

URBAN RENEWAL APPLICABLE TO AN INCREASE IN DENSITY: CONCEPTUALIZATION OF COMPACT-KDT IN VIETNAM WITH HANOI AS A CASE STUDY

Tran Minh Tung^{a,*}

^a*Faculty of Architecture & Planning, National University of Civil Engineering,
55 Giai Phong road, Hai Ba Trung district, Hanoi, Vietnam*

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Abstract

Urban renewal projects are becoming more and more active, especially in public-owned gold land plots in Vietnam's cities center. The re-development of these land resources known as the residentialization: transformation of different land-use functions into new residential areas (also new neighborhoods) - the KDTM (Khu Do Thi Moi abbreviated in Vietnamese) - is increasing the urban density in these areas. Vietnam uses three factors to control urban density: building density; number of floors and/or height of the building; floor area ratio. The current tasks of land-use policies are the determination of an urban density that can adapt to the development of urban space; take full advantage of the land value increment, boost investments without causing any consequences because of the overcrowded population. The residential units will be called compact units when their (occupancy) density exceeds the threshold of 300 persons/ha. For the Compact-KDT concept (compacted KDTM), it is recommended to have: (1) the average level of compactness corresponding to the density of 300 to 600 persons/ha; (2a) the high level of compactness to be controlled - 600 to 1200 persons/ha; (2b) the high level of compactness to be strictly controlled and applied in some exceptional cases - 1200 to 2000 persons/ha; (3) the extremely high level of compactness to be avoided - more than 2000 persons/ha. A Compact-KDT always guarantees the functions of a "normal" KDTM, there are some functionalities that should be added: organization of land-use and spatial functions; public spaces; internal traffic; and reducing energy consumption and the use of non-recyclable natural resources. Rather than being passive to fluctuations in urban density, this increase can be accommodated with a calm and fair attitude by analyzing adverse consequences and the benefits of this process, not just negative effects for the development of urban space, the concentration of population and the economic growth of cities.

Keywords: urban renewal; urban density; new urban areas/new residential areas (KDTM - Khu Do Thi Moi); residentialization; (new) compact urban areas (Compacted KDTM/Compact-KDT).

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1. Introduction

After a long period of division, wars, and stagnation of the subsidized economy, with the introduction of Doi moi reform in 1986, the concept of urban growth in Vietnam is currently well underlined. From the perspective of land-use development and corresponding to each phase of development, it is possible to guide a city's development in consideration of one out of the following three models: (1) urban growth associated with urban land expansion; (2) urban growth associated with increasing

*Corresponding author. E-mail address: tungtm@nuce.edu.vn (Tung, T. M.)

population density on existing urban land; and (3) urban growth in combination of these two types [1]. In fact, in addition to increasing urban land that has implications for peri-urban areas (which is also a concern of many Vietnamese and foreign researchers), urban growth on the basis of increasing the compactness of existing built area is immature because it still lacks theoretical and practical approach methods. This leads to the “arbitrary” in each way of processing different projects from different developers. Sometimes managers and specialists in the field of urban architecture remain perplexed, as they do not know how to comment or discuss the problems arising when they have too many opinions, multiple points of view, some of which can be even conflicting, but all these will eventually be justified in the context of transition in the cities of Vietnam.

The research methods used in this article include data collection and compilation, analysis and correlation studies which proved to be appropriate at the first stage of a long-term research, this study aims to:

- Introduce the concept of Compact-KDT model in Vietnam with better defined criteria, threshold of compactness, as a branch of the fairly well-known KDTM model;
- Transform the compact city model into the urban context of Vietnam in line with the legal framework as well as the concept;
- Link the Compact-KDT model to urban renewal projects which transform old urban functions into new residential areas to help orientate the development and management of these projects, based on rational exploitation of urban resources (land, infrastructure, attractiveness ...).

