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**URBAN RAIL-BASED DEVELOPMENT
IN HO CHI MINH CITY**

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REGIONAL AND URBAN PLANNING DOCTORAL THESIS SUMMARY

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ABBREVIATIONS

GFA:	Gross Floor Area
HCMC:	Ho Chi Minh City
LRT:	Light Rail Transit
MRT:	Mass Rapid Transit
RBD:	Rail-based Development
TOD:	Transit Oriented Development

INTRODUCTION

The rail transit has been “imported” to HCMC to solve the city’s traffic overload. But all effort to build rail system may fail if we cannot make this kind of transit become a good choice to people. The actual state of HCMC urban space has a lot of barriers for rail-based development like motorcycle; sprawling; compensation, reallocation, ... Meanwhile, the real estate market along the rail-transit line has grown very fast when it just only in construction stage. It is both potential and challenging to this type of development. Therefore, a research that systemize and propose a pattern, method and solutions for rail-based development is really necessary.

1. Aims and objectives of study

- a. *Aims:* promoting HCMC rail-based development
- b. *Objectives:*
 - Propose a pattern of rail-based development in accordance to the context of Ho Chi Minh City
 - Develop an assessing method for identifying characteristics and potential of urban rail-based development
 - Suggest rail-based development solutions for HCMC

2. Subject and scope of study

Subject: Urban space associated with rail-transit in different level: rail station, rail line and rail network

Spatial scope: space around planned rail network of HCMC

Time scope: until 2020 và vision after

3. Terminologies

- *Urban Rail Transit* is a type of railway that serves the daily travel needs of passengers in the city or surrounding areas; These may include MRT, LRT, monorail, tram.

- *Urban Space* is composed by architectural objects, greenery, water bodies that set up physical perception of urban.
- *Spatial development* is considered to be a positive change of urban space, including landscape and architecture in terms of scale, quantity, density, form, function, etc. within the limitation of space and time, interacting with other physical and non-physical elements of the city
- *Rail-based development (RBD)* is a pattern of urban spatial development associating with rail transit.

4. Method and procedure of study

a. Research approaches

This thesis chooses simultaneously two ways of approach: *first from the bottom up*, through practical survey of similar urban areas in the world, as well as the current situation inventory of urban space around the planned railway stations in HCMC; *second is the top-down* by comparison these inventory outcomes with the theoretical, policy, legal and management systems of the cities in the world.

b. Spatial level of study

The main and basic spatial level of research is station area within walking distance and feeder transit served, called RBD unit.

c. Research methodologies

- *Collecting Data Methods*: archival data collection; inventory, site survey; observation; mapping; case study
- *Processing Data Methods*: morphological, historical, logical analysis; statistic, comparison, assessment; modelling; multi-criteria assessment; analyzing, synthesizing, systemizing;

d. Research Procedure

The research procedure includes 7 steps:

- *Step 1: Archival data synthetic (both theoretical and practical)*
- *Step 2: Inventory, observation on world case studies*
- *Step 3: Ho Chi Minh city site survey and observation*
- *Step 4: Synthetic, analytic, assessing and identifying*
- *Step 5: Propose pattern, method, solutions*
- *Step 6: Discuss and compare outcomes in practice and theory*

5. Theoretical and practical significations of thesis

a. Theoretical significations

- Contribute to clarify the nature of rail-based development; thereby suggesting an appropriate approach in the context of Ho Chi Minh City;
- Set up criteria to apply the RBD model in the specific context of area in Ho Chi Minh City and other similar urban areas.

b. Practical significations

- The RBD method will be the basis to choose the appropriate actions for rail-based development in Ho Chi Minh City
- Specify design guidelines for HCMC rail-based development
- Establish basis for practical developments around the railway in Ho Chi Minh City

CHAPTER 1-OVERVIEW OF RAIL-BASED DEVELOPMENT

1.1 Rail-based development in the word

1.1.1 Brief history of rail-based development

Historically, urban development booming starts with rail, but then cities is dominated by personal vehicles like car or motorcycle. Now rail transit is coming back to be one of main motivations of urban development.

