

- Maximizing the benefits of the shophouse neighbourhoods' location and connectivity.
- Providing more facilities for the new urban areas.

Thus, each shophouse neighbourhood has a role and great value for the new urban area and for the whole city of Hanoi. The success of the Hanoi Old Quarters' shophouses in creating the identity of Hanoi, creating many culturally rich destinations, attracting tourists is convincing evidence of the development of shophouse streets in new urban areas.

In order to accelerate the formation of the attractiveness of shophouse streets in new urban areas, it is necessary to invest in additional public spaces and facilities such as landscape spaces, pedestrian zones or pedestrian streets including utilities, parking areas, and public transport connections. However, the investment in these facilities is facing following barriers:

- There are no appropriate incentive policies for the investment in public spaces and facilities. Currently, this investment is fully based on investors' vision and strategy.
- This investment is only effective with a large number of customers and visitors.

Solving these problems by increasing the density of the new urban areas will cause the overloading of the infrastructure systems. Therefore, one of the solutions is the application of digitalization to increase the number of visitors and shopping activities in shophouse streets.

Another existing issue that significantly affects the quality of spaces and utilities of the shophouse neighbourhoods is the organization of pedestrian zones and parking places. In many shophouse streets, pedestrian zones have not been completely and safely designed and constructed.

2.4. Management Aspect

Due to limited administrative tools, all problems in the management of shophouse neighbourhoods in new urban areas could not be solved effectively, therefore the opportunities for economic development could be missed. Professional organization and application of information and communication technology (ICT) are required to promote the management in the following issues:

- Management and use of common areas.
- Development of a data sharing system with appropriate security solutions.
- Management of traffic, parking and pedestrian zones (especially in the cases of flexible transformation between streets and pedestrian zones, for example on weekends).
- Management of environmental pollution and noise pollution.
- Transparency and cost optimization for management.

3. Sustainable Development of Shophouses

3.1 Theoretical and Practical Bases

Analyzing aspects of shophouses and shophouse streets provides us with theoretical bases for sustainable development of shophouses in the new urban areas of Hanoi.

Table 3 - Theoretical basis for sustainable development of shophouses

Supporting Sustainable Development Factors	Potential Solutions	Benefits
Morphology of shophouse and shophouses streets	<ul style="list-style-type: none"> - Designing shophouses with 2 open sides, separating accesses for the commercial part and the residential part. - Creating the best microclimate (inside and outside the house) based on the analysis of the house's orientations. 	<ul style="list-style-type: none"> - Private and high comfort levels for all floors. - Abilities to organize better transport and entrance. - Able to make use of the local climatic conditions.
Urban design	<ul style="list-style-type: none"> - Designing pedestrian zones 	<ul style="list-style-type: none"> - Adding landscape spaces. - More urban facilities can be integrated to increase urban-human interaction. - Possibility to create attractive outdoor shopping malls as well as commercial centres while ensuring social distance under the situation of Covid 19.

Supporting Sustainable Development Factors	Potential Solutions	Benefits
Cultural identity	- Allowing the community to engage in the design, management and operation of the shophouse neighbourhoods.	- Abilities to create spiritual places and connections for the residents. - Promoting the creativity of the residents and communities in managing and operating shophouse neighbourhoods, especially in organizing cultural activities.
Mixed-use buildings and urban areas	- Integrating more functions into urban spaces and buildings	- Creating urban service chains, upgrading utilities and quality of the living spaces. - Conditions to apply many ICT solutions, promoting digital economic development.

The practical basis for the shophouse sustainable development in new urban areas of Hanoi can be based on the results of various studies.

Shophouses accommodate and allow the coexistence of various types of people with their own identity, as well as various kinds of working spaces and retail businesses. The flexibility in adding, modifying or personalizing spaces can meet the needs of the families or communities (Aranha, 2013).

Pleasant environments and comfort outdoors can be improved through the reduction of heat and improvement of wind flow. The provision of canopies, vegetation shading, and green areas is beneficial as these decrease the impacts of solar radiation and ameliorate the evapotranspiration of plants and encourage convective ventilation. However, the characteristics of plants, the ratio and location of green areas in the settlements should be considered carefully. Additionally, the appropriate building patterns (road geometry and spacing) and density of dwelling blocks can contribute to the cooling effects by allowing/encouraging air movement or by changing/manipulating the directions of prevailing winds passing through the urban layouts (Thanh & Pitts, 2020).

Creating microclimate comfort the insides and outsides of the shophouses is one of the most fundamental solutions for increasing energy efficiency. In addition, shophouses provide favorable conditions for renewable energies, especially rooftop solar power in case of private roof spaces. Government has announced Decision 13/2020/QD-TTg dated 22 May 2020 on the mechanism of encouraging development of solar power in Vietnam.

There are many shophouse projects in Vietnam and in Hanoi with more and more attractive pedestrian zones including shopping streets, food streets, entertainment streets etc. The Sky Oasis shophouse project is a typical one. This is a subdivision of the Ecopark super project in the southeast of Hanoi (Nam Anh, 2020). The center shophouse street of this project brings owners and residents with business opportunities and high-end facilities.