2. Need for urban renewal and the process of residentialization in Vietnam

Before the French withdrew from Vietnam (in 1954), they had played a key role in the systematization and completion of the Vietnamese urban network based on the administrative and territorial divisions from the Nguyen dynasty. After 1954, as Vietnam was divided, the cities developed in two entirely different modes influenced by two ideological extremes:

- In the South, with the financial support of the Americans, cities were built through militarization - civilian cities with presence of the army;
- In the North, with the support of the Soviet Union and other socialist countries, urban spaces were developed in a context of financial shortage.

The similarity of urban planning in Vietnam's cities in this period is that there were many plans and urban projects proposed but not executed or implemented as patchwork because of the conflicts and demolitions of war for over 30 years (1954–1975). During the period of post-war reconstruction (1975–1986), because the economy encountered many difficulties as well as the policies in subsidized economy were unclear and did not bring remarkable results, the cities were mainly the functional transformations of existing urban buildings/territories. The urban renewal of this period went one-way, with almost no participation of individuals and companies [2], the state held the dominant position in the implementation of policies and funding.

After 1986, especially since the establishment of the Land Law (in 1993), when the right to use land as a kind of commodity (even a valuable commodity) was recognized, urban renewal took place more vigorously, resulting in several changes on cityscape day after day. The private sector was allowed to participate in the national economy, calling for resources from abroad that made urban renewal projects so exciting, especially on gold land plots in the city center that had previously been public, industrial or residential facilities operated and managed by state-owned enterprises (of central or local government). With the status and value of the land of potential, if an appropriate development model can be found, it will bring huge profits. In fact, the re-development of this valuable source of

land is the functional transformation of land into modern residence - new urban areas in the form of massive (re)new housing projects at a high level of concentration. In terms of concept, this process is called residentialization.

The concept of residentialization appeared in France in the 1990s from the improvement of the living environment of social housing built hastily after the Second World War to meet urgent demand of urban housing for residents. “Designed as a panacea against the phenomenon of social deskilling, residentialization comes as a result of the relative inefficiency of conventional rehabilitation operations on the living conditions of residents. This approach, which aims to reduce ill-defined problems (incivilities, social deskilling) to problems of urban form, curiously proposes a program of urban integration by creating spatial entities folded on themselves” [3]. Thus, on the one hand, the term of residentialization can be interpreted more precisely as the improvement of the residence or the sustainablization of the residence. On the other hand, this term is also synonymous with the term of gentrification, which is often translated into Vietnamese as *embourgeoisement* or as urban improvement which determines a process of renewal of residential neighborhoods already depreciated and/or replaced by those which are more affluent (to ensure that there will be financially viable and profitable returns on the investments of this renewal). Later, however, the term residentialization is used to mean that the process of demolition-transformation of former non-residential areas (such as public, industrial, green areas or other specific functions . . .) into residential neighborhoods.

So, urban renewal is related to residentialization to a certain extent. Currently, in Vietnamese cities, there are a number of urban renewal trends in the form of residentialization:

- The renovation of old residential neighborhoods, including degraded housing, replaced by new housing projects. It is possible to call this renovation urban improvement. The typical example of this trend is the transformation of KTT model (Khu Tap The in Vietnamese, also known as collective housing estate) into KDTM (Khu Do Thi Moi in Vietnamese, also known as new urban area or new residential area);
- The transformation of former industrial estates or industrial parks (which used old technologies and polluted the surrounding areas), into residential neighborhoods, mainly in the form of KDTM, depending on the scale of re-development projects, which are normally large-scale;
- The transformation of existing public facilities into residential neighborhoods. These facilities were operated in the past, however, they no longer satisfy the current demand and become useless;
- The transformation of other specific spaces into residential neighborhoods. Depending on the original functions of the transformed spaces, the corresponding type of residentialization will be established.

3. The relationship between (increasing) density and urban renewal

According to the general recognition on the urban density, there are three components:

- Residential density (dwelling unit per hectare) is the number of dwelling units per unit area, including gross and net residential density;
- Occupancy density (person per dwelling unit) is directly linked to income, space costs and spatial requirements at the household level, that is, the number of people in each dwelling unit;
- Population density (person per hectare) is the consequence of residential density and density of occupancy, expressed in terms of the number of land-users on specific area of land (total area of land for gross population density, land area carrying dwellings for net population density).