1.1.2 Railway transit statistic and the signification of RBD

There are more and more railway transit systems be built in the world is rational to the actual state of urbanization. Railway is just only effective when it is integrated with urban development, providing new values to cities in terms of environmental, social and economic aspects.

1.1.3 Diverse manifests of Rail-based development in the world

- In Europe: railway systems have been built long ago and deeply integrated into urban form. RBD in Europe now mostly concentrated in revitalizing stations and promoting surrounding public spaces.

- In American and Oceania: whilst urban form was dependent to car and abundant land resources, RBD mission in American and Oceania is to change residents' travel habits and overcome urban sprawl.

- In Asia: large population creates the challenges of developing urban infrastructure in most of Asian mega-cities. RBD in Asia cities are to seek their own harmonious balance development model in between the lessons of European and American cities.

1.2 Rail-based development in Ho Chi Minh City

1.2.1 Brief history of railway in HCMC

Railway appeared early in Saigon, contributed significantly to shape urban structure; then abandoned and motorcycle dominated.

1.2.2 Railway system planning and spatial planning in HCMC

Ho Chi Minh City railway system has legally based in general urban masterplan and transportation planning.

1.2.3 HCMC urban space status

Sprawling development, motorcycle culture, shophouse landscape, high-rise apartment blocks and sidewalk economic are brief contemporary portrait of HCMC urban space.

1.2.4 Legal system of planning in context of HCMC

The system of urban planning and management has many obstacles to apply rail-based development model.

1.2.5 Real-estate market in related to railway in HCMC

The start of construction urban railway initially created the blossoming of estates surrounding planned stations, but not fully promote the true nature and advantages of this development type.

1.3 Literature overview

There are two main approach: first is specific to one line or one station area in HCMC and second is on general planning, policy and management of railway as a mode of transport within whole city.

1.4 Identify the issues and thesis objectives

1.4.1 Summarize the issues of rail-based development in HCMC

1.4.1.1 On railway as means of transport

Railway in HCMC face challenges in finance, technology, compensation in construction stage, then the attitude of commuters in term of travel habit and the luxury real estate fast circling the station area as well as the status of urban structure in terms of population and employment distribution in large area.

1.4.1.2 On urban spatial development associated to railway

There is not legal base for urban development model in associated to railway system.

Finance, management and action mechanism have not had a unified policy for the RBD.

Many properties are fast constructing now without design guidelines, planning standards made for rail-based development.

1.4.2 Define research objectives

Thesis focus on spatial development, figure out that the main approaches to overcome the challenges of RBD in HCMC are:

- to form a **RBD pattern** suited to HCMC context as *the base* for development around railway transit
- to create a **RBD method** as *the tool* for considering the interoperability between specific context and RBD pattern
- to choose appropriate **RBD solutions** in related to result of RBD method apply to each context of HCMC urban space.

CHAPTER 2. SCIENTIFIC BASIS FOR HO CHI MINH CITY RAIL-BASED DEVELOPMENT

2.1 Theories

2.1.1 Transit-oriented development theory

Transit-oriented development (TOD) is a compact and mix-use community within distance of 2000 feet (approx.600m) from the transit station.

Transit-Oriented Community (TOC) has 5Ds principles: density, diversity, design, distance and destination.

2.1.2 Urban morphology theories

RBD morphological study is to examine both aspects of external form in parallel with internal structure, in both terms of space- time continuum and socio-cultural and political contexts.

Form-based code is a means of regulating land development to achieve a specific urban form based on transect. The regulations and standards in Form-Based Codes, presented in both diagrams and words, are keyed to a regulating plan that designates the appropriate form and scale (and therefore, character) of development rather than only distinctions in land-use types

Each area developed within the walking radius around the rail station is conventionally regulated to follow an appropriate form

depending on the location within transect zones, which specifies the parameters to shape and function of buildings and open spaces for administrating accordingly.