3.2 Proposals for Sustainable Development of Shophouses

The following proposals for regulation completion and urban design are made based on the analyzes presented in sections 2.1 and 3.1.

The proposal of regulation completion aims to minimize unnecessary legal risks and helps shophouse products develop sustainably, playing an appropriate role in the new urban areas.

There should be legal documents that clearly define a shophouse as a low-rise townhouse with two functions: residential and commercial businesses or services. Distinguished from shophouses, the areas in the base blocks of an apartment building, being divided into small areas with multiple floors and internal stairs are called shops.

It is necessary to specify the minimum area and minimum width of shophouses based on the current and future efficiency and suitability. It is also advisable to allow shophouses to provide short-stay accommodation services, either in a shared economic mode or in a professional manner.

The proposal of urban design aims to increase the quality of the indoor and outdoor microclimate comfort, improving the quality of pedestrian zones and urban facilities of shophouse streets.

Shophouse streets should be designed so that each house is accessible from 2 entries and one of the entries should have a pedestrian zone. A pedestrian zone can be an everyday pedestrian street or a transformed pedestrian zone (either on weekends or by events).

The open and nature-friendly space with quick and convenient access is the advantages of shophouse streets compared to commercial centers. So, the arrangement of separate parking areas is necessary to enlarge parking capacity for residents' and visitors' convenience and safety. This is a more practical solution to the current serious deficit of parking places in Hanoi.

In the context of high building density and high land prices in Hanoi, adopting the privately owned public space (POPS) model will help create qualities of public spaces. The Government and private developers cooperate in providing

public space to meet growing demands of the city and people. The policy of “privately owned public space” allows the contribution from the private sectors and bring benefits to the private urban development. This policy is a strong shaping force on the city and transforms commercial districts into enjoyable places (Luk, 2009).

3.3 Criteria of A Smart City

On foundation of digitalization and internet of things (IoT) smart city can provide various services for every citizen and outlanders in a lot of fields, such as tourism, transportation, management, environmental monitoring and conservation and so on. Smart city is a new concept in providing interactive digital services to make urban areas become more efficient, more environmentally friendly, more socially inclusive, while having lower operational costs, which can efficiently serve larger population (Tahir & Malek, 2016).

Six (6) smart city development criteria are: smart economy, smart mobility, smart environment, smart people, smart life and smart governance (Tahir & Malek, 2016). Criteria of **smart economy** (innovation, entrepreneurialism, economic image and trademark, labor market flexibility, global market integration, transform ability (Tahir & Malek, 2016)); **smart mobility** (local and supra-local accessibility; ICT availability; modern, sustainable and safe transport systems (Tahir & Malek, 2016)); and **smart governance** (availability of public and social services, e-government, and transparent governance (Tahir & Malek, 2016)) are closely related to the issues mentioned in section 2.2, 2.3, 2.4. In other words, criteria and solutions to a smart city applied to shophouse streets in new urban areas can effectively deal with the above-mentioned issues.

Specifically, for the issues in section 2.2, “smart governance” will help to work out measures to monitor and apply appropriate sanctions; “smart economy” will give innovative and valuable business that are the answers to the mentioned economic pressures while preserving an attractive and healthy natural environment. Solving problems in section 2.3, “smart mobility” and “smart economy” will increase the number of visitors and shopping activities as well as organize the pedestrian zones. Similarly, smart “governance” will be an effective solution to problems of management in section 2.4.

3.4 Proposals for the Sustainable Development of Shophouses towards Smart City Criteria

Digitalization is a group of platform solutions to promote/maximize the potentials of the shophouses in sustainable development according to the criteria of a smart city.

The digitalization of shophouse projects should be started from urban designing, infrastructure designing of each shophouse. After that, all project data will become community’s property. These data will be used for managing, operating, maintenance and upgrading at need.

Along with the development of ICT, many technological infrastructural systems will be able to be integrated into traffic management systems, public facilities systems (lighting, watering, fountains etc.), security systems, surveillance and remote-control systems and so on. The aforementioned digital platform helps to collect and analyze a lot of information which are the bases for procedure optimization, resources and funds utilization.

The smart city digital platform can provide direct support for shophouses. For example, the Roadside Service Availability – RSA algorithm can be implemented to share resources of business entities in a smart city. The business entities can digitalize their commercial service with address, GPS location, service type, availability, etc. (V, T, & T, 2020).

4. Conclusion

The approximately 200-year history of development shows that shophouses have a lot of potentials for sustainable development in Hanoi. To understand the core value and suitable development solutions, it is necessary to distinguish a shophouse from a townhouse. A shophouse needs to be defined as a 3 - 5 floor townhouse with both residential and commercial or service functions.

In parallel with the completion of legal bases related to shophouses, it is necessary to have policies to help this type of dwelling develop sustainably, becoming attractive and possessing features of new urban area projects. Among those policies, in case of high population density and high land prices in Hanoi, it is necessary to study regulations on privately owned public space (POPS). For the sustainable development of shophouses, appropriate urban design solutions are required. Each shophouse must have separate entrances and one of which should be connected to a pedestrian zone. Other issues such as parking, landscape spaces are also need to be concerned.

With economic characteristics, shophouse streets can play a significant role in the implementation of digitalization, ICT infrastructure development, integrating services of a smart city.

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