However, Vietnam often uses the following three factors to manage construction and control the density of urban development:

- Building density (%): including gross/net density, density of the set/of each section/of each function of building, defined as the proportion of the area of land which is occupied by the building;
- Number of floors and/or the height of the building: Nh;
- Floor area ratio FAR: the ratio of the total area of the building to the area of the land.

For the three factors above, the first two factors are well underlined in the spatial planning in Vietnam, while the last factor is the consequence of these first two: building density = FAR \times Nh. While building density is strictly regulated for each type of building or urban area, the control of building height appears unclear and is not based on the scientific foundation. This leads to the demand-supply mechanism in an arbitrary way. Normally, urban managers in Vietnam limit the height of buildings to ensure the aesthetics of the city. This caused confusion for citizen in which high-rise building is the main reason for planning failure. The fixing of the building height and the building density for each urban project can be shown in the master plans, zoning plans and the detailed planning on scale 1/500. Currently, this is not yet possible for Vietnamese cities, especially in the fast-growing cities where the processes of urban renewal are rapid.

The building density reflects the scale of the projects, the efficiency of land use and how profitable an investment can be. The higher index means the higher construction surface and the larger investment. In the context of extremely high land price, high building density secures high profit returns for development. For housing development, the higher building density is equal to the increase of residential areas, and population density which will put pressure on the technical and social infrastructure of the city and a huge impact on the environment. This influences the attractiveness of the projects, more generally, the attractiveness and competitiveness of the city. In reality, the building density also demonstrates the need for social equity in terms of land-use rights and obligations, which are a content of social justice. Many countries have imposed higher taxes when the actual ratio of development projects is higher than the planning index.

In terms of aesthetic and visual quality, with the same building density, if the FAR is lower, the Nh becomes higher, the empty surface of the city will be larger (more non-built spaces). This does not only satisfy the requirement of beauty (meaning) but also facilitates the reduction of air pollution, dust, and creates more spaces for green development and leisure activities. In addition, FAR is an important index which has been widely applied in the planning systems of many countries to regulate and control urban density. Thus, the future trend in urban management in Vietnam will at the same time be in compliance with the building density and the FAR, which ensure on the one hand the increase in the density for the efficiency of the investments, particularly in urban renewal projects, and on the other hand the ventilation of the city and protect the area of land for public function (non-built public spaces).

The current trend is the determination of a reasonable urban density that reconciles the development of urban spaces, the benefits and location of land by contributing to urban growth and promoting investment, limiting the consequences of overpopulation in some urban areas. This trend is commonly known as ecodensity/eco-density or ecodensity/eco-density [4, 5].

In Vietnam, there are two simultaneous processes of increasing land values and urban density:

- The expansion of urban spaces through the urbanization in peri-urban areas, as well as the increase in density and land values (economic value and residential value) through investments in new technical infrastructure (conversion of rural into urban land). This process usually takes some time to accumulate population and infrastructure because people suspect and expect the possibility of success of the territories. So, the process of land value increment is slower and sometimes there is the circumstance in which the buyers are waiting for infrastructure to be completed while the developer

expect the flow of capital to boost infrastructure development;

- Land restructuring in existing urban areas through residentialization, combined with an increasing in population density (conversion of old city into new city land). This way (re)accumulates more quickly the population because the infrastructure is already established, hence, people can easily imagine their living conditions, and trust in the success of the territory. To take advantage of the (often very high) land values of these areas, and by ensuring profits, investors often develop their projects in terms of quality of construction, quality of service and quantity of beneficiaries - all these result in a significant increasing in urban density.