2.1.3 User-oriented transportation theories

Travel, from its nature, is the connection between the one place to another place, or in other words, travel is connecting places. RBD is the work of creating places, and these places must create an environment that satisfies the needs of using the rail transit. The quantitative scale of the RBD unit can be calculated on the basis of the traffic capacity of the railway transit.

2.2 RBD inventory and case studies

2.2.1 Mapping analysis and morphological analysis

By mapping, morphological analysis, it could be summarized the RBD characters as follows:

- *Density*: most of highest density area are within rail transit station walking distance. There are various ways of reaching high density, not only high-rise construction.

- *Diversity*: urban space around transit station is diverse in many aspects, namely road network, building forms, function, population composition, historical characteristics, etc.

- *Accessibility and walking comfortability*: well-organized and pedestrian-friendly space within walking distance from railway station will maximize the effectiveness of rail transit

- *Community-oriented and place identity*: each of successful RBD case has its own identity and all of them accumulates numbers of urban residents living in the area, creating a certain attraction on the overall sites connected by the rail network

2.2.2 Experiences from case studies and survey

- High density development, connecting throughout the underground to high-rise in New York.
- TOD strategic plan of Denver.
- TOD standard (ITDP) applied in Vancouver.
- Reallocating land-use and value capture for Tokyo RBD.
- Rail + Property (R+P) in Hongkong.
- Social Housing and MRT in Singapore.
- Feeder tuk-tuk and vendor around Bangkok Skytrain station
- Motorcycle parking within metro station in Taipei

2.3 HCMC context and status of planned rail station areas

2.3.1 Context of HCMC in RBD perspectives

In terms of legal framework, the HCMC's general spatial plan needs to be integrated, inherited and concretized in the RBD model.

In terms of climatic conditions, HCMC is completely located in a tropical climate with two separate rain and dry seasons, having a great impact on the decision to use railway transit.

In terms of economy and finance, HCMC must consider all the RBDs as the tool to bring about a long-term, sustainable socio-economic development.

In terms of social aspects, as the central gateway urban, converging people from all over the country and the world, the RBD in HCMC needs to reach consensus, participation of diverse residents, from normal users, to investors and municipal authorities.

2.3.2 Planned station area site survey in HCMC

In terms of *urban structure*, HCMC now has a spontaneous integration of functions at work, play, entertainment, but still the state of monocentric and pendulum traffic.

In terms of *urban form*, there are three types: the *traditional* type has been originally planned, the *modern* type of new urban development and the *spontaneous* type of sprawling residential areas.

In terms of *urban status*, there are two cases: undeveloped areas (including planned ones) and existing areas (which may have a long history of development).

CHAPTER 3. HCMC RBD PATTERN-METHOD-SOLUTIONS

3.1 Propose RBD pattern for HCMC

3.1.1 RBD concept

Each railway station and the areas within 600m radius around the station is considered to be a RBD unit. In actual space, this RBD unit may have different shapes on the basis of an average time to the station is 10 minutes walking.

Each RBD unit is the key feature to promote the spirit and place identity of their surrounding area and then to the entire city.

Each RBD unit has place-oriented structure and spatial-temporal continuum form.

3.1.2 RBD principles

- Optimize density of users (including resident, employer and customer within the RBD area and surrounding)
- Integrate *diversity* of functions, users and building forms, public open spaces
- Provide good connectivity to railway station by promoting pedestrian-friendly environment and optimizing the feeder transit, intermodal transportation.
- Enhance publicity and community via organizing space towards safety, security, comfort and aesthetics

- Champion and promote the place existing characters to create a unique identity of each RBD

3.1.3 RBD structure

The RBD structure is primarily reflected in qualitative principles such as *density* and *diversity*, which then affect qualitative principles like *connectivity*, *community* and *identity*.

Each RBD unit will have to fully integrate all three types of place (first place of accommodation, second place of work/study, third place of amusement, entertainment, communication) in different proportion, but have one dominant type of place which have the biggest proportion. The place RBD structure manifests itself through and influence on the spatial structure.