As such, the urban renewal plots of the city center are becoming the hottest areas of the city. In fact, if the operators invest in the project on these land plots, they must find the benefits, at the same time, by saving the time of the projects and increasing the number of housing units. Urban areas renovated by residentialization are generally known for their characteristics described as follows:

- Their housing is relatively luxury, but the type of housing is often scarce, almost no type of housing could really be luxury to the small number of floors, for example, villas, garden houses etc., because these types of houses occupy so much land. They are often replaced by public or service facilities to ensure the legality requested by the managers as well as to convince customers about various types of amenities accompanied in a residential project. The term luxury will refer to multi-storey buildings - considered a popular product of the industrialized city period - also creating luxury multi-storey buildings or luxury apartments (penthouse, duplex apartment, triplex apartment etc.);

- The dwelling units in the projects, normally apartments, often have larger area due to the larger number of rooms (moderately 3 to 5 rooms), toilets (normally equal or superior to the number of the rooms), more open spaces, more complex and complete apartment structure;

- The buildings have more floors, varying from 25 to 35 floors or higher in some cases, up to 40 or even 50 floors, compared to other residential areas currently varying from 20 to 25 floors (previously from 15 to 20 floors). This is a consequence of the simultaneous increase in the area and number of housing units mentioned above. When urban managers in Vietnam control urban density and set planning control through two factors: building density (which often tends to be lower in urban management) and floor area ratio (which often tends to increase when project implement), so the height must obviously be raised.

4. Urban compactness and the possibility of applying the Compact-KDT concept

4.1. Determination of a Compact-KDT with urban compactness

The compactness of the city is described through five factors called 5 D's [6]:

- Density - increasing according to the context;
- Diversity - the use of mixed and diverse spaces - promoting the relationship among the workplace, housing and services, including several options for different types of housing, business opportunities, green spaces, multi-function and social amenities;
- Design - narrowly linked streets and lanes, intended for public transport, for gentle traffic (pedestrian, bicycle) - which means walkable city;
- Destination - the concentration of population and/or employment creating a destination by high levels of access to services for the benefit of the residents;
- Distance - the increase of accessibility and the closer distance (for pedestrians) to public transport, green spaces and public facilities.

However, it is important to distinguish between the compactness of spaces and the density of the building. Urban compactness is a concept in which density is only an indicator. The compact city, based on the minimization of the traveling distance, has the attributes of walkable city. Thus, besides the density of construction, urban compactness is also determined by the diversity and concentration of land-use function, which allows for the greatest possible increase in opportunities in a certain distance [6]. In other words, increasing density is just a necessary condition for creating a compact city.

The compact city has already been a very popular concept in the world, but in Vietnam, it seems very new and controversial, especially regarding the question: to which extent should density of population/construction be called compactness? Perhaps, in the current context of Vietnam, the compactness of the city must pay more attention to the human scale. So what is a Compact-KDT in comparison to a KDTM normally established by theoretical basis of Vietnamese residential units?

The original model of the neighborhood unit proposed a population of 5000 to 9000 persons on an area of 160 acres, or about 64 hectares. Thus, the population density will range between 80 and 140 persons per ha, corresponding to the thresholds of the low-average density. The model of the residential unit in Vietnam proposed a population of 4000 to 20000 persons in an area of 50 to 100 hectares [7]. Thus, the population density varies between 40 and 400 persons per ha. This density corresponds to the thresholds between the average density and the high density. Compared to the model of the neighborhood unit and considered as the original theory of Vietnam's residential unit, its density is higher. This could be explained with the neighborhood unit model introduced in the early twentieth century when population pressure and population concentration were not high. For example, in Hanoi, the demographic statistics in 2009 showed that a ward, managed by urban district, has an average surface area of 158 hectares and an average population of 16653 persons [7]. The average density is about 100 persons per ha. Even for the most compact districts in Hanoi, their average density is not reaching the threshold of 400 persons per ha as the maximum threshold of the theoretical concept of the residential unit, such as Hoan Kiem district: 280 persons per ha (529 ha, 147334 persons), Ba Dinh district: 250 persons per ha (922 ha, 225910 persons), Dong Da district: 370 persons per ha (996 ha, 370117 persons), Hai Ba Trung district: 310 persons per ha (960 ha, 295726 persons), and the average density of these 4 districts is about 300 persons per ha (3407 ha, 1039087 persons) (Population data of Hanoi is based on the source of the National Bureau of Statistics, until 01/04/2009).

Thus, from the theory and practice, the residential unit will be called compact neighborhood when the density exceeds the threshold of 300 persons per ha, which corresponds to the average, high and very high density (Table 1).