Based on the theory of form-based-code, the proposed RBD structure has spatial hierarchy, presented in two levels:

a. Structure of a RBD unit

Each RBD unit will have a dominant place type which occupied on highest GFA. Concentration of people will be highest in the center of the RBD unit and gradually lowered around.

In each RBD unit, the composition of elements to reach high density is also diverse, manifested differently depending on the location of that RBD unit in the overall urban space.

b. Structure of composing RBD unit

On each railway line, the density is highest in the existing urban core. However, this high-density graph is not purely one-sided parabolic but also tends to be sinusoidal with the top at the station and the middle area between the adjacent stations (less than 1km).

The RBD unit's composition needs to diversify RBD unit types on each line, and also increase the diversity of RBD unit

combinations on the overall urban space, to complement and fulfill to each RBD unit disadvantages.

3.1.3.1 The influence parameters of RBD structure

There are 4 groups of parameters that effect on RBD structure:

- The position of RBD unit in overall urban space
- The role of RBD unit in overall transit / transport system
- The development status of the RBD unit
- The socio-cultural characters of RBD unit surrounding area

Using the RBD method to determine the characteristics and potential of RBD unit, then apply the calculating land use correlation coefficient with railway capacity to determine quantitative parameters and analytical methods to define qualitative solutions.

3.1.4 RBD form

The most important character of RBD form is to create pedestrian-friendly environment, throughout which enhance the community and place identity.

a. Urban block and street pattern

The optimal spatial pattern of RBD unit is grid system with small blocks, clear regular shape and form, maximizing number of junctions in pedestrian network.

Each RBD should have optimal urban blocks size is about 150m x 150m; road network density of about 10km/sq.km; and the pedestrian junction density of about 40-50 knots.

b. Open space and landscape architecture

- *Streetscape*: It is necessary to ensure that the street space is organized suitably to hot and humid tropical climate for pedestrian convenience, security, safety and well-connected.

- *Plaza, park and other natural landscape*: these are the transitional space of passengers on their foot, from the public transport, or other personal vehicles to railway station. Therefore, these landscapes should be well-equipped with facilities such as seating, trash bin, lighting, trees, artwork, signs and signage, billboards, etc., to bring function, information, aesthetical and comfortability to the pedestrian and also contribute the finance of the station management.

c. Built forms in RBD area

Functions reflected dominant place type will be

The functions that represent the dominant place type of each RBD will be prioritized in the proportion of space occupied and the closest connection, most directly to the station. At the same time the dominant place type will also be reflected in the corresponding built forms within RBD unit.

d. Station design and function

The most important characteristic of the railway station design is to compose the transitional space between the rail transit and other types of traffic and with urban space, especially underground space. The *connectivity* is the most important criterion, the second is design solutions ensured diversity, community and identity in transit.

The functional components of station to ensure connectivity should include at least the entrance, waiting area, ticketing, gathering space, public transit (bus, taxi) and paratransit drop-off, etc. and may be also kiss-n-ride, park-n-ride spaces, depending on location. The transitional space in Vietnamese context needs pay more attention to motorbike. Motorcycles parking with parking fee includes to rail

card and also some kind of tuk-tuk style motorbikes should be considered as specific integral component of HCMC railway transit.

3.2 Develop the RBD method for HCMC development

3.2.1 Objective of method

There should be a method to determine the current state of space and future potential development in order to select the appropriate solutions in accordance to specific context and guide the station area development toward the ideal RBD pattern.

3.2.2 Basis of method

The RBD method inherit of criteria has been verified by world theory and practice; added criteria appropriate to the context of HCMC, and the systematic classification of scoring criteria based on the RBD pattern (concept, principles, structure and form)

3.2.3 Criteria system

- Criteria on current urban space characteristics (A)
- Criteria on potential development (B)
- Criteria on market readiness (C)

3.2.4 Method usage

The scores of the three criteria systems are sum up and divided into overall average. Based on the results of the assessment, classifying RBD unit into 3 main categories:

- Prospect type (overall GPA of 0-3.5)
- Standard type (GPA 3.5-6.5)
- Strategy type (GPA of 6.5 or above)

The final results of RBD method will be expressed in series of RBD unit identity code. Each code includes 6 criteria: 1. General information, 2. Location, 3. Morphology, 4. Existing plan, 5. Potentials, 6. Status; 7. Action plan.