Then, with the population of 4000 to 20000 persons per residential unit (i.e. 1000 to 5000 dwelling unit per residential unit), the area of a compact residential unit corresponding to each density threshold will be shown in Table 2.

Thus, according to the regulations in force, a "normal" KDTM having the scale equivalent to a residential unit will have a scale up to 50 ha (in some cases, the projects with 20 ha as minimum scale can also be approved with some additional conditions), so for a Compact-KDT (of which population is equivalent to that of a residential unit), depending on the level of compactness, one can have a different minimum area. In other words, the area should not be considered a single indicator to determine the scale of a Compact-KDT. The most important indicator is the compactness level which is based on population density:

- (1) The average-level of compactness - corresponding to the density of 300 to 600 persons per ha;
- (2) The high-level of compactness - corresponding to the density of 600 to 2000 persons per ha;

Table 1. Population thresholds for density classification

	Residential density (dwelling unit per ha)	Population density (person per ha)	Residential floor density (m ² per ha)	Floor area ratio (time)
Low	< 15	< 60	< 1500	0.15
Low-average	15–40	60–160	1500–4000	0.15–0.4
Average	40–120	160–480	4000–12000	0.4–1.2
High	120–500	480–2000	12000–50000	1.2–5.0
Very high	> 500	> 2000	> 50000	> 5.0
According to [6]		According of the author's conversion in Vietnam conditions		

Notes: Temporary average of occupancy density of 4 persons per ha, temporary average of Residential floor of 25 m² per person.

Table 2. The size of a compact residential unit corresponding to the different compactness levels

Density threshold (compactness level)	AVERAGE				HIGH						VERY HIGH
Population density (person per ha)	300	400	500	600	700	800	900	1000	1250	1500	≥ 2000
Residential density (dwelling unit per ha)	75	100	125	150	175	200	225	250	313	375	500
Mean “residential unit” area per person (m ² per person)	33	25	20	17	14	13	11	10	8	7	5
Minimum area of “compact residential unit” (ha)	13	10	8	7	6	5	4	4	3	3	2
Maximum area of “compact residential unit” (ha)	66	50	40	33	29	25	22	20	16	13	10
Housing height corresponding to the population density (floor)	6	8	12	25	35+						

Notes: Housing height corresponding to the population density - Temporarily refer to the Urban Designer Australia's EcoDenCity proposal for the height and shape of buildings corresponding to the urban density for the city of Sydney [5]. After reviewing and checking, the author thinks temporarily that we can apply this proposal to Vietnamese cities while waiting for the correct proposals based on aggregate data and actual surveys.

(3) The extremely high level of compactness - corresponding to the density of more than 2000 persons per ha.

However, according to the regulation “the minimum 8 m² per person for housing standard” of Vietnam Building Code (QCVN 01:2008/BXD), i.e. 1250 persons per ha, the maximum level of compactness will be also 1250 persons per ha, which corresponds to 313 dwelling units per ha and

they can be rounded up to 1200 persons per ha or 300 dwelling units per ha. Thus, if the level of compactness exceeds the threshold of 1200 persons per ha or 300 dwelling units per ha, the Compact-KDT should be examined and evaluated with greater caution, at the same time accompanied by some additional conditions to avoid the negative variation to be difficult to control. Therefore, the level of compactness can be divided into:

- (1) The average-level of compactness - corresponding to the density of 300 to 600 persons per ha;
- (2a) The high-level of compactness to be controlled - corresponding to the density of 600 to 1200 persons per ha;
- (2b) The high-level of compactness to be strictly controlled, applied in some exceptional cases - corresponding to the density of 1200 to 2000 persons per ha;
- (3) The extremely high level of compactness to be avoided (in the current conditions of the technology of construction and urban management in Vietnam) - corresponding to the density of more than 2000 persons per ha.

5. Conceptualization and possibility of applying the Compact-KDT

As such, it is possible to list the keywords for the concept of a Compact-KDT:

- Compactness and economy - through the consumption of less urban space per area for the safeguarding of land and against the expansion of the city;
- Diversity and mix-used functions - instead of the mono-functionalization in land use according to traditional planning;
- Community interaction and social communication - by reducing the physical distance to improve human contacts in spaces on a human scale;
- Balance and rationality - towards a harmony between demands and possible impacts;
- On-site and nearby - by maximizing the capacity of self-sufficiency, minimizing external dependence and improving the comfort of the living environment;
- Public circulation and soft mobility - in the close and external relationship with the surrounding neighborhoods (of the city), internal between the components of the neighborhood (within the neighborhood).

Thus, a Compact-KDT always guarantees the functions of a residential unit as “normal” KDTM, but because of its compactness, it should be added some factors:

- Organization of land-use and spatial functions - Land use in a (more) economic way which respects the principle of reinforcing the coherence of spaces according to a mixture of functions that maximizes activities both in time (the different activities corresponding to different times) and in space (the vertical development replacing the horizontal one, that is to say, the functions are super-imposed rather juxtaposed). The use and maximization of the intrinsic physical factors of the neighborhood units, as well as adjacent neighborhoods, will contribute to the creation of the ambiance and habitat environment;

- Public spaces - Improving the quality of public spaces (exclusive or integrated with other spaces). In particular, the creation of mixed-use housing (public spaces accompanying housing to encourage the participation of inhabitants in supply and diversification of services). These public spaces create the spirit of the entire residential neighborhood to a safe and convenient place, encourage residents to go out, facilitate communication and human interaction instead of just improving the quality of the interior of the home which makes the inhabitants lazy;

- Interior traffic - Cars are limited, at least within the neighborhood. So it is necessary to determine the areas of the cars (except the specialized cars) by arranging the car parks in the periphery, close to

the places with connections to the transport system. In common, inter-neighborhood helps to prevent cars from passing through the neighborhood. Encouragement of soft traffic (pedestrians, bicycles ...) is necessary - the scale of the Compact-KDT ensuring pedestrian distance, so the middle of the streets inside will be smaller (just enough for specialized vehicles, such as car deliveries, firefighters, ambulances ...), sidewalks are laid out, reinforced security and friendly with the daily activities on the street (daily/periodic markets, shops, small restaurants, walks, neighborhood communication, etc.). The development of public transport within the neighborhood should be closely linked to the public transport system of the city, in particular to the main urban axes (Fig. 1);

- Reducing energy consumption and the use of non-recyclable natural resources - Green buildings are integrated into residential neighborhoods based on the principles of energy efficiency, energy balance consumed and energy produced, which encourage self-sufficiency in energy for equipment, machinery, as well as for the inhabitants (food, victuals ... on site through urban agriculture within the neighborhood, for example, shared gardens, community gardens, agricultural parks ...). Buildings, existing facilities (in the case of urban renewal) will be benefited by providing the heritage spaces, creating the unique characters for the neighborhood as well as the historical continuity of the city. It is also better to reduce the cost of the investment. Waste is recycled or reused, such as gray wastewater is treated for reuse, such as watering plants in streets and parks, and black wastewater that is technically transformed into fertilizer.