3.3 RBD solutions for Ho Chi Minh City

3.3.1 Legal framework and implement process for RBD

3.3.1.1 Apply on urban planning system

- *Strategic masterplan type* along the railway line
- *Station area masterplan or RBD unit masterplan*, especially on underground stations need underground space planning.

3.3.1.2 Apply on urban design

In order to realize the RBD, it is necessary to consider the application of urban design tools, as process rather than drawings. Urban design can be either typical design (not location-dependent) or detailed design for specific place. Urban design may be both guidelines, coding, or action plan, actual activities.

3.3.1.3 Implementing procedure

The implementation of planning/design projects is in sequence from top to bottom, from planning to design, then to guidelines, constructing. However, it may also depend on the circumstances in which the subject matter may be public or private or public-private partnership; may not be sequential or may not be applied to all areas.

3.3.2 Promoting policy for RBD

- Value-capture policy for RBD
- RBD incentives
- Housing and Rail
- Assessing-based policies

Each RBD unit will be applied the corresponding development policies in related to RBD code defined in the outcome RBD method. The planning of an RBD network needs to combine a wide range of strategic, standard and prospect areas to fully integrate dynamic and resources for development.

3.3.3 Spatial design and action plan solutions for HCMC RBD

3.3.3.1 For urban space along railway line

Structure Planning along the railways should balance dominance place types and balance the demand for two-way traffic at different times, ensuring the principles of diversity, density and realizing the city's multi-centric development model. Applying the *transfer development right* (TDR) tool for development of RBD unit on the same railway line.

3.3.3.2 For urban space around railway station

Main solutions for RBD unit in HCMC is *reallocation*.

3.3.3.3 For railway station

Each railway station not only design in accordance to basic standards but also ensuring other features such as: convenience stores; food stalls; motorcycle parking; transitional area; station plaza; underground and elevated connection with surrounding

3.3.3.4 For each separate development in RBD unit

The RBD parameters are realized to each separate development project at four levels of influence:

- RBD-0: *the developments right above or next to the railway station, having directly connection to the station.*
- RBD-200: *the developments adjacent to the station but not have directly connection to station (within 200m radius)*
- RBD-600: *the developments in walking distance to station (within 600m radius)*
- RBD-2000: *the developments in connection to the railway station via feeder transit (within 2km radius)*

CHAPTER 4. DISCUSSION OF THESIS OUTCOME

4.1. Apply RBD method on metro line 1 – Ben Thanh Suoi Tien

Overall, the existing core stations (Ben Thanh, Opera House) have the highest score on RBD identification and market readiness, while the development potential is low due to most occasional land are no longer available, whilst renovation and transformation is really costly due to high land values and many strict regulations. These terminal areas are classified as Strategic, which serves as a driving force for development around other stations in the same line.