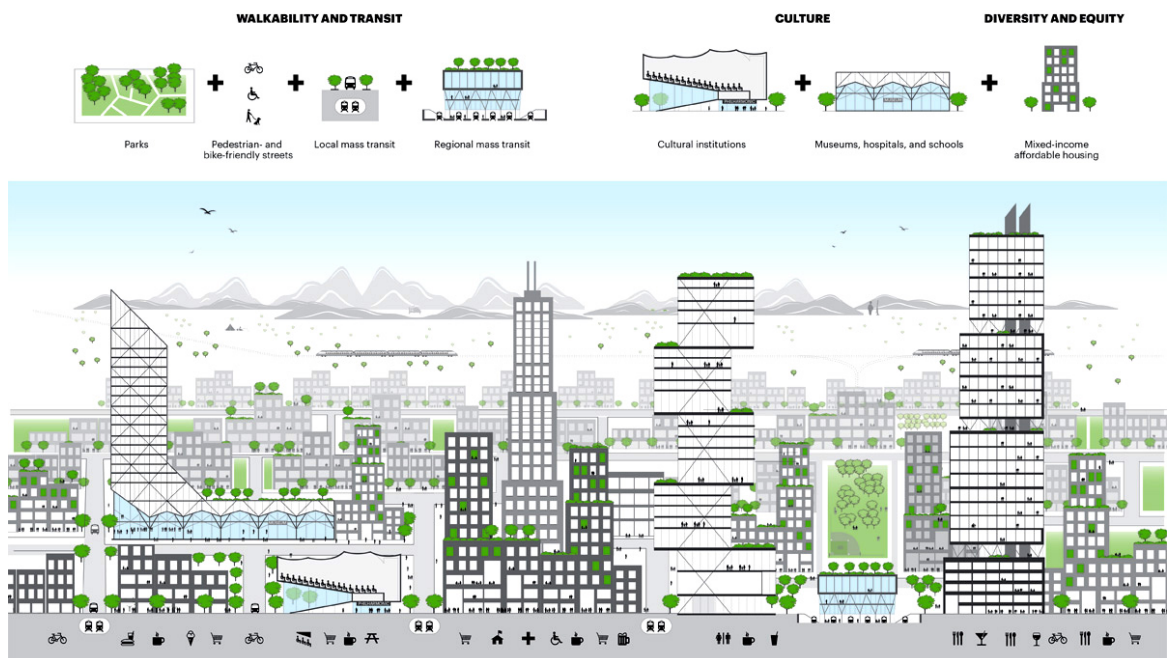


Figure 1. Compact city is also walkable city of culture and diversity [8]

So, to ensure balance between the supply and the operation of urban infrastructures, the Compact-KDT will be found:

- Along the public transport routes (main bus lines, BRT buses, urban railways, metros ...) - with a concentrated population of the district, on the one hand, the public transport routes will allow a large amount of passenger flows, on the other hand these public transport lines will quickly reach the minimum threshold of passenger services to promote their role and the rapid return of capital;

- In and around nodes, urban poles and major intersections, public transit nodes - these are the most concentrated areas with social and technical infrastructure in the city. Therefore, with a large population, the demand of residents could gain a quick response. The rental of the neighborhood also ensures an appropriate distance between living area and public amenities;

- At the periphery of open spaces - to reconcile gross densities (construction/residential/occupancy), at the same time exploit open spaces, strengthen surveillance and avoid the desolate situation of these spaces, create an attractive place for communities;

- In urban areas where public investment is concentrated - to promote and improve the efficiency of public investment. They are also playing a strategic role for the restructuring of urban spaces in the regular direction of urban managers and specialists;

- In some high investment sectors of the private sector (for example, around the commercial center or functional complex) - to attract and encourage private investment, and to create attractive nodes/poles of urban growth based on the population concentrated on the site and in the surrounding areas.

6. Conclusion

Urban renewal process in Vietnam was always associated with increasing density by maintaining the density of the building and establishing a new, higher floor area ratio to gain more profits from land redevelopment, especially when land in the city center is considered a valuable resource because of its scarcity and limitation. Thus, the increase in urban density in the city center is an inevitable trend, in which urban renewal projects through residentialization will become important catalysts to accelerate this process. Rather than being passive to fluctuations in urban density, this increase can be accommodated with a calm and fair attitude by analyzing all the adverse consequences and the benefits of this process, not just a negative effect for development of urban space, the concentration of population and the economic growth of cities.

A reasonably high urban population density will be achieved through (1) mixed-use planning, and (2) maximum utilization of transit capacity which will reduce the need for energy and other resources, improve the quality of the environment and the efficiency of land use. Therefore, the determination of the concepts of Compact City and Compact-KDT will be necessary in the future, so that the component spaces of the city can re-produced towards a more rational use of urban, natural and human resources. Urban compactness will be implemented step by step, through projects of (re)new residential neighborhoods, in the form of Compact-KDT. For the sustainable and dynamic urban development, the control on the levels of compactness will always be interesting and essential to secure the best efficiency of each district and the whole city.

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