	Ga số 1. Bến Thành		Ga số 2. Nhà hát TP		Ga số 3. Ba Son		Ga số 4. Văn Thành		Ga số 8. Rạch Chiếc		Ga số 6. Thảo Điền		Ga số 7. An Phú		Ga số 5. Tân Cảng		Ga số 11. Thủ Đức		Ga số 9. Phước Long		Ga số 13. Suối Tiên		Ga số 12. Khu CN cao		Ga số 14. BXe MDông		Ga số 10. Bình Thái	
SỰ SẴN SÀNG CỦA THỊ TRƯỜNG	10	8,3	6,3	9,1	6,7	7,4	7,0	6,3	5,9	1,1	2,7	3,0	0,4	1,9														
TỀM NĂNG PHÁT TRIỂN	4,8	3,0	6,8	4,7	7,8	5,0	5,8	7,8	4,8	9,3	5,0	5,3	8,3	5,8														
ĐẶC ĐIỂM PKGDs	8,8	9,1	5,6	5,6	4,2	5,8	5,1	4,0	5,1	1,0	3,9	2,0	0,6	1,5														
THANG ĐO TIỀM NĂNG PKGDs	RẤT CAO		CAO		TRUNG BÌNH		THẤP		RẤT THẤP																			
THANG ĐO ĐIỀU KIỆN HẠ TẦNG	RẤT TỐT		TỐT		TRUNG BÌNH		KÉM		RẤT KÉM																			
HẠ TẦNG KỸ THUẬT	8,2	8,5	6,2	6,3	4,0	6,1	5,0	4,7	5,7	1,6	4,4	1,9	1,1	2,2														
HẠ TẦNG XÃ HỘI	9,0	9,2	5,2	5,6	4,0	6,1	5,3	3,8	5,2	0,7	4,0	2,6	0,7	1,7														
THU HÚT ĐẦU TƯ	7,4	5,6	6,6	6,9	7,3	6,2	6,4	7,1	5,3	5,2	3,9	4,2	4,3	3,8														
	<i>CHIẾN LƯỢC</i>				<i>TRUNG GIẠN</i>								<i>TỀM NĂNG</i>															

From the assessment, the potential of RBD along the metro line 1 is on-going in accordance to the development general trend of a mono-centric city like HCMC. This progress is also in line with the reality of attracting investment development along the metro line 1 in

the recent time when there are a series of new investment projects such as Vinhomes Tan Cang, Vinhomes Golden River Ba Son, Masteri Thao Enter, Gateway Thao Dien, ...

4.2. Discussion on thesis findings

- *Contribution to the General Plan and development process of HCMC:* The combination of RBD units on the railway network and grid will create unique characteristics and promote effects of the RBD pattern to city living environment. This is also the basis for adjusting the approach of the existing urban planning and management system of Vietnam, which is based mainly on the planning theory of neighbourhood since the centralized planning system. Thus, it has a big warping between planning outcome and the real development in the current market.

- *Contribute to the general theory and practice:* the RBD pattern has been inherited from TOD concept and case studies, but have new approach in place structure and transect-oriented development management, while integrating into the legal framework of urban planning and management processes of HCMC and Vietnam.

4.2.1. Additional research suggestions

The RBD method need to be improved in terms of detailed scoring criteria, being verified to suit the context, level and trend of development in each period and each specific area.

CONCLUSION AND RECCOMENDATION

I. CONCLUSION

The rail-based development used to be a major trend in the formation of human settlement of the early industrial revolution and

is now returning to a new trend in the 21st century, incorporated into action plans of many cities towards of sustainable development.

From theoretical to practical, successful RBD cases need to overall integration, from the selected model to the implementing method, to realize the tissue. Then, each solution is specific to each place and location, in accordance to its actual conditions.

1. *The RBD pattern proposed to HCMC has following characters:*

1.1 *RBD Concept*

- The RBD model will based on the composing RBD units, each of which has the core is railway station and the area within pattern 600m radius around the station (about 1km²)
- Each RBD unit has *place-oriented structure* and *spatial-temporal continuum form*.

1.2 *RBD principles:*

- Optimize *high density* of users
- Integrate *diversity* of functions, users and building forms, public open spaces surrounding.
- Provide good *connectivity* to railway by optimizing feeder transportation and promoting pedestrian friendly environment.
- Enhance publicity and *community* via organizing space towards safety, security, comfort and aesthetics
- Champion and promote the place existing characters to create unique *identity* of each RBD in overall railway system and urban space.

1.3 *RBD structure*

- Each RBD unit will have to fully integrate all three types of place (first place of accommodation, second place of work/study, third place of amusement, entertainment,

communication) in different proportion, but have one dominant type of place which have the biggest proportion.

- Place proportion and dominant place type is the basis to determine population/employment/service parameters and then define the size, location, shape of urban space.
- The RBD structure is spatially hierarchical, expressed in two levels: RBD unit structure and RBD unit composing structure, influenced by 4 groups of parameters: RBD unit location in overall urban space, RBD unit role in overall transit / transport system, development status of RBD unit, socio-cultural characters of RBD unit surrounding area.

1.4 RBD form

- RBD form reflect its structure: diverse forms, prioritized dominant place type in terms of maximizing spatial occupancy and directly connecting to railway station
- RBD unit has high density of road and pedestrian route network, small urban blocks; high quality environment, expressed especially on street scape in terms of continuity, consistency, diversity and human scale harmonious.
- Architectural types for RBD mostly are complex and flexible, including: shophouse, high-rise condominium with commercial podium; multifunctional complex; and perimeter development.
- Each station will be an urban landmark, at the same time incorporate unified characters of the railway line and its specific features. Station design need to promote good connectivity; integrate convenient facilities that suit to HCMC climate (roof, escalator, ventilation fan, ...) and socio-cultural conditions (motorcycle, vendor, food, beverages, ...).

2. The RBD method for identifying the current characteristics and development potential:
 - The RBD structure and form characteristics actually are in the ideal state. So there needs RBD method as an assessment tool to determine the existing state and the potential for development to establish the basis for choosing development solutions.
 - The method is based on three criteria systems: *character identification*, *development potential*, *market readiness*. The *character identification* criteria will be the fundamental base to select structural and spatial design solutions; while the *potential development* and *market readiness* criteria are a pair, similar to the supply-demand rules to identify solutions in accordance to development process. An integrated assessment of these three criteria will classify each RBD unit into three main categories: strategy, standard and prospect.
3. **RBD solutions for HCMC** including 3 main groups:
 - 3.1 *Legal framework*
 - RBD oriented planning and design standards
 - Add to legal planning and design system: strategic planning along the railway lines and urban design, typical design and feature place landscape design.
 - 3.2 *Promoting policies*
 - Strategy RBD units: the motivated point for whole lines; exploiting economic efficiency of commercial and communication facilities; value capture by various tool, like tax-increment financing; air right transfer, etc.;

- Standard RBD units: stipulates the compulsory social housing rate, in combination with incentive; implies the public utilities; optimize the connection;
- Prospect RBD units: reserve land for long term development; giving priority to large capital investors for synthetic development; public investment for initial infrastructure to motivate and attract developments

3.3 *Design and implement*

To balance the structure of place type structure along the route by urban planning; upgrading the quality of space by urban design; implemented with the mechanism of land acquisition and redistribution, on-site resettlement; set development parameters based on RBD assessment method and in accordance with distance correlation with station (RBD-0, RBD-200, RBD-500, RBD-2000).

II. RECCOMENDATION

The thesis was done in the context that HCMC is constructing the first railway line but not yet been put into use. The contribution of the dissertation is necessary to prepare for rail-based development. However, the research model has not been tested in practice in HCMC when the rail transit comes into operate.

Recommendations from the dissertation findings are as follows:

1. *Central Government*: to create favorable conditions for financial mechanisms and policies, programs related to RBD such as social housing, low-income housing, public space attached to the railway.
2. *MoC*: formulated standards and norms for RBD, which demonstrates the principles of the RBD pattern and at the same time legalizes all types of urban planning and design in related to railway

3. *HCMC*: prioritizing the land fund and planning mechanism of planning in order to carry out RBD pilot project, especially the areas along the metro lines 1, 2 which are deploying, exemplifying, to provide the basis for further deployment in other lines in the future.
4. *Universities, training institutions and research institutes*: To consider and supplement scientific research subjects related to RBD.
5. *Other organizations*: To propagate and mobilize urban residents to use the rail transit, aiming to build a new metro culture, turning each railway station into a healthy, harmonious and sustainable place.

PUBLICATION RELATED TO THE THESIS

1. Vu Viet Anh (2013), “Urban Design with TOD”, *Kiến trúc Việt Nam Journal No. 3/2013*, p.32
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